



**CITY OF SWEET HOME**

**CONTRACT DOCUMENTS**

**FOR**

**SWEET HOME WATER TREATMENT PLANT  
FINISHED WATER AND BACKWASH  
PUMPING SYSTEMS IMPROVEMENTS**

Department of Public Works, Engineering Division

1400 24th Avenue

Phone 541.367.6359

November 2021

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**CITY OF SWEET HOME**

**SWEET HOME WATER TREATMENT PLANT  
FINISHED WATER AND BACKWASH PUMPING SYSTEMS IMPROVEMENTS**

**November 2021**

**DESIGN CERTIFICATION**

The Technical Specifications contained herein have been prepared by, or under the responsible charge of, the following registered person(s):

**West Yost Associates**  
Preston VanMeter, PE  
General, Civil, Mechanical  
License # 51615PE



EXPIRES : 6/30/2022

**ACE Engineering LLC**  
Allan T. Goffe, PE, SE  
Structural  
License # 64239PE



EXPIRES 6/30/2023

**Landis Consulting**  
Benjamin E. Perry, PE  
Electrical  
License # 86683PE



EXPIRES: 12-31-2022

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**CITY OF SWEET HOME, OREGON**  
**CONTRACT DOCUMENTS**  
**FOR**  
**SWEET HOME WATER TREATMENT PLANT**  
**FINISHED WATER AND BACKWASH PUMPING SYSTEMS IMPROVEMENTS**

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	Contract
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16135 Boxes and Enclosures

16150 Wiring Connections

16447 Low Voltage Motor Control Centers (MCC)

**CONTRACT DOCUMENT**

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FOR CONSTRUCTION OF

**CITY OF SWEET HOME  
WATER TREATMENT PLANT FINISHED WATER AND BACKWASH  
PUMPING PROJECT**

Department of Public Works, Engineering Division  
1400 24th Avenue  
Phone 541.367.6359

Issued November 10, 2021

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## INSTRUCTIONS TO BIDDERS

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Sealed bids for the **WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT** will be received on behalf of the City of Sweet Home by Greg Springman at 1400 24<sup>th</sup> Ave, Sweet Home, OR 97386 until bid closing time of **2:00 PM local time on Tuesday, December 14, 2021**. Immediately following the closing time, the bids shall be opened and publicly read. The outside of the Bid envelopes shall be clearly marked **WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT** and show (1) the Bidder's name, (2) the Bid Opening time and date and (3) the Bidders CCB license number, and shall be delivered to the City of Sweet Home by or before the above listed bid closing time.

The City will require that for projects greater than \$100,000, the "First-Tier Subcontractor Disclosure Form" as contained in the bidding documents, be submitted with the bid documents in a separate sealed envelope by the Bid Closing or within two working hours of the Bid Closing, not later than **4:00 PM local time Tuesday, December 14, 2021**. The envelope shall be clearly marked "**Disclosure Form for WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT**", and shall include (1) Bidders name, and (2) the submittal time and date deadline. Bidders who fail to submit the required disclosure will be considered non-responsive. Immediately following the disclosure deadline, the bids shall be opened and publicly read. **Submittals by Facsimile or Electronic Data Interchange (EDI) will not be accepted.**

Contract specifications, and plan sets – in PDF file format –, may be obtained from the Bids and RFPs menu off the Government on the City of Sweet Home website at <https://www.sweethomeor.gov/rfps>. Questions about the project elements may be directed to Trish Rice, Engineering Technician, Sweet Home Public Works, 1400 24<sup>th</sup> Avenue, Sweet Home, Oregon, 97386, contact by phone at 541-818-8037, or email [price@sweethomeor.gov](mailto:price@sweethomeor.gov).

Each bidder must possess or have access to the 2021 Oregon Standard Specifications for Construction. These are available online at: [https://www.oregon.gov/ODOT/Business/Pages/Standard\\_Specifications.aspx](https://www.oregon.gov/ODOT/Business/Pages/Standard_Specifications.aspx)

No bid shall be received or considered unless the bidder is registered with the Construction Contractors Board for construction projects or licensed with the Landscape Contractors Board for landscaping projects.

Bidders Checklist: All prospective bidders must include the following:

- Each bid must contain a statement as to whether the Bidder is a resident Bidder, as defined in ORS 279C.365. In determining the lowest responsible bidder, the City of Sweet Home will, for the purpose of awarding the Contract, add a percentage increase on the bid of a nonresident bidder equal to the percentage, if any, of the preference given to that bidder in the state in which the bidder resides.
- All bids shall contain a statement declaring that the Bidder agrees to comply with the provisions of ORS 279C.800 to 279C.870 regarding payment of prevailing wages and the Bureau of Labor and industries fee.
- The project bid document set, with names and corporate information of the bidder, schedule of prices completely filled out, additional addendum items if any; however, project drawings do not need to be included.
- The First-Tier Subcontractor Disclosure Form as noted above.
- Each bid must contain Surety and Bond information.
- A 10% bid bond, certified check, or cashier's check shall accompany each bid on all projects and shall be forfeited if the bidder fails to enter into a Contract with the City of Sweet Home within ten (10) days after the date of the Notice of Award.

The City may reject any bid not in compliance with all prescribed public procedures and requirements, and may reject for good cause any and all submittals upon a finding of the City that it is in the best interest to do so, as determined solely by the City.

**BID**

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To the Honorable Mayor and City Council  
City of Sweet Home, Oregon 97386

**BIDDER'S DECLARATION AND UNDERSTANDING**

The undersigned Bidder declares that the Contract Documents for the construction of the proposed improvement have been carefully examined; that the site has been personally inspected; that the Bidder is satisfied as to the quantities of materials, items of equipment and conditions or work involved including the fact that the description of the quantities of work and materials as included herein is brief and is intended only to indicate the general nature of such items and to identify the said quantities with the detailed requirements of the Contract Documents; and that the bid is made according to the provisions and under the terms of the Contract Documents, which documents are hereby made a part of this bid. The bidder has received and considered the following Addenda to specifications, if any, of revisions and/or additions to the plans; No. \_\_\_\_\_ to No. \_\_\_\_\_, inclusive; Plan Revision Sht. No. \_\_\_\_\_; Plan Addition Sht. No. \_\_\_\_\_.

The minimum bid submittal requirement for this project shall include this Bid form and schedule(s) of prices, bid bond as required, first-tier subcontractor form and all other required attachments. All Contract Documents are included in this Bid by reference, whether attached or not.

The Bidder further declares that the only persons or parties interested in this bid are those named herein: that this bid is in all respects fair and without fraud: that it is made without collusion with any official of the City of Sweet Home, and that the bid is made without any connection or collusion with any person making another bid on this Contract.

The Bidder further declares that the provisions required by the Oregon Revised Statutes ORS 279C.800 relating to Prevailing Wage Rates shall be included in and made a part of the Contract. The Bidder further declares that all applicable sections relating to Public Contracts as set forth in ORS 279A to 279C have been complied with in making this bid, and, as required, shall be made a part of the Contract Documents as completely as if the same were fully set forth herein.

The Bidder further declares that they are registered, or shall become registered if awarded a contract, with the Construction Contractor's Board, and possess such additional licenses and certifications as required by law for the performance of the Work proposed herein as required by OAR 812.

The Bidder further agrees that its own judgment has been exercised regarding the interpretation of subsurface information and all data, which it believes pertinent from the Engineer, Owner, and other sources in arriving at these conclusions, have been utilized.

**CONTRACT EXECUTION, BONDS AND CERTIFICATES OF INSURANCE**

The Bidder agrees that if this bid is accepted, a Contract with the City of Sweet Home, Oregon, will be executed within ten (10) days after the date of the Notice of Award, in the form of Contract annexed hereto, and will at that time, deliver to the City of Sweet Home the Performance and Payment Bond required by Subsection 00130.4 of the Oregon Standard Specifications for Construction (as revised), the certificates of insurance as specified in these documents, and will, to the extent of this bid, furnish all machinery, tools, apparatus, and other means of construction and do the work and furnish all of the materials necessary to complete the work in the manner, in the time, and according to the methods as specified or shown in the Contract Documents.

It is the intent of the City of Sweet Home to award the Contract to the lowest responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Contract Documents and does not exceed the funds available. The City of Sweet Home shall have the right to waive informalities or irregularities in a Bid received and to accept the Bid which, in the City of Sweet Home's judgment, is in the City of Sweet Home's own best interest. In submitting this Bid, it is understood that the City of Sweet Home reserves the right to accept or reject in part or in whole, any and all bids received, to adjust the scope of the work within reasonable limits, to postpone award for a reasonable time, or award to the selected firm or contractor any subsequent engineering design and construction services contract, part or in whole, for recommended capital projects as allowed by law. The RFB does not commit the City of Sweet Home to pay any costs incurred to prepare a bid.



**BIDDER**

The name of the Bidder submitting this bid is:

\_\_\_\_\_ (Name)  
 \_\_\_\_\_ (Address)  
 \_\_\_\_\_ (City, State, Zip)  
 \_\_\_\_\_ (Telephone)  
 \_\_\_\_\_ (Email)  
 \_\_\_\_\_ (Federal Tax ID No)  
 \_\_\_\_\_ (Construction Contractor Board No)  
 \_\_\_\_\_ (Workers' Comp Ins. Co.)  
 \_\_\_\_\_ (Workers' Comp Policy/Binder No)

The above Bidder's name and address is the address to which all communications concerned with this bid and with the Contract shall be sent.

In accordance with ORS 279C.365, Bidder hereby declares that it (circle correct designation) **is / is not** a resident Bidder. If the bidder is non-resident, indicate \_\_\_\_\_ % preference of your state resident bidders.

In accordance with ORS 279C.800 to 279C.870, Bidder hereby declares that it complies with provisions for labor, materials, Industrial Accident Fund, liens, withholding taxes, and employee drug testing.

The names of the principal officers of the corporation submitting this bid, or of the partnership, or of all persons interested in this bid as principals, are as follows:

_____	_____
_____	_____
_____	_____

**If Sole Proprietor of Partnership:** IN WITNESS hereto the undersigned has set his/her hand this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_ (Signature of Bidder)  
 \_\_\_\_\_ (Title)

**If Corporation:** IN WITNESS WHEREOF the undersigned corporation has caused this instrument to be executed and its seal affixed by its duly authorized officers this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_ (Name of Corporation)  
 \_\_\_\_\_ (By)  
 \_\_\_\_\_ (Title)  
 \_\_\_\_\_ (Attest)

Secretary (Mandatory Signature)



(SEAL)

## CONTRACT

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THIS CONTRACT, made between the CITY OF SWEET HOME, a municipal corporation, hereinafter called "Owner" and \_\_\_\_\_, hereinafter called "Contractor".

### WITNESSETH:

The Contractor, in consideration of the sums to be paid and other covenants herein contained, agrees to perform and complete the work herein described and to furnish all necessary machinery, tools, apparatus, equipment, supplies, materials, and labor and perform all work in accordance with the 2021 Oregon Standard Specifications for Construction, the Special Specifications bound herewith, and in accordance with such alterations or modifications of the same as may be made by the City, and according to such directions as may from time to time be made or given by the Engineer under the authority and within the meaning and purpose of this Contract. This agreement shall be binding upon the heirs, executors, administrators, successors, and assigns of the Contractor.

The applicable Drawings, the Oregon Standard Specifications for Construction, the Special Specifications, and the Schedule of Contract Prices bound herewith are hereby specifically referred to and by reference made a part hereof, and shall by such reference have the same force and effect as though all of the same were fully inserted herein.

The Contractor shall faithfully complete and perform all of the obligations of this Contract, and in particular, shall promptly, as due, make payment of all just debts and obligations incurred in the performance of said Contract and shall not permit any lien or claim to be filed or prosecuted against the City.

The Contractor, its subcontractors, if any, and all employers working under this Contract are subject employers under the Oregon Workers' Compensation Law and shall comply with ORS 656.017, which requires them to provide workers' compensation coverage for all their subject workers.

The Contractor agrees to protect, indemnify, and hold harmless the Owner, its officers, agents, and employees harmless against any and all loss, claims, or suits (including costs and attorney's fees) for or on account of injury to or death of persons, damage to, or destruction of property belonging to either the Owner or others occurring by reason of the act or neglect of the Contractor, Contractor's employees, or agents (including subcontractors) in connection with the performance of this Contract.

It is expressly understood that this Contract shall be governed by the laws of the State of Oregon. The statutes of the State of Oregon for public works contracts, specifically but not exclusively ORS 279C, as amended or superseded, including the latest additions and revisions, are incorporated by reference as part of the contract documents, and the party contracting with the Owner hereby covenants and agrees to comply with all of the obligations and conditions applicable to public contracts pursuant to ORS 279C as though each obligation or condition were set forth fully herein. In addition, if the contract identified above calls for a public improvement as that term is defined by ORS 279A.010, the party contracting with the Owner further agrees to comply with all obligations and conditions applicable to public contracts for public improvements pursuant to ORS 279C as though each obligation or condition were set forth fully herein.

The Contractor further declares by the signing of this Contract that all the provisions required by ORS 279A to 279C relating to Public Contracts, Purchasing, and Prevailing Wage Rates for work performed under the Contract with the Owner are made part of this Contract as completely as if the same were fully set forth herein.

In consideration of the faithful performance of all of the obligations herein set out and in consideration of the faithful performance of this Contract, the Owner agrees to pay to the Contractor the amount earned, as determined from the actual quantities of work performed and prices and other basis of payment specified, taking into consideration any amounts that may be deductible, under the terms of the Contract.

The Contractor agrees to complete the work within the time specified herein and to accept as full payment hereunder the amounts computed as determined by the Contract Documents and based on the said bid.

Said improvements shall be completed by the date specified in said Contract Documents and if not so completed, unless said time for completion is extended, as provided in the Contract Documents, or if extended, if the same is not completed within the time extended, the City will be caused to incur liquidated damages as specified in the

Contract Documents. Liquidated damages shall be retained out of any monies due or to become due under this agreement.

Payments shall be made as provided in the Contract Documents.

Should suit or action be undertaken to enforce any of the terms of this agreement or to seek damages for its breach, the prevailing party shall be entitled to an award of its reasonable attorney fees, including those incurred on appeal.

IN WITNESS WHEREOF the parties hereto have executed or caused to be executed by their duly authorized officials, the Contract and affixed their respective official seals.

**CONTRACTOR:**

**OWNER:  
CITY OF SWEET HOME, OREGON:**

APPROVED AS TO FORM:

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

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

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

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

By: \_\_\_\_\_  
Public Works Director

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

By: \_\_\_\_\_  
City Manager

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

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

*(Note: Signatures of two officers are required for a corporation.)*

\_\_\_\_\_  
Corporation Tax No. (if incorporated)

\_\_\_\_\_  
Social Security No. (if individual)

**BID BOND**

---

DATE. \_\_\_\_\_

BOND NO. \_\_\_\_\_.

AMOUNT OF BID: \_\_\_\_\_ (\$).

KNOW ALL MEN BY THESE PRESENTS, that we

\_\_\_\_\_  
*(Name of Contractor)*

as Principal, hereinafter called the PRINCIPAL, and

\_\_\_\_\_  
*(Name of Surety)*

a corporation duly organized under the laws of the State of \_\_\_\_\_ having its principal place of business at \_\_\_\_\_, in the State of \_\_\_\_\_, and authorized to do business in the State of Oregon, as SURETY, hereinafter called the Surety, are held firmly and bound unto the City of Sweet Home, Oregon, as Obligee, hereinafter called the OBLIGEE, in the sum of

\_\_\_\_\_ Dollars & Cents (\$ \_\_\_\_\_), *(10% of total contract price)*

for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS BOND IS SUCH THAT:

WHEREAS, the PRINCIPAL is herewith submitting his or its Bid for \_\_\_\_\_, said Bid, by reference thereto, being hereby made a part hereof.

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contracts Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and materials furnished in the prosecution thereof, or on the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

A certified copy of the agent's power-of-attorney must be attached hereto.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
PRINCIPAL

\_\_\_\_\_  
SURETY

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

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

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

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

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

**PAYMENT BOND**

---

DATE. \_\_\_\_\_

BOND NO. \_\_\_\_\_

TOTAL BID AMOUNT: \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that we

\_\_\_\_\_  
*(Name of Contractor)*

as CONTRACTOR (Principal), and

\_\_\_\_\_  
*(Name of Surety)*

a corporation, duly organized to do a general surety business in the State of Oregon as SURETY, jointly and severally, bind ourselves, our heirs, executors, administrators, successors, and assigns firmly in the sum of

\_\_\_\_\_ Dollars & Cents (\$ \_\_\_\_\_), *(total contract price)*

to the Owner for the payment of labor, materials, and equipment furnished for the use in the performance of the Contract, which is incorporated herein by reference. The Contractor and Surety, jointly and severally, agree that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments, hereto, upon amendment to the Contract not increasing the Contract Price more than twenty five percent (25%). The term "amendment wherever used in this Bond, and whether referring to this Bond, the Contract, or the loan documents, shall include any alteration, extension, or modification of any character whatsoever.

With respect to the Owner, this obligation shall be null and void if the Contractor: 1) promptly makes payment, directly or indirectly, for all sums due Claimants, and 2) defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment of labor, materials, or equipment furnished for use in the performance of the Contract.

With respect to Claimants, this obligation shall be null and void if the contractor promptly makes payment, directly or indirectly, for all sums due.

A Claimant is defined as persons claiming to have supplied labor or materials, for the prosecution of the work provided for in the Construction Contract, including any person having a direct contractual relationship with the Contractor furnishing the Bond or direct contractual relationship with any subcontractor, or an assignee of such person, or a person claiming monies due to the State Accident Insurance Fund Corporation, State Department of Unemployment Trust Fund, or the Department of Revenue, in connection with the performance of the Construction contract, has a right of action on the Contractor's Board as provided in ORS 279C.380 only if: 1) the person or the assignee of the person has not been paid in full; and 2) the person gives written notice of claim, as prescribed in ORS 279C.605, to the Contractor and the Secretary of State, in the Construction Contract with a state agency, or the clerk or auditor if the public body is other than a state agency.

The intent of this Bond shall be to include without limitation, the terms 'labor, materials or equipment, that part of water, gas, power, light, heat, oil. Gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the work of the Contractor, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

The Contractor and Surety hereby jointly and severally agree with the Owner that every Claimant, who has not paid in full before the expiration of a period of one hundred twenty (120) days after the date on which the last of such Claimant's work or labor was done or performed, or materials were furnished by such Claimant, for which claim is made, may have a right of action on this Bond. The Owner shall not be liable for the payment of any costs or

expenses including attorneys' fees which the Owner may incur in connection with its defense of any such right of action.

No suit or action shall be commence on this Bond by any Claimant: 1) Unless claimant shall have given written notice to the Contractor and the Secretary of State, if the Contractor with a state agency, or the clerk or auditor of the public body which let the Contract if the public body is other than a state agency, within one hundred twenty (120) days after such Claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, or hand delivered in an envelope addressed to the Contractor, and such other entity who is to receive notice, at any place where that party maintains an office, conducts business, or at its residence, or delivered to that location. 2) After the expiration of two (2) years from the date on which the Claimant last performed labor, materials or equipment. Any limitation embodied in this Bond, which is prohibited by any law controlling the project, shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by law.

When the Claimant has satisfied the conditions of the above, the Surety shall promptly and at the Surety's expense take the following actions: 1) Send an answer to the Claimant, with a copy to the Owner, within forty-five (45) days after receipt of the claim, stating the amount that are undisputed and the basis for challenging any amount that are disputed. 2) pay or arrange for payment of any undisputed amounts.

The Surety's total obligation shall not exceed the amount of the bond and any amendment thereto as outlined above, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

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

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

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

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

Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

Definitions: 1) Construction Contract; The agreement between the Owner and the Contractor identified on the signature page, including all contract Documents and changes thereto.

IN WITNESS THEREOF, the parties hereto have caused this bond to be executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

*(Corporate Seal)*

\_\_\_\_\_  
Principal

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

\_\_\_\_\_  
Street/City Address

*(Corporate Seal)*

\_\_\_\_\_  
Surety

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

\_\_\_\_\_  
Street/City Address

*(Corporate Seal)*

\_\_\_\_\_  
Surety Witness:

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

\_\_\_\_\_  
Street/City Address

\_\_\_\_\_  
City of Sweet Home, 1400 24<sup>th</sup> Avenue, Sweet Home OR 97386 *(Owner)*

\_\_\_\_\_  
**WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT** *(Project)*

\_\_\_\_\_  
None *(Bond Modifications)*

**PERFORMANCE BOND**

---

DATE. \_\_\_\_\_

BOND NO. \_\_\_\_\_

TOTAL BID AMOUNT: \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that we

\_\_\_\_\_  
*(Name of Contractor)*

as CONTRACTOR (Principal), and

\_\_\_\_\_  
*(Name of Surety)*

a corporation, duly organized to do a general surety business in the State of Oregon as SURETY, jointly and severally, bind ourselves, our heirs, executors, administrators, successors, and assigns firmly in the sum of

\_\_\_\_\_ Dollars & Cents (\$ \_\_\_\_\_), *(total contract price)*

to the Owner for the performance of the Construction Contract and any extension thereof, and during the twelve (12) month guaranty period which contract, extension and guaranty are incorporated herein by reference.

If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in the following paragraph.

If there is no Owner Default, the Surety's obligation under this Bond shall arise after: 1) The Owner has notified the Contractor and the Surety at its address described on the signature page herein, that the Owner is considering declaring the contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held no later than fifteen (15) days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any subsequently to declare a Contractor Default; and 2) The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty (20) days after the Contractor and the Surety have received notice as provided in the above paragraph; and 3) The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the construction contract in accordance with the terms of the contract with the Owner.

When the Owner has satisfied the conditions of the above paragraph, the Surety shall promptly and at the Surety's expense take one of the following actions: 1) Arrange for the Contractor with consent of the Owner, to perform and complete the Construction Contract; or 2) Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors, which agents or independent contractors shall be acceptable to the Owner; or obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in the following paragraph in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or 4) Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances: 4a) After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefore to the Owner; or 4b) Deny liability in whole or in part and notify the Owner citing reasons therefore.

If the Surety does not proceed as provided in the above paragraph with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen (15) days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to

enforce any remedy available to the Owner. If the Surety proceeds as provided in the above paragraph, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under the second above paragraph, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for: 1) The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract; 2) Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under the second above paragraph; and 3) Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted with two (2) years after Contractor Default or within two (2) years after the Contractor ceased working or within two (2) years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

The Surety shall not be liable to the Owner or others for obligation of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators or successors.

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

Notice to the Surety, the Owner or the Contractor shall be mailed by certified or registered mail or delivered to the address shown on the signature page.

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

Definitions: 1) Balance of the Contract Price; The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

2) Construction Contract; The agreement between the Owner and the Contractor identified on the signature page, including all contract Documents and changes thereto.

3) Contractor Default; Failure of the contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction contract.

4); Owner Default; Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction contract or to perform and complete or comply with the other terms thereof.

IN WITNESS THEREOF, the parties hereto have caused this bond to be executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

*(Corporate Seal)*

\_\_\_\_\_  
Principal

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

\_\_\_\_\_  
Street/City Address

*(Corporate Seal)*

\_\_\_\_\_  
Surety

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

\_\_\_\_\_  
Street/City Address

*(Corporate Seal)*

\_\_\_\_\_  
Surety Witness:

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

\_\_\_\_\_  
Street/City Address

\_\_\_\_\_  
City of Sweet Home, 1400 24<sup>th</sup> Avenue, Sweet Home OR 97386 *(Owner)*

\_\_\_\_\_  
**WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT** *(Project)*

\_\_\_\_\_  
None *(Bond Modifications)*

**FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM**

---

**Project Name:** **WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT**

**Bid Closing Date & Time:** Tuesday, December 14, 2021, 2:00 PM.

**Bid Open Time:** Tuesday, December 14, 2021, 2:00 PM.

**Disclosure Due Date & Time:** Tuesday, December 14, 2021, 4:00 PM.

Bid total greater than \$100,000? \_\_\_\_\_ (Yes / No, if No, subcontractor information is not required).

If the bidder will not be using any subcontractors that are subject to the above disclosure requirements, the Bidder is required to indicate "NONE" on this form.

Bidders are required to disclose information about certain first-tier subcontractors when the contract value for a Public Improvement is greater than \$100,000, see ORS 279C.370. Specifically, when the contract amount of a first-tier subcontractor furnishing labor or labor and materials would be greater than or equal to: (i) 5% of the project Bid, but at least \$15,000 whichever is greater; or (ii) \$350,000 regardless of the percentage of the total project bid, the Bidder must disclose the following information about that subcontractor either in its Bid submission, or within two hours after Bid Closing:

- The name of each subcontractor, and
- The category of work to be performed, and
- The dollar value of the subcontract.

Compliance with the disclosure and submittal requirements outlined herein and in ORS 279C.370 and its amendments is a matter of Responsiveness. Bids that are submitted by the Bid Closing Time, but for which the disclosure submittal has not been made by the specified deadline, are not Responsive and shall not be considered for Contract award.

Subcontractor's Name	Category of Work	Dollar Value of Subcontract

Use additional sheets of this page if necessary.

Submitted by: \_\_\_\_\_ (Bidder & Contact Name), \_\_\_\_\_ (Phone #).

**BID FORM**

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**Bid Schedule**

The Bid amount for each of the Bid Items below must be filled in and completed.

Bid prices shall include everything necessary for the completion of the work stipulated in the Contract Documents, including but not limited to providing materials, equipment, tools, management, superintendence, labor and services. Bid prices shall include all federal, state, and local taxes.

In the event that the addition of the bid item extended amounts does not equal the Total Bid Price, the corrected addition of all the bid item extended amounts will govern and the Owner will correct the Total Bid Price accordingly.

If the Bid Schedule contains neither the item nor the total price for an item, then it shall be deemed incomplete and the Bid shall be deemed non-responsive by the Owner.

<b>Bid Item</b>	<b>Description</b>	<b>Total Bid Price (in figures)</b>
1	Mobilization/Demobilization	\$
2	All other Work required in the Contract Documents	\$
	<b>Total Bid Price</b>	<b>\$</b>

TOTAL BID PRICE (Items 1 and 2)

(in words) \_\_\_\_\_

\_\_\_\_\_ dollars

## PREVAILING WAGE for PUBLIC WORKS CONTRACTS

### OREGON BOLI SPECIFICATIONS

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All the provisions required by ORS 279C.800 through ORS 279C.870 relating to the payment of prevailing wage rates for work performed under the Contract with the City of Sweet Home shall be complied with.

Each worker in each trade or occupation employed in the performance of this contract either by the contractor, subcontractor, or other person doing or contracting to do, or contracting for the whole or any part of the work on this contract, must be paid not less than the applicable state prevailing rate of wage in accordance with ORS 279C.838 and 279C.840.

Each year the Oregon Bureau of Labor and Industries (BOLI) publishes two rates publications (and amendments to both) that are available by calling 971-673-0839 or online at the BOLI website at:

<https://www.oregon.gov/boli/employers/Pages/prevailing-wage-rates.aspx>

Prevailing wage rates that apply to this contract are the **July 1, 2021, Prevailing Wage Rates for Public Works Contracts** in Oregon and most recent **PWR Apprenticeship Rates** on the date of Bid advertisement.

Oregon law requires that the higher of the state prevailing wage rates (PWR) or federal Davis-Bacon rates be paid to workers on projects subject to both the state PWR law and federal Davis-Bacon Act. **WATER TREATMENT PLANT FINISHED WATER AND BACKWASH PUMPING PROJECT** does not use federal funds and does not require Davis-Bacon rates. Only Oregon BOLI Prevailing Wage Rates apply to this project.

If the contractor fails to pay for any labor or services, the City can pay for this labor or services and withhold these amounts from payments due the contractor. ORS 279C.520; OAR 839-025-0020(2)(b).

The contractor shall pay daily, weekly, weekend and holiday overtime as required in ORS 279C.540.

The contractor shall give written notice to the workers of the number of hours per day and days per week they may be required to work. ORS 279C.520(2); OAR 839-025-0020(2)(c)

Contractors and subcontractors are required to prepare weekly certified payroll reports and statements and submit them to the City by the fifth business day of each month (ORS 279C.845; OAR 839-025-0010). Contractor payment will be withheld until the City is in receipt of these certified weekly payroll reports. Information submitted on certified statements may be used only to ensure compliance with the provisions of ORS 279C.800 through ORS 279C.870.

Contractors and subcontractors which are on BOLI's List of PWR Contractors Ineligible to Receive Public Works Contracts, as well as any firm, corporation, partnership or association in which the contractor or subcontractor has a financial interest, are ineligible to receive public works contracts until removed from the list. The current version of the list is available on the BOLI website at:

<https://www.oregon.gov/boli/employers/Pages/pwr-ineligible-contractors.aspx>

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### PAYMENT OF MEDICAL CARE AND PROVIDING WORKERS' COMPENSATION

Oregon BOLI Law ORS 279C.530

The contractor shall make prompt payment for all medical services for which the contractor has agreed to pay, and for all amounts for which the contractor collects or deducts from the worker's wages. ORS 279C.530; OAR 839-025-0020(2)(d)

All subject employers working under this Contract shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its subcontractors complies with these requirements.

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## PUBLIC WORKS BOND

### Oregon Public Contracting Law

In addition to the required payment bond and performance bond, unless exempt under ORS 279C.836 (7), (8), or (9), the contractor and every subcontractor is required to file a \$30,000 Public Works Bond with the Construction Contractor's Board before starting work on the project, to be used exclusively for unpaid wages determined to be due by BOLI.

The contractor shall include in every subcontract a provision requiring the subcontractor to have said Public Works Bond filed with the Construction Contractor's Board before starting work on the project, unless the subcontractor is exempt. The contractor is required to verify that subcontractors, unless exempt, have filed a public works bond before permitting a subcontractor to start work on a project.

The Statutory Public Works Bond form is available from BOLI upon request or may be downloaded from <https://www.oregon.gov/boli/employers/Documents/public-works-bond.pdf>.

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## RECIPROCAL PREFERENCE LAW

### Oregon's Reciprocal Preference Law

Oregon's reciprocal preference law, ORS 279A.120, requires public contracting agencies, in determining the lowest responsible bidder, to add a percent increase to each out-of-state bidder's bid price which is equal to the percent of preference given to local bidders in the bidder's home state. For example, if the low bidder is from a state that grants a 10 percent preference to its own in-state bidders, the Oregon agency must add 10 percent to that bidder's price when evaluating the bid.

OAR 125-246-0310: Reciprocal Preferences.

- (1) When evaluating offers according to OAR 125-247-0255 through 125-247-0260, 125-249-0390 or 125-249-0640 through 125-249-0660, Authorized Agencies must add a percentage increase to the Offer of a Nonresident Offeror equal to the percentage, if any, of the preference that would be given to that Offeror in the state in which the Offeror resides. An Authorized Agency may rely on the list maintained by the Department according to ORS 279A.120(4) to determine:
  - (a) Whether the Nonresident Offeror's state gives preference to in-state Offerors; and if so,
  - (b) The amount of such preference (Percentage).
- (2) Authorized Agencies must add a percentage to the Offer that matches the Percentage described in Section (1) before determining Tie-Offerors in accordance with OAR 125-246-0300.

The National Association of Procurement Officials (NASPO) has gathered information on preference laws of all states. See <https://www.naspo.org/research-innovation/state/OR> for more details. This list is for your use in making contract awards under Oregon's reciprocal preference law. If you are in need of any assistance in the application of this law, please call or contact the State Procurement Office:

State of Oregon  
Department of Administrative Services  
State Procurement Office  
1225 Ferry Street SE, U-140,  
Salem, OR 97301-4285.  
Tel: 503-378-4642.

**PROJECT DRAWINGS (SEPARATE ATTACHMENT)**  
**CONSTRUCTION DETAILS**

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See Attached.

**OWNER'S SPECIAL PROVISIONS**  
**GENERAL REQUIREMENTS AND INFORMATION**

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The General Requirements and Information references, as provided in the Special Provisions I are general in nature, those descriptions and references in the Technical Specification portion of the Special Provision II section are related more specifically to the particulars of the Project.

NOTE: All codes, standards, workmanship, material testing, general items, products, execution, special provisions, measurement and payments etc., are well documented in the Specifications noted above, and are NOT repeated here, but are included herein in whole or in part as reference and shall be applicable.

**DESCRIPTION NARRATIVE OF WORK**

Description of work is summarized in Section 01110 Summary of Work.

**TIME AND PLACE OF RECEIVING BIDS**

Sealed bids will be received at the City of Sweet Home Public Works Department at 1400 24<sup>th</sup> Avenue, Sweet Home, Oregon, at which time as noted in the bid documents, the sealed bids will be publicly opened and read. Bids submitted after the specified time will not be received or opened.

The City of Sweet Home reserves the right to accept the bids and award a contract to the lowest responsible bidder; to postpone the acceptance of the Bid and the award of the contract for a period not to exceed thirty (30) calendar day; or to reject any and all bids received and further advertise the project for bids. The City of Sweet Home may reject any bid not in compliance with all prescribed public bidding procedures and requirements, and may reject for good cause any or all bids upon a finding of the City that it is in the public interest to do so.

The City of Sweet Home reserves the right to accept all, or any component in part, any Bid Schedule (e.g. A, B,...) grouped bid items, or individual bid items as noted in the specifications.

**CONSTRUCTION SCHEDULE**

The work, as described in these Plans and Specifications, is to begin no earlier than that approved by City Council and noted in the Notice to Proceed. Following the Award of Contract, and prior to issuance of the Notice to Proceed, a Pre-Construction meeting will be held, at which the Contractor shall submit a written Work Schedule, Traffic Control Schedule, Erosion Control Plan, or other documents to the Engineer. The Work Schedule shall specify the project work days to be utilized within the allowable completion time. Failure to complete the work within the completion time prescribed shall be considered cause for assessing liquidated damages, as set forth in Paragraph "LIQUIDATED DAMAGES" of Section 00700 General Conditions.

The construction schedule, as approved by the Engineer, will be an integral part of the Contract and will establish interim contract completion dates for the various activities. "Day" used throughout the Contract, unless otherwise stated, means "calendar day". Should any activity not be completed within five (5) days after the stated scheduled date, the Engineer shall have the right to order the Contractor to expedite completion of the activity by whatever means the Engineer deems appropriate and necessary without additional compensation to the Contractor.

It is expressly understood, and agreed, that failure by the Engineer to exercise the option to either order the Contractor to expedite an activity, or to expedite the activity by other means, shall not be considered precedent setting for any other activities.

**TYPE OF BID**

The Bid for the work is to be submitted on a lump sum basis as called for in the Bid. The estimate of quantities of work to be done as tabulated in the Bid, and although stated with as much accuracy as possible, is approximate only, and is assumed solely for the convenience of the Contractor while assembling the Bid.

**BASIS OF AWARD**

Award, if made, will be to a lowest responsible bidder (as defined by O.R.S.) for any combination of schedules as stated above which is determined by the City to be in the City's best interest to award.

## PERMITS

The contractor shall be responsible for acquiring any permits necessary for the completion of the work, i.e. fill & grade, water & wastewater plumbing, stormwater, or building construction on private property.

## INCIDENTAL ITEMS

It is the intent of these documents that the bid items listed in the Bid shall provide full and complete payment for this project, as described in the Plan and Specifications. Payment for any incidental items, whether noted on the Plans and Specifications or not, which are necessary for the completion of the project as designed, but not listed explicitly as or with a bid item, shall be considered to have been included with the Bid.

## PREQUALIFICATION

Prequalification is not required for this project.

## UTILITIES

The utilities shown on the Plans are located to the best degree possible from the information available, but are not guaranteed to be either accurate or complete. The existence of existing utility conflicts, not indicated on the Plans, shall not be the basis of extra work claims except that the cost of extra materials actually required to perform the work, and incorporated into the work, may be submitted for reimbursement in accordance with the General Conditions. The decision of the Engineer, as to the validity of such claims, shall be final. IN ACCORDANCE WITH ORS 757.542 TO 757.562 inclusive, it shall be the responsibility of the Contractor to notify all utility companies and organizations of his intention to begin construction. The Contractor alone shall be responsible for protecting all utilities and replacing utilities damaged by the Contractor during construction.

## LIMITATION / SUBMISSION REQUIREMENTS

The City of Sweet Home reserves the right to:

- Accept or reject any or all bids received as a result of the RFB,
- Negotiate with qualified Bidders, as allowed by law.
- Cancel any RFB, in part or in whole, if it is determined to be in the best interest of the City to do so,
- Award to the selected firm or contractor any subsequent engineering design and construction services contract, part or in whole, for recommended capital projects,
- The RFB does not commit the City of Sweet Home to pay any costs incurred to prepare a bid.

## SAFETY REQUIREMENTS

The Contractor shall have the sole responsibility for complying with the requirements of the Oregon Occupational Safety and Health Code, particularly Division 3, OAR 437-003, "Construction". Failure of the Contractor to comply with specific requirements shall be the Contractor's liability. No liability for safety violations will be assumed by the Engineer, City, or other involved parties. The Contractor shall comply with all Federal, State, County and City regulations.

## PROTECTION OF FACILITIES

The Contractor shall make provisions for protection of all work during the period of construction, and shall repair or replace any facilities damaged by flood, fire, vandalism, neglect, or other means prior to acceptance of the completed facility by the Owner.

## INSPECTION/ENGINEER

The term Inspector, Engineer, or the authorized representative of the Owner, for the purposes of approving materials and workmanship, shall be the City of Sweet Home.

## SPECIFICATIONS

The Contractor shall perform all work in conformance with the contract documents.

## PROJECT WARRANTY

In addition to other specific warranties required by these Specifications, all work, including material and workmanship supplied by the Contractor shall be warranted to be free of defect for one (1) year from the date the written Final Acceptance by the City of Sweet Home. The Contractor also agrees to hold the City harmless from claims of any kind arising from damage due to said defects. The Contractor shall make all repairs, and replacements promptly upon receipt of written orders for same from the Owner. If the Contractor fails to make the repairs and replacements promptly, the Owner may do the Work, and the Contractor and his surety shall be liable for the cost thereof.

## TEMPORARY PROTECTION AND DIRECTION OF TRAFFIC

This shall include all temporary protection and direction of traffic per Oregon Standard Specifications for Construction, ODOT specifications, and as shown on the drawings or as stated herein. Traffic Control shall be per current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

Traffic control devices which are expected to be in place for the duration of the project may be shown on the drawings. The Contractor shall provide such other traffic control devices as may be required at locations where construction is of short duration (i.e., street intersections and access to private property).

Adequate warning protection will be required for pedestrians, residents, and any material stored in a staging area in the right-of-way, or roadway. Nighttime protection with lighted barricades may be required. Emergency vehicles must have access or have access provided when needed.

A traffic control plan shall be submitted to the Engineer for review and approval. Following approval, the plan SHALL BE ADHERED TO AT ALL TIMES. The Contractor may find it necessary to consider various traffic control options for different stages of construction. Limited street closure to through traffic will not be allowed on this project. The Contractor must submit and receive approval from the Engineer prior to any modifications to the approved plan. If, in the opinion of the Engineer, the Contractor fails to comply with the drawings or the approved traffic control plan, or fails to protect the public safety, in addition to other penalties as described in the Standard Construction Specification, payment for this item shall be reduced at the discretion of the Engineer.

The Contractor shall furnish the Engineer with the name and phone number of a responsible person with authority to ensure that the provisions of the plan are complied with, particularly with regard to 24 hour availability to provide a one (1) hour response to problems. The Contractor shall, at all times, protect access to private property.

Access for all residents must be maintained at all times, provide 48 hour written notice to the residents when specific driveways may be out of use. Maintaining access at all times to adjoining properties shall be incidental to the Contract and no extra payment shall be made for work relating to maintaining access, including temporary rock or asphalt necessary for the convenience and safety of the public.

## EROSION CONTROL

As required per DSL, COE, DEQ, and any other National permits. All construction activities shall conform to City NPDES permit and Stormwater Control Best Management Practices.

Erosion control measures shall protect excessive sediment runoff into catchbasins or ditch channels located at or near the work areas. Material deposits in excess must be removed by the contractor. The City of Sweet Home will not provide removal. This will include control of runoff from any areas used for staging when or if the staging area is in a portion of the street right-of-way.

## FINAL CLEANUP

Final cleanup of all work sites or staging areas shall remove construction materials, equipment, debris, and dirt or gravel from all surfaces, as well as from catch basins and storm drains, that may have been impacted by construction activities. This may also include periodic street sweeping regularly since there are local residents within the work zone.

## LIQUIDATED DAMAGES

Liquidated Damages provisions on this project shall be accordance with Section 00700 General Conditions.

## BONDING REQUIREMENTS

A performance bond and payment bond in the amount of 100% of the contract price shall be furnished to the City of Sweet Home upon executing the contract.

A warranty bond for one year is required from the date of the acceptance by the City. The City of Sweet Home shall be named on the bond as the project Owner.

## QUALITY CONTROL TESTING

The Owner reserves the right to perform any testing as may be required to determine compliance with the specifications. Costs for such testing shall be the Owner's responsibility unless testing indicates noncompliance. Costs for such testing indicating noncompliance shall be borne by the Contractor. Noncomplying Work shall be corrected and testing will be repeated until the Work complies with the specifications. Contractor shall pay any costs for retesting non-complying Work.

The Contractor shall cooperate in every respect with the activities of the testing agency.

## PROPERTY PIN AND SURVEY/GPS MONUMENT PROTECTION

All property pins adjacent to and within the work area shall be protected from disturbance. If property corners are disturbed during the course of the work, and are not specifically referenced in the Bid Tabulations as requiring setting or resetting, they shall be replaced by a licensed surveyor at the Contractor's expense.

The care and protection, and replacement of damaged or dislodged property monumentation shall also apply to all City and Linn County Survey Markers, GPS Monuments, DLC Corner Monuments, and other position control points.

## MANDATORY PRE-BID MEETING

A Mandatory Pre-Bid Meeting will held by the Owner and Engineer at **2:00pm on Thursday, December 2, 2021** at the **Sweet Home Water Treatment Plant, 1500 47<sup>th</sup> Ave., Sweet Home, OR 97386**. The City will accept Bids on the Project only from Bidders listed on the Mandatory Pre-Bid Meeting as indicated on the Master Sign-in Sheet maintained by the Engineer. The Master Sign-in Sheet will be issued to all Bid Holders following the Mandatory Pre-Bid Meeting. Bids received from Bidders not listed on the Master Sign-in Sheet will be returned unopened.

## PRE-CONSTRUCTION MEETING

A Pre-Construction meeting will be required on this project after the bidder award. When it occurs as noted in the Instructions to Bidders, the meeting will be located at City Hall, and scheduled to take place anytime within ten (10) working days following the Notice of Award. Weather and or other construction scheduling issues may modify this time frame. The Construction Contract and the Notice to Proceed will generally be issued at the meeting.

## RETAINAGE

To ensure the proper performance of the Contract, the Owner shall retain five (5%) of the amount of each progress payment until final completion and acceptance of all work covered by this contract.

## WAGES AND SALARIES

Attention of Contractors is particularly called to the requirements concerning wages to be paid to certain categories and classifications of employees.

## DISPOSAL OF EXCESS MATERIAL

All excess trench excavation, existing sidewalk or curb, and other materials designated to be removed under the contract shall be disposed of off-site at the Contractor's expense and in a legal manner. Fill permits, stating Contractor provided quantity, transportation carrier, and fill destination, if within the City Limits, shall be acquired by the City as needed.

## PAYMENT

The contractor shall accept the compensation as full payment for furnishing all materials, labor, tools, and equipment necessary to complete the work. Compensation shall include loss or damage arising from the nature of

the work or action of the elements, or any unforeseen difficulties, which may be encountered during the prosecution of the work.

The quantities listed in the bid schedule do not govern final payment. Payments to the contractor will be made only for the actual quantities of the work performed and for the quantities of work performed as extra work or under supplemental agreement. When items of work are not listed in the bid schedule, the work shall be considered incidental and no separate payment shall be paid.

If the contract cost is determined wholly or in part, on a lump-sum basis, Engineer may use unit prices bid by Contractor in making progress estimates on the work. In case said unit prices do not, in the opinion of the Engineer, truly represent actual relative costs of different parts of work, a percentage of the unit price may be used in making progress estimates.

**END OF OWNER'S SPECIAL PROVISIONS**

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## **SECTION 00200**

### **INFORMATION AVAILABLE TO BIDDERS**

#### **1.0 RECORD DRAWINGS AND ADDITIONAL INFORMATION**

Previous construction activities have occurred at portions of the Site. The following record drawings have been used by the Design Consultant in preparing the Contract Documents and are available for review during regular business hours at the Owner's Engineering Department, upon 48 hours' notice to Owner. The Owner makes no warranty as to the accuracy of this information.

- A. Drawings dated March 2008, prepared by Erwin Consulting Engineering, LCC, entitled "City of Sweet Home, Oregon 6.0 MGD Water Treatment Plant", consisting of 141 sheets, numbered C100 to I703.
- B. Ground-Penetrating Radar (GPR) report located rebar in the area of the new backwash pump dated March 26<sup>th</sup>, 2021. The report was prepared by Concrete GPR LLC, entitled "Concrete Slab Investigation, Sweet Home Water Treatment Plant", consisting of 5 sheets.

**END OF SECTION**

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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# STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

## ARTICLE 1—DEFINITIONS AND TERMINOLOGY

### 1.01 *Defined Terms*

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

11. *Claim*

- a. A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment of Contract Price or Contract Times; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract.
- b. A demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal, or seeking resolution of a contractual issue that Engineer has declined to address.
- c. A demand or assertion by Owner or Contractor, duly submitted in compliance with the procedural requirements set forth herein, made pursuant to Paragraph 12.01.A.4, concerning disputes arising after Engineer has issued a recommendation of final payment.
- d. A demand for money or services by a third party is not a Claim.

12. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), lead-based paint (as defined by the HUD/EPA standard), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to Laws and Regulations regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

13. *Contract*—The entire and integrated written contract between Owner and Contractor concerning the Work.

14. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

15. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents.

16. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

17. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

18. *Cost of the Work*—See Paragraph 13.01 for definition.

19. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

20. *Drawings of Record* - Those drawings made or revised by the Contractor during progress of construction and approved by the owner or the Design Professional, illustrating how various elements of the work were actually installed.

21. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

22. *Electronic Document*—Any Project-related correspondence, attachments to correspondence, data, documents, drawings, information, or graphics, including but not limited to Shop Drawings and other Submittals, that are in an electronic or digital format.
23. *Electronic Means*—Electronic mail (email), upload/download from a secure Project website, or other communications methods that allow: (a) the transmission or communication of Electronic Documents; (b) the documentation of transmissions, including sending and receipt; (c) printing of the transmitted Electronic Document by the recipient; (d) the storage and archiving of the Electronic Document by sender and recipient; and (e) the use by recipient of the Electronic Document for purposes permitted by this Contract. Electronic Means does not include the use of text messaging, or of Facebook, Twitter, Instagram, or similar social media services for transmission of Electronic Documents.
24. *Engineer*—The Engineer as specified in the Agreement is West Yost Associates Inc.
25. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.
26. *Final Completion*—The completion of all of the Work called for under the Contract including but not limited to, if applicable, satisfactory operation of all equipment, by means of acceptance tests, correction of all punch list items to the satisfaction of the Owner and the Design Professional, settlement of all claims, if any, payment and release of records of all construction and like liens, delivery of all guarantees, equipment operation and maintenance manuals, as-built drawings, building certificate required prior to occupancy, electrical certificates, mechanical certificates, plumbing certificates, all other required approvals and acceptances by city, county and state governments, or other authority having jurisdiction, and removal of all rubbish, tools, scaffolding and surplus materials and equipment from the job site.
27. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto.
- a. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated into the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, is not a Hazardous Environmental Condition.
  - b. The presence of Constituents of Concern that are to be removed or remediated as part of the Work is not a Hazardous Environmental Condition.
  - c. The presence of Constituents of Concern as part of the routine, anticipated, and obvious working conditions at the Site, is not a Hazardous Environmental Condition.
28. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and binding decrees, resolutions, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
29. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

30. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date, or by a time prior to Substantial Completion of all the Work.
31. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
32. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
33. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract. The Owner shall be the City of Sweet Home, Oregon.
34. *Payment Bond* – The form of security approved by the OWNER and furnished by the CONTRACTOR and CONTRACTOR’S Surety guaranteeing payment for all labor, materials, services, and equipment furnished for use by the CONTRACTOR in performance of the Contract.
35. *Performance Bond* – The form of security approved by the OWNER and furnished by the CONTRACTOR and CONTRACTOR’S Surety guaranteeing the complete and faithful performance of all the obligations and conditions placed upon the CONTRACTOR by the Contract.
36. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising Contractor’s plan to accomplish the Work within the Contract Times.
37. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
38. *Punch List*—List of incomplete items of work and of items of work which are not in conformance with the contract. The list will be prepared by the ENGINEER when the CONTRACTOR:
  - a. Notifies the ENGINEER in writing that the work has been completed in accordance with the contract;
  - b. Requests in writing that the OWNER accept the work.
39. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative (RPR) includes any assistants or field staff of Resident Project Representative.
40. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
41. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals.
42. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor’s Applications for Payment.

43. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
44. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands or areas furnished by Owner which are designated for the use of Contractor.
45. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
46. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.
47. *Submittal*—A written or graphic document, prepared by or for Contractor, which the Contract Documents require Contractor to submit to Engineer, or that is indicated as a Submittal in the Schedule of Submittals accepted by Engineer. Submittals may include Shop Drawings and Samples; schedules; product data; Owner-delegated designs; sustainable design information; information on special procedures; testing plans; results of tests and evaluations, source quality-control testing and inspections, and field or Site quality-control testing and inspections; warranties and certifications; Suppliers' instructions and reports; records of delivery of spare parts and tools; operations and maintenance data; Project photographic documentation; record documents; and other such documents required by the Contract Documents. Submittals, whether or not approved or accepted by Engineer, are not Contract Documents. Change Proposals, Change Orders, Claims, notices, Applications for Payment, and requests for interpretation or clarification are not Submittals.
48. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion of such Work.
49. *Successful Bidder*—The Bidder to which the Owner makes an award of contract.
50. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
51. *Supplier*—A manufacturer, fabricator, supplier, distributor, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.
52. *Technical Data*
  - a. Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (1) existing subsurface conditions at or adjacent to the Site, or existing physical conditions at or adjacent to the Site including existing surface or

subsurface structures (except Underground Facilities) or (2) Hazardous Environmental Conditions at the Site.

- b. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then Technical Data is defined, with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06, as the data contained in boring logs, recorded measurements of subsurface water levels, assessments of the condition of subsurface facilities, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical, environmental, or other Site or facilities conditions report prepared for the Project and made available to Contractor.
  - c. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data, and instead Underground Facilities are shown or indicated on the Drawings.
53. *Underground Facilities*—All active or not-in-service underground lines, pipelines, conduits, ducts, encasements, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or systems at the Site, including but not limited to those facilities or systems that produce, transmit, distribute, or convey telephone or other communications, cable television, fiber optic transmissions, power, electricity, light, heat, gases, oil, crude oil products, liquid petroleum products, water, steam, waste, wastewater, storm water, other liquids or chemicals, or traffic or other control systems. An abandoned facility or system is not an Underground Facility.
54. *Unit Price Work*—Work to be paid for on the basis of unit prices.
55. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
56. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

## 1.02 Terminology

- A. The words and terms discussed in Paragraphs 1.02.B, C, D, and E are not defined terms that require initial capital letters, but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.
- B. *Intent of Certain Terms or Adjectives*: The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such

- term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.
- C. *Day*: The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
  - D. *Defective*: The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - 1. does not conform to the Contract Documents;
    - 2. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
    - 3. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or Paragraph 15.04).
  - E. *Furnish, Install, Perform, Provide*
    - 1. The word “furnish,” when used in connection with services, materials, or equipment, means to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
    - 2. The word “install,” when used in connection with services, materials, or equipment, means to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
    - 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, means to furnish and install said services, materials, or equipment complete and ready for intended use.
    - 4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.
  - F. *Contract Price or Contract Times*: References to a change in “Contract Price or Contract Times” or “Contract Times or Contract Price” or similar, indicate that such change applies to (1) Contract Price, (2) Contract Times, or (3) both Contract Price and Contract Times, as warranted, even if the term “or both” is not expressed.
  - G. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **ARTICLE 2—PRELIMINARY MATTERS**

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

- A. *Performance and Payment Bonds*: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner the performance bond and payment bond (if the Contract requires Contractor to furnish such bonds).

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

#### 2.02 *Copies of Documents*

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

#### 2.03 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Contract (or as otherwise required by the Contract Documents), Contractor shall submit to Engineer for timely review:
  - 1. Three (3) copies of an initial schedule or schedules which shall show the dates at which the CONTRACTOR will start and complete the various parts of the contract. The scheduled completion date must be the same as the contractual completion date. Should the CONTRACTOR show a completion date earlier than the Contractual completion date, the resulting "float" shall belong to both the OWNER and the CONTRACTOR. The ENGINEER will review schedules and if required, CONTRACTOR shall resubmit revised schedules within two (2) working days after return of review copy. The Notice to Proceed will not be issued until an acceptable schedule is submitted.
  - 2. a preliminary Schedule of Submittals; and
  - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.
- B. Within thirty (30) days following opening of Bids, unless the Owner decides to cancel the award as allowed by law, the apparent low Bidder will be furnished with a Notice of Award accompanied by three (3) copies each of the Contract Documents in form for signatures.

#### 2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. CONTRACTOR shall start to perform the Work within ten (10) calendar days after the date indicated upon the written Notice to Proceed issued by the ENGINEER. No Work shall be done

at the Site prior to the date on which the Contract Times commence to run, all governmental permits, approvals or authorizations have been given, and all insurance certificates have been submitted to the Owner.

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

#### 2.05 *Acceptance of Schedules*

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

#### 2.06 *Electronic Transmittals*

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

## ARTICLE 3—CONTRACT DOCUMENTS: INTENT, REQUIREMENTS, REUSE

### 3.01 *Intent*

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

### 3.02 *Reference Standards*

- A. *Standards Specifications, Codes, Laws and Regulations*
  - 1. Unless otherwise stated, reference to Standard Specifications contract documents shall reference the 2021 Oregon Standard Specifications for Construction prepared jointly by the Oregon Department of Transportation (ODOT) and American Public Works Association (APWA) Oregon Chapter.
  - 2. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, means the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
  - 3. No provision of any such standard specification, manual, reference standard, or code, and no instruction of a Supplier, will be effective to change the duties or responsibilities of Owner, Contractor, or Engineer from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner or Engineer any duty or authority to supervise or direct the performance of the

Work, or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

### 3.03 *Reporting and Resolving Discrepancies*

#### A. *Reporting Discrepancies*

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

#### B. *Resolving Discrepancies*

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

### 3.04 *Requirements of the Contract Documents*

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

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

### 3.05 *Reuse of Documents*

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

### 3.06 *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;
  - 2. Addenda, Supplemental Agreements and Change Orders, the one dated later having the precedence over another dated earlier;
  - 3. Agreement;
  - 4. Owner's Special Provisions;
  - 5. General Conditions (Section 00700);
  - 6. General Requirements (Sections 01010 through 01999);
  - 7. Other Technical Specifications (Section 02000 and all other Sections following);
  - 8. Drawings;
  - 9. Instructions to Bidders;
  - 10. Bid Forms;

11. Invitation to Bid.
- B. With reference to the Drawings, the order of precedence is as follows:
  1. Enumerated dimensions govern over scaled dimensions
  2. Detail drawings govern over general drawings
  3. Addenda/Change Order drawings govern over any other drawings
  4. Contract Drawings govern over standard drawings/plans
  5. Specific notes take precedence over schedules
  6. Notes, descriptions or schedules take precedence over graphic representations
- C. The provisions of the Contract Documents shall take precedence over any Laws or Regulations applicable to the performance of the work unless such an interpretation of the provisions of the Contract Documents would result in a violation of such Law or Regulation.

#### **ARTICLE 4—COMMENCEMENT AND PROGRESS OF THE WORK**

##### **4.01 *Commencement of Contract Times; Notice to Proceed***

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

##### **4.02 *Starting the Work***

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

##### **4.03 *Reference Points***

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

##### **4.04 *Progress Schedule***

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.
  1. Once each month, prior to the processing of the monthly progress payment, the CONTRACTOR shall provide an updated schedule to the ENGINEER. Updates must accurately reflect as-built schedule.

2. In addition, a three-week rolling “look-ahead” schedule shall be updated and provided to the ENGINEER at the beginning of each work week. The two-week rolling schedule shall include the CONTRACTOR’s proposed daily activities and location(s) of work during the coming two-week period. No work shall commence at the beginning of each workweek until the updated two-week rolling schedule is submitted. During the contract period, the CONTRACTOR shall also coordinate his activities daily with the ENGINEER.
  3. Proposed adjustments in the Progress Schedule that will change the Contract Times must be submitted in accordance with the requirements of Article 11.
- B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work will be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

#### 4.05 *Delays in Contractor’s Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor’s performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Such an adjustment will be Contractor’s sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
1. Severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
  2. Abnormal weather conditions;
  3. Acts or failures to act of third-party utility owners or other third-party entities (other than those third-party utility owners or other third-party entities performing other work at or adjacent to the Site as arranged by or under contract with Owner, as contemplated in Article 8); and
  4. Acts of war or terrorism.
  5. Weather-Related Delays
    - a. If “abnormal weather conditions” as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably

anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled.

- b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:
  - 1) Every workday on which one or more of the following conditions exist will be considered a “bad weather day”:
    - i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a workday) through 7:00 p.m. on the workday in question equals or exceeds **1.0** inches of precipitation (as rain equivalent, based on the snow/rain conversion indicated in the table entitled Foreseeable Bad Weather Days; such table is hereby incorporated in this SC-4.05.C by reference.
    - ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: **15** degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: **32** degrees Fahrenheit.
  - 2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by the City of Sweet Home Public Works Department.
  - 3) Contractor shall anticipate the number of foreseeable bad weather days per month indicated in the table in Exhibit **[exhibit number]**—Foreseeable Bad Weather Days.
  - 4) In each month, every bad weather day exceeding the number of Foreseeable Bad Weather Days will be considered as “abnormal weather conditions.” The existence of abnormal weather conditions will not relieve Contractor of the obligation to demonstrate and document that delays caused by abnormal weather are specific to the planned work activities or that such activities thus delayed were on Contractor’s then-current Progress Schedule’s critical path for the Project.
  - 5) Contractor shall include the following Foreseeable Bad Weather Days in the Progress Schedule as follows:
    - i) January – 3 Days
    - ii) February – 2 Days
    - iii) March – 1 Day
    - iv) April – 0 Days
    - v) May – 0 Days
    - vi) June – 0 Days
    - vii) July – 0 Days
    - viii) August – 0 Days
    - iv) September – 0 Days

- v) October – 1 Day
- vi) November – 2 Days
- vii) December – 3 Days

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

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

### 5.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor in writing of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

### 5.02 *Use of Site and Other Areas*

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

- 1. Contractor shall confine construction equipment, the storage of materials and equipment and operations of workers to the work and staging areas as shown on the drawings and shall not unreasonably encumber the site and other areas with construction equipment or other materials or equipment. Contractor shall be responsible for keeping driveways and other main access points to the site open. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
  - 2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.13, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or in a court of competent jurisdiction; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris will conform to applicable Laws and Regulations.

- C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

- A. *Reports and Drawings*: The following drawings and reports are available for the Contractor
  1. Record Drawings for the Sweet Home Water Treatment Plant.
    - a. Drawings dated March 2008, prepared by Erwin Consulting Engineering, LCC, entitled "City of Sweet Home, Oregon 6.0 MGD Water Treatment Plant", consisting of 141 sheets, numbered C100 to I703.
  2. Ground-Penetrating Radar (GPR) report located rebar in the area of the new backwash pump dated. Add information when available.
  3. Technical Data contained in such reports and drawings.
  4. No other information on existing subsurface or physical conditions is available for the Contractor.
- B. *Underground Facilities*: Underground Facilities are shown or indicated on the Drawings, pursuant to Paragraph 5.05, and not in the drawings referred to in Paragraph 5.03.A. Information and data regarding the presence or location of Underground Facilities are not intended to be categorized, identified, or defined as Technical Data.
- C. *Reliance by Contractor on Technical Data*: Contractor may rely upon the accuracy of the Technical Data with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b.
- D. *Limitations of Other Data and Documents*: Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
  1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
  2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings;
  3. the contents of other Site-related documents made available to Contractor, such as record drawings from other projects at or adjacent to the Site, or Owner's archival documents concerning the Site; or

4. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

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

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine whether it is necessary for Owner to obtain additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the subsurface or physical condition in question may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the condition in question has been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- E. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in

Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. Such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
  - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
  - c. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
- a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise;
  - b. The existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or
  - c. Contractor failed to give the written notice required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.
- F. *Underground Facilities; Hazardous Environmental Conditions*: Paragraph 5.05 governs rights and responsibilities regarding the presence or location of Underground Facilities. Paragraph 5.06 governs rights and responsibilities regarding Hazardous Environmental Conditions. The provisions of Paragraphs 5.03 and 5.04 are not applicable to the presence or location of Underground Facilities, or to Hazardous Environmental Conditions.

#### 5.05 *Underground Facilities*

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

3. verifying the actual location of those Underground Facilities shown or indicated in the Contract Documents as being within the area affected by the Work, by exposing such Underground Facilities during the course of construction;
  4. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
  5. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated on the Drawings, or was not shown or indicated on the Drawings with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing regarding such Underground Facility.
- C. *Engineer's Review:* Engineer will:
1. promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated on the Drawings, or was not shown or indicated with reasonable accuracy;
  2. identify and communicate with the owner of the Underground Facility; prepare recommendations to Owner (and if necessary issue any preliminary instructions to Contractor) regarding the Contractor's resumption of Work in connection with the Underground Facility in question;
  3. obtain any pertinent cost or schedule information from Contractor; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and
  4. advise Owner in writing of Engineer's findings, conclusions, and recommendations.

During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Early Resumption of Work:* If at any time Engineer determines that Work in connection with the Underground Facility may resume prior to completion of Engineer's review or Owner's issuance of its statement to Contractor, because the Underground Facility in question and conditions affected by its presence have been adequately documented, and analyzed on a preliminary basis, then the Engineer may at its discretion instruct Contractor to resume such Work.
- F. *Possible Price and Times Adjustments*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, to the extent that any existing Underground Facility at the Site that was not shown

or indicated on the Drawings, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
  - b. Contractor's entitlement to an adjustment of the Contract Times is subject to the provisions of Paragraphs 4.05.D and 4.05.E; and
  - c. Contractor gave the notice required in Paragraph 5.05.B.
2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, then any such adjustment will be set forth in a Change Order.
  3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.
  4. The information and data shown or indicated on the Drawings with respect to existing Underground Facilities at the Site is based on information and data (a) furnished by the owners of such Underground Facilities, or by others, (b) obtained from available records, or (c) gathered in an investigation conducted in accordance with the current edition of ASCE 38, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data, by the American Society of Civil Engineers. If such information or data is incorrect or incomplete, Contractor's remedies are limited to those set forth in this Paragraph 5.05.F.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: These General Conditions identify:

1. those reports known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site;
2. drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
3. Technical Data contained in such reports and drawings.
4. The following table lists the reports known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and the Technical Data (if any) upon which Contractor may rely:

Report Title	Date of Report	Technical Data
No reports	N/A	N/A

5. The following table lists the drawings known to Owner relating to Hazardous Environmental Conditions at or adjacent to the Site, and Technical Data (if any) contained in such Drawings upon which Contractor may rely:

Drawings Title	Date of Drawings	Technical Data
No Drawings	N/A	N/A

- B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data as defined in Paragraph 1.01.A.46.b. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:
1. the completeness of such reports and drawings for Contractor’s purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto;
  2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
  3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work; or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

- F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.
- G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, as a result of such Work stoppage, such special conditions under which Work is agreed to be resumed by Contractor, or any costs or expenses incurred in response to the Hazardous Environmental Condition, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off. Entitlement to any such adjustment is subject to the provisions of Paragraphs 4.05.D, 4.05.E, 11.07, and 11.08.
- H. If, after receipt of such written notice, Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.
- I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court, arbitration, or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.I obligates Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J obligates Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

## ARTICLE 6—BONDS AND INSURANCE

### 6.01 *Performance, Payment, and Other Bonds*

- A. Bonds shall be furnished in accordance with the City of Sweet Home Contract requirements. These shall include, but not be limited to, performance bond and payment bond.
- B. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of Contractor's obligations under the Contract. These bonds must remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the terms of a prescribed bond form, or other provisions of the Contract.
- C. All bonds must be in the form included in the Bidding Documents or otherwise specified by Owner prior to execution of the Contract, except as provided otherwise by Laws or Regulations, and must be issued and signed by a surety named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Department Circular 570 (as amended and supplemented) by the Bureau of the Fiscal Service, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority must show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- D. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue bonds in the required amounts.
- E. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer in writing and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which must comply with the bond and surety requirements above.
- F. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- G. Upon request to Owner from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Owner shall provide a copy of the payment bond to such person or entity.
- H. Upon request to Contractor from any Subcontractor, Supplier, or other person or entity claiming to have furnished labor, services, materials, or equipment used in the performance of the Work, Contractor shall provide a copy of the payment bond to such person or entity.

### 6.02 *Insurance—General Provisions*

- A. Owner and Contractor shall obtain and maintain insurance as required in these contract documents and City of Sweet Home Special Provisions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized in the state or jurisdiction in which the Project is located to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary

Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

- C. Alternative forms of insurance coverage, including but not limited to self-insurance and "Occupational Accident and Excess Employer's Indemnity Policies," are not sufficient to meet the insurance requirements of this Contract, unless expressly allowed in the Supplementary Conditions.
- D. Contractor shall deliver to Owner, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Contractor has obtained and is maintaining the policies and coverages required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, full disclosure of all relevant exclusions, and evidence of insurance required to be purchased and maintained by Subcontractors or Suppliers. In any documentation furnished under this provision, Contractor, Subcontractors, and Suppliers may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those applicable to this Contract.
- E. Owner shall deliver to Contractor, with copies to each additional insured identified in the Contract, certificates of insurance and endorsements establishing that Owner has obtained and is maintaining the policies and coverages required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies, documentation of applicable self-insured retentions (if allowed) and deductibles, and full disclosure of all relevant exclusions. In any documentation furnished under this provision, Owner may block out (redact) (1) any confidential premium or pricing information and (2) any wording specific to a project or jurisdiction other than those relevant to this Contract.
- F. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, will not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- G. In addition to the liability insurance required to be provided by Contractor, the Owner, at Owner's option, may purchase and maintain Owner's own liability insurance. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.
- H. Contractor shall require:
  - 1. Subcontractors to purchase and maintain worker's compensation, commercial general liability, and other insurance that is appropriate for their participation in the Project, and to name as additional insureds Owner and Engineer (and any other individuals or entities identified in the Supplementary Conditions as additional insureds on Contractor's liability policies) on each Subcontractor's commercial general liability insurance policy; and
  - 2. Suppliers to purchase and maintain insurance that is appropriate for their participation in the Project.

- I. If either party does not purchase or maintain the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- J. If Contractor has failed to obtain and maintain required insurance, Contractor's entitlement to enter or remain at the Site will end immediately, and Owner may impose an appropriate set-off against payment for any associated costs (including but not limited to the cost of purchasing necessary insurance coverage), and exercise Owner's termination rights under Article 16.
- K. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect (but is in no way obligated) to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price will be adjusted accordingly.
- L. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests. Contractor is responsible for determining whether such coverage and limits are adequate to protect its interests, and for obtaining and maintaining any additional insurance that Contractor deems necessary.
- M. The insurance and insurance limits required herein will not be deemed as a limitation on Contractor's liability, or that of its Subcontractors or Suppliers, under the indemnities granted to Owner and other individuals and entities in the Contract or otherwise.
- N. All the policies of insurance required to be purchased and maintained under this Contract will contain a provision or endorsement that the coverage afforded will not be canceled, or renewal refused, until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured and Engineer.

6.03 *Contractor's Insurance*

- A. *Required Insurance:* Contractor shall purchase and maintain Worker's Compensation, Commercial General Liability, and other insurance pursuant to the specific requirements set forth herein.
- B. *General Provisions:* The policies of insurance required by this Paragraph 6.03 must:
  - 1. include at least the specific coverages required;
  - 2. be written for not less than the limits provided, or those required by Laws or Regulations, whichever is greater;
  - 3. remain in effect at least until the Work is complete (as set forth in Paragraph 15.06.D), and longer if expressly required elsewhere in this Contract, and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract;
  - 4. apply with respect to the performance of the Work, whether such performance is by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed

by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable; and

5. include all necessary endorsements to support the stated requirements.
- C. *Additional Insureds*: The Contractor's commercial general liability, automobile liability, employer's liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies, if required by this Contract, must:
1. include and list as additional insureds Owner (City of Sweet Home) and Engineer (West Yost Associates), and any individuals or entities identified as additional insureds herein;
  2. include coverage for the respective officers, directors, members, partners, employees, and consultants of all such additional insureds;
  3. afford primary coverage to these additional insureds for all claims covered thereby (including as applicable those arising from both ongoing and completed operations);
  4. not seek contribution from insurance maintained by the additional insured; and
  5. as to commercial general liability insurance, apply to additional insureds with respect to liability caused in whole or in part by Contractor's acts or omissions, or the acts and omissions of those working on Contractor's behalf, in the performance of Contractor's operations.
- D. *Other Additional Insureds*: As a supplement to the provisions of Paragraph 6.03.C of the General Conditions, the commercial general liability, automobile liability, umbrella or excess, pollution liability, and unmanned aerial vehicle liability policies must include as additional insureds the Owner and Engineer.
- E. *Workers' Compensation and Employer's Liability Insurance*: This insurance shall protect CONTRACTOR against all claims under applicable state workers' compensation laws, including coverage as necessary for the benefits provided under the United States Longshoremen's and Harbor Workers' Act and the Jones Act. 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" or "other states" and waiver of subrogation endorsements. The liability limits, as required by state law shall be not less than:
1. Workers' Compensation: Statutory.
  2. Employer's Liability: \$500,000 each occurrence
- F. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against claims for:
1. damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees,
  2. damages insured by reasonably available personal injury liability coverage, and
  3. damages because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

G. *Commercial General Liability—Form and Content:* Contractor’s commercial liability policy must be written on a 1996 (or later) Insurance Services Organization, Inc. (ISO) commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage.
  - a. Such insurance must be maintained for three years after final payment.
  - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, including but not limited to coverage of Contractor’s contractual indemnity obligations in Paragraph 7.18.
3. Severability of interests and no insured-versus-insured or cross-liability exclusions.
4. Underground, explosion, and collapse coverage.
5. Personal injury coverage.
6. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
7. For design professional additional insureds, ISO Endorsement CG 20 32 07 04 “Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured” or its equivalent.

I. *Commercial General Liability Insurance Coverage:* This insurance shall be occurrence type written in comprehensive form and shall protect CONTRACTOR, OWNER, and ENGINEER as additional insureds, against claims arising out of performance of the Work. The policy shall also include personal injury liability coverage, contractual liability coverage, completed operations and products liability coverage, and coverage for blasting, explosion, collapse of buildings, and damage to underground property. The liability limits for bodily injury and property damage shall be not less than:

1. Combined Single Limit for each occurrence:       \$1,000,000
2. General aggregate:                                       \$2,000,000

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

Automobile Liability	Policy limits of not less than:
<b>Bodily Injury</b>	
Each Person	\$1,000,000
Each Accident	\$1,000,000
<b>Property Damage</b>	
Each Accident	\$1,000,000

<b>Automobile Liability</b>	<b>Policy limits of not less than:</b>
<b>[or]</b>	
<b>Combined Single Limit</b>	
Combined Single Limit (Bodily Injury and Property Damage)	\$2,000,000

K. Umbrella Liability Insurance: This insurance shall protect CONTRACTOR, OWNER, and ENGINEER as additional insureds, against claims in excess of the limits provided under workers' compensation and employer's liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits for bodily injury and property damage shall be not less than:

1. Combined Single Limit for each occurrence:       \$1,000,000
2. General aggregate:                                       \$2,000,000

6.04 *Property Losses; Subrogation*

A. The builder's risk insurance policy purchased and maintained in accordance with Paragraph 6.04 (or an installation floater policy if authorized), will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors.

1. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils, risks, or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all individuals or entities identified in the Supplementary Conditions as builder's risk or installation floater insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused.
2. None of the above waivers extends to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

B. Any property insurance policy maintained by Owner covering any loss, damage, or consequential loss to Owner's existing structures, buildings, or facilities in which any part of the Work will occur, or to which any part of the Work will attach or adjoin; to adjacent structures, buildings, or facilities of Owner; or to part or all of the completed or substantially completed Work, during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06, will contain provisions to the effect that in the event of payment of any loss or damage the insurer will have no rights of recovery against any insureds thereunder, or against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them, and that the insured is allowed to waive the insurer's rights of subrogation in a written contract executed prior to the loss, damage, or consequential loss.

1. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from fire or any of the perils, risks, or causes of loss covered by such policies.
- C. The waivers in this Paragraph 6.05 include the waiver of rights due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other insured peril, risk, or cause of loss.
- D. Contractor shall be responsible for assuring that each Subcontract contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from fire or other peril, risk, or cause of loss covered by builder's risk insurance, installation floater, and any other property insurance applicable to the Work.

6.05 *Receipt and Application of Property Insurance Proceeds*

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

**ARTICLE 7—CONTRACTOR'S RESPONSIBILITIES**

7.01 *Contractor's Means and Methods of Construction*

- A. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.
- B. If the Contract Documents note, or Contractor determines, that professional engineering or other design services are needed to carry out Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures, or for Site safety, then Contractor shall cause such services to be provided by a properly licensed design professional, at Contractor's expense. Such services are not Owner-delegated professional design services

under this Contract, and neither Owner nor Engineer has any responsibility with respect to (1) Contractor's determination of the need for such services, (2) the qualifications or licensing of the design professionals retained or employed by Contractor, (3) the performance of such services, or (4) any errors, omissions, or defects in such services.

7.02 *Supervision and Superintendence*

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

7.03 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall maintain good discipline and order at the Site.
- B. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of Contractor's employees; of Suppliers and Subcontractors, and their employees; and of any other individuals or entities performing or furnishing any of the Work, just as Contractor is responsible for Contractor's own acts and omissions.
- C. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site will be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.
  - 1. Regular working hours will be 7:00 AM to 3:30 PM, local time.
  - 2. Owner's legal holidays are New Year's Day, Martin Luther King Jr. Day, President's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

7.04 *Services, Materials, and Equipment*

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

- C. All materials and equipment must be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.
- D. Contractor shall be responsible for the cost of any overtime pay or other expense incurred by the Owner for Engineer's services (including those of the Resident Project Representative, if any), Owner's representative, and construction observation services, occasioned by the performance of Work on Saturday, Sunday, any legal holiday, or as overtime on any regular work day. If Contractor is responsible but does not pay, or if the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

7.05 "Or Equals"

- A. *Contractor's Request; Governing Criteria:* Whenever an item of equipment or material is specified or described in the Contract Documents by using the names of one or more proprietary items or specific Suppliers, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material, or items from other proposed Suppliers, under the circumstances described below.
  - 1. If Engineer in its sole discretion determines that an item of equipment or material proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer will deem it an "or equal" item. For the purposes of this paragraph, a proposed item of equipment or material will be considered functionally equal to an item so named if:
    - a. in the exercise of reasonable judgment Engineer determines that the proposed item:
      - 1) is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
      - 2) will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;
      - 3) has a proven record of performance and availability of responsive service; and
      - 4) is not objectionable to Owner.
    - b. Contractor certifies that, if the proposed item is approved and incorporated into the Work:
      - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
      - 2) the item will conform substantially to the detailed requirements of the item named in the Contract Documents.
- B. *Contractor's Expense:* Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-

equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal," which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

- D. *Effect of Engineer's Determination:* Neither approval nor denial of an "or-equal" request will result in any change in Contract Price. The Engineer's denial of an "or-equal" request will be final and binding, and may not be reversed through an appeal under any provision of the Contract.
- E. *Treatment as a Substitution Request:* If Engineer determines that an item of equipment or material proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer consider the item a proposed substitute pursuant to Paragraph 7.06.

#### 7.06 *Substitutes*

- A. *Contractor's Request; Governing Criteria:* Unless the specification or description of an item of equipment or material required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of equipment or material under the circumstances described below. To the extent possible such requests must be made before commencement of related construction at the Site.
  - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of equipment or material from anyone other than Contractor.
  - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.06.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.
  - 3. Contractor shall make written application to Engineer for review of a proposed substitute item of equipment or material that Contractor seeks to furnish or use. The application:
    - a. will certify that the proposed substitute item will:
      - 1) perform adequately the functions and achieve the results called for by the general design;
      - 2) be similar in substance to the item specified; and
      - 3) be suited to the same use as the item specified.
    - b. will state:
      - 1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times;
      - 2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

- 3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.
  - c. will identify:
    - 1) all variations of the proposed substitute item from the item specified; and
    - 2) available engineering, sales, maintenance, repair, and replacement services.
  - d. will contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.
- B. *Engineer's Evaluation and Determination:* Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.
- C. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- D. *Reimbursement of Engineer's Cost:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request will be final and binding, and may not be reversed through an appeal under any provision of the Contract. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.06.D, by timely submittal of a Change Proposal.

#### 7.07 *Concerning Subcontractors and Suppliers*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner. The Contractor's retention of a Subcontractor or Supplier for the performance of parts of the Work will not relieve Contractor's obligation to Owner to perform and complete the Work in accordance with the Contract Documents.

- B. Contractor shall retain specific Subcontractors and Suppliers for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor or Supplier to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within 5 days.
- E. Owner may require the replacement of any Subcontractor or Supplier. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors or Suppliers for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor or Supplier so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor or Supplier.
- F. If Owner requires the replacement of any Subcontractor or Supplier retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.
- G. No acceptance by Owner of any such Subcontractor or Supplier, whether initially or as a replacement, will constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis, Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors and Suppliers.
- J. The divisions and sections of the Specifications and the identifications of any Drawings do not control Contractor in dividing the Work among Subcontractors or Suppliers, or in delineating the Work to be performed by any specific trade.
- K. All Work performed for Contractor by a Subcontractor or Supplier must be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract for the benefit of Owner and Engineer.
- L. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor for Work performed for Contractor by the Subcontractor or Supplier.

- M. Contractor shall restrict all Subcontractors and Suppliers from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed in this Contract.
- N. The Contractor shall include the following provisions in all its first-tier subcontracts and contracts with material suppliers:
  - 1. A clause that requires the subcontractor to pay its subcontractors or material suppliers within 10 days after the contractor receives payment from the public agency for satisfactory work performed as required by Oregon's Prompt Payment statutes.
  - 2. A clause that requires the subcontractor to provide a first-tier subcontractor with a standard form that the first-tier subcontractor may use as an application for payment or another method the subcontractor may use for requesting payment and to use that form and regular administrative procedures for processing payments for the entire term of the subcontract unless authorized to change the form and administrative payment procedures under Oregon's Prompt Payment statutes.
  - 3. A clause that requires the payment of an interest penalty in the amount of 9% per annum if the subcontractor does not make payment to its subcontractors or material suppliers within 10 days as required by Oregon's Prompt Payment statutes.
- O. The Contractor shall include a clause in each of its subcontracts and contracts with material suppliers requiring the first-tier subcontractor to include the payment and interest penalty provisions stated above in Section 6.06(H) in each subcontract and require those subcontractors of any tier to include such clauses in each subcontract of any tier.

#### 7.08 *Patent Fees and Royalties*

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

costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### 7.09 *Permits*

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

#### 7.10 *Taxes*

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

#### 7.11 *Laws and Regulations*

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

retain 25% of any amount earned if the CONTRACTOR does not file any certified payroll form as required.

E. *Oregon Prevailing Wage Requirements*

1. Minimum wage rates shall be no less than the Oregon State Bureau of Labor and Industries wage rates.
2. Wage rates that apply to this contract will be as published by the Oregon State Bureau of Labor and Industries, effective January 1, 2021, and available from:

Bureau of Labor and Industries  
Wage and Hour Division  
800 NE Oregon Street, #1045  
Portland, Oregon 97232-2180  
Attention: Prevailing Wage Rate Specialist  
  
(971) 673-0761

BOLI Website:  
[www.Oregon.gov/boli](http://www.Oregon.gov/boli)

BOLI Wage Rates including amendments:  
<https://www.oregon.gov/boli/WHD/PWR/Pages/index.aspx>

3. Before any payment is made by the Owner of any sums due under this contract, the Owner must receive from the Contractor and any subcontractor a copy of the "Statement of Intent to Pay Prevailing Wages" approved by the Oregon State Bureau of Labor and Industries. Also following the acceptance of the project, the Owner must receive from the Contractor and each subcontractor a copy of the "Affidavit of Wages Paid" and in addition, from the prime Contractor, a copy of "Release for the Protection of Property Owners and General Contractor," all approved by the State Bureau of Labor and Industries. The Contractor and each subcontractor shall pay all fees associated with and make all applications directly to the Bureau of Labor and Industries. Forms may be obtained from the Bureau of Labor and Industries. These affidavits will be required before any funds retained, according to the provisions of ORS Chapter 279C, are released to the Contractor. Payment by the Contractor or subcontractor of any fees shall be considered incidental to the construction and all costs shall be included in other pay items of the project.
4. In accordance with the Oregon BOLI Prevailing Wage Rate Laws, the following conditions apply to and are hereby incorporated into this contract. However, this is not an exclusive listing of requirements and the Contractor is referred to BOLI for complete requirements.
  - a. If the contractor fails to pay for labor and services, the agency can pay for them and withhold these amounts from payments to the contractor. ( ORS 279C.515; OAR 839-025-0020(2)(a));
  - b. The contractor must pay daily, weekly, weekend and holiday overtime as required. ( ORS 279C.540; OAR 839-025-0020(2)(b));
  - c. The employer must give written notice to the workers of the number of hours per day and days per week they may be required to work. (OAR 839-025-0020(2)(c));

- d. The contractor must make prompt payment for all medical services for which the contractor has agreed to pay, and for all amounts for which the contractor collects or deducts from the worker's wages. (ORS 279C.530; OAR 839-025-0020(2)(d));
  - e. The contractor shall file a public works bond with the Construction Contractors Board before starting work on the project. ( ORS 279C.830(3)(a) );
  - f. The contractor shall include in every subcontract a provision requiring the subcontractor to have a public works bond filed with the Construction Contractors Board before starting work on the project. (ORS 279C.830 (3) (b)).
- F. CONTRACTOR shall promptly, as due, make payments to all persons supplying labor or materials for the prosecution of the work provided for herein, and shall also pay all contributions or amounts due the State Industrial Accident Fund on account of the performance of this Contract. The CONTRACTOR shall not permit any lien or claim to be filed or prosecuted against the OWNER on account of any labor or material furnished or contributions due said State Industrial Accident Funds.
- 1. In case CONTRACTOR shall fail, neglect, or refuse to make prompt payment of any claim for labor or services (including payments to the State Industrial Accident Fund), furnished by any person in connection with this Contract as said claim becomes due, whether said services and labor be performed for the CONTRACTOR or subcontractor, then the proper officer or officers representing the OWNER may pay such claim(s) and charge the amount thereof against funds which are or will become due to the CONTRACTOR, but the payment of any such claim in the manner herein authorized shall not relieve the CONTRACTOR or his surety from obligations which will result from such claims.
- G. CONTRACTOR and all his subcontractors engaged on the project shall have the right to provide Workmen's Compensation coverage by either of the methods permitted under the Oregon Workers' Compensation Law. The CONTRACTOR shall pay all contributions or amounts due to the Industrial Accident Fund from CONTRACTOR or a subcontractor that are incurred in performance of the contract.
- H. Any and all other of the Laws of Oregon which are applicable to work of the nature herein contemplated shall be observed in all respects.
- I. The CONTRACTOR shall pay to the Department of Revenue all sums withheld from employees under ORS 316.167.
- J. The CONTRACTOR shall pay promptly any person furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the CONTRACTOR, of all sums that the CONTRACTOR agrees to pay for the services and all money and sums that the CONTRACTOR deducted from wages as required by ORS 279C.530.
- K. The CONTRACTOR shall, where allowed by the specifications, use goods produced or manufactured in the state of Oregon if price, fitness, availability and quality are otherwise equal. Notwithstanding this requirement, the CONTRACTOR shall not substitute goods unless the substitution has been approved in writing by the Project Engineer.

- L. The CONTRACTOR shall require every subcontractor, unless exempt, to file a public works bond relating to the subcontract work.
- M. The CONTRACTOR, where allowed by the specifications, shall use supplies or materials manufactured from recycled materials. Notwithstanding this requirement, the CONTRACTOR shall not substitute goods unless the substitution has been approved in writing by the Project Engineer.
- N. The CONTRACTOR shall comply with Section 202, Executive Order 11245 dated September 24, 1965, as it applies to this Contract. He shall not discriminate against any employee or applicant for employment because of race, color, creed or national origin.

#### 7.12 *Record Documents*

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

#### 7.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations.
- B. Contractor shall designate a qualified and experienced safety representative whose duties and responsibilities are the prevention of Work-related accidents and the maintenance and supervision of safety precautions and programs.
- C. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- D. All damage, injury, or loss to any property referred to in Paragraph 7.13.C.2 or 7.13.C.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or

- indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- E. Contractor shall comply with all applicable U.S. Department of Labor Occupational Safety and Health Act (OSHA) and requirements and all other applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
  - F. Contractor shall notify Owner; the owners of adjacent property; the owners of Underground Facilities and other utilities (if the identity of such owners is known to Contractor); and other contractors and utility owners performing work at or adjacent to the Site, in writing, when Contractor knows that prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
  - G. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. Any Owner's safety programs that are applicable to the Work are identified or included in the Supplementary Conditions or Specifications.
  - H. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
  - I. Contractor's duties and responsibilities for safety and protection will continue until all the Work is completed, Engineer has issued a written notice to Owner and Contractor in accordance with Paragraph 15.06.C that the Work is acceptable, and Contractor has left the Site (except as otherwise expressly provided in connection with Substantial Completion).
  - J. Contractor's duties and responsibilities for safety and protection will resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.
  - K. Safety and accident reports shall be submitted in accordance with the Contractors reporting procedure or by the OR-OSHA reporting form. Unless otherwise provided herein, Contractor shall inform Owner of any accidents and OR-OSHA reportable accidents on the same day or as soon as reasonably possible. Other incidents or accidents will be reported in writing within three (3) calendar days of occurrence.

#### 7.14 *Hazard Communication Programs*

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

#### 7.15 *Emergencies*

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

determines that a change in the Contract Documents is required because of an emergency or Contractor's response, a Work Change Directive or Change Order will be issued.

## 7.16 Submittals

### A. Shop Drawing and Sample Requirements

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

### B. Submittal Procedures for Shop Drawings and Samples: Contractor shall label and submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals.

#### 1. Shop Drawings

- a. Contractor shall submit the number of copies required in the Specifications.
- b. Data shown on the Shop Drawings must be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide, and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.C.

#### 2. Samples

- a. Contractor shall submit the number of Samples required in the Specifications.

- b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the Submittal for the limited purposes required by Paragraph 7.16.C.
3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

*C. Engineer's Review of Shop Drawings and Samples*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the accepted Schedule of Submittals. Engineer's review and approval will be only to determine if the items covered by the Submittals will, after installation or incorporation in the Work, comply with the requirements of the Contract Documents, and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction, or to safety precautions or programs incident thereto.
3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
4. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order or other appropriate Contract modification.
5. Engineer's review and approval of a Shop Drawing or Sample will not relieve Contractor from responsibility for complying with the requirements of Paragraphs 7.16.A and B.
6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, will not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.
7. Neither Engineer's receipt, review, acceptance, or approval of a Shop Drawing or Sample will result in such item becoming a Contract Document.
8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.C.4.

*D. Resubmittal Procedures for Shop Drawings and Samples*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous Submittals.

2. Contractor shall furnish required Shop Drawing and Sample submittals with sufficient information and accuracy to obtain required approval of an item with no more than two resubmittals. Engineer will record Engineer's time for reviewing a third or subsequent resubmittal of a Shop Drawing or Sample, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges.
  3. If Contractor requests a change of a previously approved Shop Drawing or Sample, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.
- E. *Submittals Other than Shop Drawings, Samples, and Owner-Delegated Designs*
1. The following provisions apply to all Submittals other than Shop Drawings, Samples, and Owner-delegated designs:
    - a. Contractor shall submit all such Submittals to the Engineer in accordance with the Schedule of Submittals and pursuant to the applicable terms of the Contract Documents.
    - b. Engineer will provide timely review of all such Submittals in accordance with the Schedule of Submittals and return such Submittals with a notation of either Accepted or Not Accepted. Any such Submittal that is not returned within the time established in the Schedule of Submittals will be deemed accepted.
    - c. Engineer's review will be only to determine if the Submittal is acceptable under the requirements of the Contract Documents as to general form and content of the Submittal.
    - d. If any such Submittal is not accepted, Contractor shall confer with Engineer regarding the reason for the non-acceptance, and resubmit an acceptable document.
  2. Procedures for the submittal and acceptance of the Progress Schedule, the Schedule of Submittals, and the Schedule of Values are set forth in Paragraphs 2.03, 2.04, and 2.05.
- F. *Owner-delegated Designs: Submittals pursuant to Owner-delegated designs are governed by the provisions of Paragraph 7.19.*

**7.17 Contractor's General Warranty and Guarantee**

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer is entitled to rely on Contractor's warranty and guarantee.
- B. Owner's rights under this warranty and guarantee are in addition to, and are not limited by, Owner's rights under the correction period provisions of Paragraph 15.08. The time in which Owner may enforce its warranty and guarantee rights under this Paragraph 7.17 is limited only by applicable Laws and Regulations restricting actions to enforce such rights; provided, however, that after the end of the correction period under Paragraph 15.08:
  1. Owner shall give Contractor written notice of any defective Work within 60 days of the discovery that such Work is defective; and

2. Such notice will be deemed the start of an event giving rise to a Claim under Paragraph 12.01.B, such that any related Claim must be brought within 30 days of the notice.
- C. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
1. abuse, or improper modification, maintenance, or operation, by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  2. normal wear and tear under normal usage.
- D. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents is absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents, a release of Contractor's obligation to perform the Work in accordance with the Contract Documents, or a release of Owner's warranty and guarantee rights under this Paragraph 7.17:
1. Observations by Engineer;
  2. Recommendation by Engineer or payment by Owner of any progress or final payment;
  3. The issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
  4. Use or occupancy of the Work or any part thereof by Owner;
  5. Any review and approval of a Shop Drawing or Sample submittal;
  6. The issuance of a notice of acceptability by Engineer;
  7. The end of the correction period established in Paragraph 15.08;
  8. Any inspection, test, or approval by others; or
  9. Any correction of defective Work by Owner.
- E. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract will govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

#### 7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, from losses, damages, costs, and judgments (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising from third-party claims or actions relating to or resulting from the performance or furnishing of the Work, provided that any such claim, action, loss, cost, judgment or damage is attributable to bodily injury, sickness, disease, or death, or to damage to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom, but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly

employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable.

- B. In any and all claims against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A will not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

#### 7.19 *Delegation of Professional Design Services*

- A. Owner may require Contractor to provide professional design services for a portion of the Work by express delegation in the Contract Documents. Such delegation will specify the performance and design criteria that such services must satisfy, and the Submittals that Contractor must furnish to Engineer with respect to the Owner-delegated design.
- B. Contractor shall cause such Owner-delegated professional design services to be provided pursuant to the professional standard of care by a properly licensed design professional, whose signature and seal must appear on all drawings, calculations, specifications, certifications, and Submittals prepared by such design professional. Such design professional must issue all certifications of design required by Laws and Regulations.
- C. If a Shop Drawing or other Submittal related to the Owner-delegated design is prepared by Contractor, a Subcontractor, or others for submittal to Engineer, then such Shop Drawing or other Submittal must bear the written approval of Contractor's design professional when submitted by Contractor to Engineer.
- D. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, and approvals performed or provided by the design professionals retained or employed by Contractor under an Owner-delegated design, subject to the professional standard of care and the performance and design criteria stated in the Contract Documents.
- E. Pursuant to this Paragraph 7.19, Engineer's review, approval, and other determinations regarding design drawings, calculations, specifications, certifications, and other Submittals furnished by Contractor pursuant to an Owner-delegated design will be only for the following limited purposes:
  - 1. Checking for conformance with the requirements of this Paragraph 7.19;
  - 2. Confirming that Contractor (through its design professionals) has used the performance and design criteria specified in the Contract Documents; and
  - 3. Establishing that the design furnished by Contractor is consistent with the design concept expressed in the Contract Documents.
- F. Contractor shall not be responsible for the adequacy of performance or design criteria specified by Owner or Engineer.

- G. Contractor is not required to provide professional services in violation of applicable Laws and Regulations.

## **ARTICLE 8—OTHER WORK AT THE SITE**

### **8.01 *Other Work***

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any third-party utility work that Owner has arranged to take place at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford proper and safe access to the Site to each contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work.
- D. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.
- E. If the proper execution or results of any part of Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.
- F. The provisions of this article are not applicable to work that is performed by third-party utilities or other third-party entities without a contract with Owner, or that is performed without having been arranged by Owner. If such work occurs, then any related delay, disruption, or interference incurred by Contractor is governed by the provisions of Paragraph 4.05.C.3.

### **8.02 *Coordination***

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be

set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

1. The identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
  2. An itemization of the specific matters to be covered by such authority and responsibility; and
  3. The extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

### 8.03 *Legal Relationships*

- A. If, in the course of performing other work for Owner at or adjacent to the Site, the Owner's employees, any other contractor working for Owner, or any utility owner that Owner has arranged to perform work, causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment will take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract, and any remedies available to Contractor under Laws or Regulations concerning utility action or inaction. When applicable, any such equitable adjustment in Contract Price will be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times or Contract Price is subject to the provisions of Paragraphs 4.05.D and 4.05.E.
- B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.
1. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this Paragraph 8.03.B.
  2. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due Contractor.
- C. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's

failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

## **ARTICLE 9—OWNER'S RESPONSIBILITIES**

### **9.01 *Communications to Contractor***

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

### **9.02 *Replacement of Engineer***

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

### **9.03 *Furnish Data***

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

### **9.04 *Pay When Due***

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

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

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

### **9.06 *Insurance***

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

### **9.07 *Change Orders***

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

9.13 *Owner's Site Representative*

- A. Owner will furnish an "Owner's Site Representative" to represent Owner at the Site and assist Owner in observing the progress and quality of the Work. The Owner's Site Representative is not Engineer's consultant, agent, or employee. Owner's Site Representative will be Steven Haney, City of Sweet Home Utilities Manager.

**ARTICLE 10—ENGINEER'S STATUS DURING CONSTRUCTION**

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe, as an experienced and qualified design professional, the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the

Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.07. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

#### 10.03 *Resident Project Representative*

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

#### 10.04 *Engineer's Authority*

- A. Engineer has the authority to reject Work in accordance with Article 14.
- B. Engineer's authority as to Submittals is set forth in Paragraph 7.16.
- C. Engineer's authority as to design drawings, calculations, specifications, certifications and other Submittals from Contractor in response to Owner's delegation (if any) to Contractor of professional design services, is set forth in Paragraph 7.19.
- D. Engineer's authority as to changes in the Work is set forth in Article 11.
- E. Engineer's authority as to Applications for Payment is set forth in Article 15.

#### 10.05 *Determinations for Unit Price Work*

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

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

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

#### 10.07 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, will create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation, and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Contractor under Paragraph 15.06.A, will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.07 also apply to the Resident Project Representative, if any.

#### 10.08 *Compliance with Safety Program*

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

### **ARTICLE 11—CHANGES TO THE CONTRACT**

#### 11.01 *Amending and Supplementing the Contract*

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

## 11.02 *Change Orders*

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

## 11.03 *Work Change Directives*

- A. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.07 regarding change of Contract Price.
- B. If Owner has issued a Work Change Directive and:
  - 1. Contractor believes that an adjustment in Contract Times or Contract Price is necessary, then Contractor shall submit any Change Proposal seeking such an adjustment no later than 30 days after the completion of the Work set out in the Work Change Directive.
  - 2. Owner believes that an adjustment in Contract Times or Contract Price is necessary, then Owner shall submit any Claim seeking such an adjustment no later than 60 days after issuance of the Work Change Directive.

## 11.04 *Field Orders*

- A. Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly.

- B. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.05 *Owner-Authorized Changes in the Work*

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

11.06 *Unauthorized Changes in the Work*

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

11.07 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price must comply with the provisions of Paragraph 11.09. Any Claim for an adjustment of Contract Price must comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
  - 1. Where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03);
  - 2. Where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.07.C.2); or
  - 3. Where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.07.C).
- C. *Contractor's Fee:* When applicable, the Contractor's fee for overhead and profit will be determined as follows:
  - 1. A mutually acceptable fixed fee; or

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

#### 11.08 *Change of Contract Times*

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

#### 11.09 *Change Proposals*

- A. *Purpose and Content:* Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; contest an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; challenge a set-off against payment due; or seek other relief under the Contract. The Change Proposal will specify any proposed change in Contract Times or Contract Price, or other proposed relief, and explain the reason for the

proposed change, with citations to any governing or applicable provisions of the Contract Documents. Each Change Proposal will address only one issue, or a set of closely related issues.

**B. *Change Proposal Procedures***

1. *Submittal*: Contractor shall submit each Change Proposal to Engineer within 30 days after the start of the event giving rise thereto, or after such initial decision.
2. *Supporting Data*: The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal.
  - a. Change Proposals based on or related to delay, interruption, or interference must comply with the provisions of Paragraphs 4.05.D and 4.05.E.
  - b. Change proposals related to a change of Contract Price must include full and detailed accounts of materials incorporated into the Work and labor and equipment used for the subject Work.

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

3. *Engineer's Initial Review*: Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal. If in its discretion Engineer concludes that additional supporting data is needed before conducting a full review and making a decision regarding the Change Proposal, then Engineer may request that Contractor submit such additional supporting data by a date specified by Engineer, prior to Engineer beginning its full review of the Change Proposal.
  4. *Engineer's Full Review and Action on the Change Proposal*: Upon receipt of Contractor's supporting data (including any additional data requested by Engineer), Engineer will conduct a full review of each Change Proposal and, within 30 days after such receipt of the Contractor's supporting data, either approve the Change Proposal in whole, deny it in whole, or approve it in part and deny it in part. Such actions must be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
  5. *Binding Decision*: Engineer's decision is final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- C. *Resolution of Certain Change Proposals***: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties in writing that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice will be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.
- D. *Post-Completion***: Contractor shall not submit any Change Proposals after Engineer issues a written recommendation of final payment pursuant to Paragraph 15.06.B.

#### 11.10 *Notification to Surety*

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

### **ARTICLE 12—CLAIMS**

#### 12.01 *Claims*

- A. *Claims Process*: The following disputes between Owner and Contractor are subject to the Claims process set forth in this article:
  - 1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;
  - 2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents;
  - 3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters; and
  - 4. Subject to the waiver provisions of Paragraph 15.07, any dispute arising after Engineer has issued a written recommendation of final payment pursuant to Paragraph 15.06.B.
- B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the Engineer, for its information only. The responsibility to substantiate a Claim rests with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.
- C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim will be stated in writing and submitted to the other party, with a copy to Engineer.
- D. *Mediation*
  - 1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate will stay the Claim submittal and response process.
  - 2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process will resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and

decision process will resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.
- E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action will be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.
- F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim will be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.
- G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim will be incorporated in a Change Order or other written document to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

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

### **13.01 *Cost of the Work***

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
  1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
  2. When needed to determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work will be in amounts no higher than those commonly incurred in the locality of the Project, will not include any of the costs itemized in Paragraph 13.01.C, and will include only the following items:
  1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor in advance of the subject Work. Such employees include, without limitation, superintendents, foremen, safety managers, safety representatives, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work will be apportioned on the basis of their time spent on the Work. Payroll costs include, but are not limited to, salaries and wages plus the cost of fringe benefits, which

include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, will be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts will accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment will accrue to Owner, and Contractor shall make provisions so that they may be obtained.
3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, which will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee will be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.
4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed or retained for services specifically related to the Work.
5. Other costs consisting of the following:
  - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
  - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
    - 1) In establishing included costs for materials such as scaffolding, plating, or sheeting, consideration will be given to the actual or the estimated life of the material for use on other projects; or rental rates may be established on the basis of purchase or salvage value of such items, whichever is less. Contractor will not be eligible for compensation for such items in an amount that exceeds the purchase cost of such item.
  - c. *Construction Equipment Rental*
    - 1) Rentals of all construction equipment and machinery, and the parts thereof, in accordance with rental agreements approved by Owner as to price (including any surcharge or special rates applicable to overtime use of the construction equipment or machinery), and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs will be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts must cease when the use thereof is no longer necessary for the Work.

- 2) Costs for equipment and machinery owned by Contractor or a Contractor-related entity will be paid at a rate shown for such equipment in the Oregon Department of Transportation Rental Rate Blue Book. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs.
  - 3) With respect to Work that is the result of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price (“changed Work”), included costs will be based on the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, must cease to accrue when the use thereof is no longer necessary for the changed Work.
- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
  - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
  - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of builder’s risk or other property insurance established in accordance with Paragraph 6.04), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses will be included in the Cost of the Work for the purpose of determining Contractor’s fee.
  - g. The cost of utilities, fuel, and sanitary facilities at the Site.
  - h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
  - i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.
- C. *Costs Excluded*: The term Cost of the Work does not include any of the following items:
1. Payroll costs and other compensation of Contractor’s officers, executives, principals, general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor’s principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor’s fee.
  2. The cost of purchasing, renting, or furnishing small tools and hand tools.

3. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
4. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
5. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
6. Expenses incurred in preparing and advancing Claims.
7. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

D. *Contractor's Fee*

1. When the Work as a whole is performed on the basis of cost-plus-a-fee, then:
  - a. Contractor's fee for the Work set forth in the Contract Documents as of the Effective Date of the Contract will be determined as set forth in the Agreement.
  - b. for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work, Contractor's fee will be determined as follows:
    - 1) When the fee for the Work as a whole is a percentage of the Cost of the Work, the fee will automatically adjust as the Cost of the Work changes.
    - 2) When the fee for the Work as a whole is a fixed fee, the fee for any additions or deletions will be determined in accordance with Paragraph 11.07.C.2.
2. When the Work as a whole is performed on the basis of a stipulated sum, or any other basis other than cost-plus-a-fee, then Contractor's fee for any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price on the basis of Cost of the Work will be determined in accordance with Paragraph 11.07.C.2.

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

13.02 *Allowances*

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

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

13.03 *Unit Price Work*

- A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, and the final adjustment of Contract Price will be set forth in a Change Order, subject to the provisions of the following paragraph.
- E. *Adjustments in Unit Price*
1. Contractor or Owner shall be entitled to an adjustment in the unit price with respect to an item of Unit Price Work if:
    - a. the quantity of the item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
    - b. Contractor's unit costs to perform the item of Unit Price Work have changed materially and significantly as a result of the quantity change.
  2. The adjustment in unit price will account for and be coordinated with any related changes in quantities of other items of Work, and in Contractor's costs to perform such other

Work, such that the resulting overall change in Contract Price is equitable to Owner and Contractor.

3. Adjusted unit prices will apply to all units of that item.

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

##### 14.01 *Access to Work*

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

##### 14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work will be governed by the provisions of Paragraph 14.05.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
  1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
  2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
  3. by manufacturers of equipment furnished under the Contract Documents;
  4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
  5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

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

#### 14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt written notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.
- E. *Preservation of Warranties:* When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages:* In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

#### 14.04 *Acceptance of Defective Work*

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

payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

#### 14.05 *Uncovering Work*

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

#### 14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work will not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### 14.07 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace defective Work as required by Engineer, then Owner may, after 7 days' written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees,

Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

- C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

### **15.01 *Progress Payments***

- A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments for Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments*
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.
    - a. Owner anticipates the date of progress payments will be the 10<sup>th</sup> day of each calendar month.
  - 2. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment must also be accompanied by: (a) a bill of sale, invoice, copies of subcontract or purchase order payments, or other documentation establishing full payment by Contractor for the materials and equipment; (b) at Owner's request, documentation warranting that Owner has received the materials and equipment free and clear of all Liens; and (c) evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
  - 3. Beginning with the second Application for Payment, each Application must include an affidavit of Contractor stating that all previous progress payments received by Contractor have been applied to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
  - 4. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
  - a. to supervise, direct, or control the Work;
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto;
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work;
  - d. to make any examination to ascertain how or for what purposes Contractor has used the money paid by Owner; or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.
6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:
  - a. the Work is defective, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or
  - e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

*D. Payment Becomes Due*

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

*E. Reductions in Payment by Owner*

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:
  - a. Claims have been made against Owner based on Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages resulting from Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;
  - b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;
  - c. Contractor has failed to provide and maintain required bonds or insurance;
  - d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;
  - e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;
  - f. The Work is defective, requiring correction or replacement;
  - g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;
  - h. The Contract Price has been reduced by Change Orders;

- i. An event has occurred that would constitute a default by Contractor and therefore justify a termination for cause;
    - j. Liquidated or other damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
    - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens; or
    - l. Other items entitle Owner to a set-off against the amount recommended.
  2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed will be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
  3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld will be treated as an amount due as determined by Paragraph 15.01.D.1 and subject to interest as provided in the Agreement.
- F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

#### 15.02 *Contractor's Warranty of Title*

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

#### 15.03 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, will be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under this Article 15.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which will fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have 7 days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.
  - D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
  - E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
  - F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

#### 15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
  1. At any time, Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when

Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through 15.03.E for that part of the Work.

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

#### 15.05 *Final Inspection*

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

#### 15.06 *Final Payment*

##### A. *Application for Payment*

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

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

#### 15.07 *Waiver of Claims*

- A. By making final payment, Owner waives its claim or right to liquidated damages or other damages for late completion by Contractor, except as set forth in an outstanding Claim, appeal under the provisions of Article 17, set-off, or express reservation of rights by Owner. Owner reserves all other claims or rights after final payment.
- B. Upon receipt of final payment, the Contractor shall send Owner an "unconditional waiver and release upon final payment", which waives all claims and rights by the Contractor against

Owner other than those pending matters that have been duly submitted as a Claim, or appealed under the provisions of Article 17.

- C. In the event of a dispute between the Owner and the Contractor, the Owner may withhold from the final payment an amount of 150 percent of the disputed amount.

15.08 *Correction Period*

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

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

## **ARTICLE 16—SUSPENSION OF WORK AND TERMINATION**

### **16.01 *Owner May Suspend Work***

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

### **16.02 *Owner May Terminate for Cause***

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

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

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

#### 16.03 *Owner May Terminate for Convenience*

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

#### 16.04 *Contractor May Stop Work or Terminate*

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

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

## **ARTICLE 17—FINAL RESOLUTION OF DISPUTES**

### **17.01 *Methods and Procedures***

Except as otherwise provided in the Contract Documents and by law, in the event of a dispute between OWNER and CONTRACTOR regarding any part of the Contract Documents or the performance of the Work, the parties will use the following procedure to resolve the dispute. Either party may notify the other that for purposes of time limits herein, the dispute resolution process has been instituted. The existence of any such dispute does not excuse continued performance under the Contract Documents.

- A. CONTRACTOR's and OWNER's project managers will first attempt to resolve the dispute through discussion and negotiation.
- B. If the project managers are unable to resolve the dispute within 20 days, the matter will be referred to the next managerial level of the respective parties.
- C. If the dispute is not resolved within 30 days of referral to management, the parties will attempt in good faith to resolve the dispute through mediation. Each party will bear its own costs of mediation and will share equally in common costs.
- D. If the dispute has not been resolved through mediation within 60 days of commencement of the mediation, either party may initiate litigation of the dispute or exercise such rights and remedies as either may have under the Contract Documents or the law.
- E. The parties may mutually agree to extend the time limits, or otherwise modify the procedure set forth above.
- F. Notwithstanding the above procedure, either party may seek injunctive relief to prevent irreparable harm.

## **ARTICLE 18—MISCELLANEOUS**

### **18.01 *Giving Notice***

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

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Assignment of Contract*

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

18.09 *Successors and Assigns*

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

18.10 *Headings*

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

## SECTION 01110

### SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. General description of the Project and the Work to be performed by the Contractor.
- B. General Project Description
  - 1. The Sweet Home Water Treatment Plant Finish Water (FW) and Backwash Pumping System Improvements Project involves the following main elements:
    - a. Adding variable frequency drives (VFDs) on the existing FW pumps to improve plant operations.
    - b. Installing a new backwash pump in the location provided for a future FW pump to improve backwash operations and eliminate the use of the City's distribution system for backwash operations that creates severe pressure fluctuations throughout the water distribution system.

##### 1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section
  - 1. Section: 01999 – Reference Forms

##### 1.03 WORK COVERED BY CONTRACT

- A. The Work covered under this Contract will be performed at the site of the City of Sweet Home's Sweet Home Water Treatment Plant, 1500 47th Avenue, Sweet Home, OR 97386. The project location is indicated on the Drawings.
- B. The Work to be performed by the Contractor generally includes:
  - 1. Furnishing all labor, superintendence, materials, power, water, tools, equipment and services required by the Contract Documents or required to complete the Work.
  - 2. Coordinate work of all trades.
  - 3. Furnishing and installing miscellaneous items incidental to or necessary for completion of the Work, whether these items are specifically indicated in the Contract Documents or not.
- C. The Work consists of, but is not limited to, construction of the following items:
  - 1. New Finished Water Pump VFD
    - a. Install a new control panel adjacent to existing Siemens control panel, CP101.
    - b. Furnish and install cables from each of the new VFD drives and the Active Harmonic Filter to the new control panel.

2. New Backwash Pump
  - a. Furnish and install a vertical turbine backwash pump and piping, valves, and appurtenances as shown on the Drawings.
  - b. Replace existing power conductors feeding MCC602 with 600A rated conductors.
  - c. Replace existing circuit breaker trip plug in MDP601 with new 600A trip plug.
  - d. Furnish and install cables connect the backwash pump soft starter MCC section and the backwash pump and piping appurtenances to the new control panel.

#### 1.04 OTHER CONTRACTS

- A. Other Construction Work: The Owner may be undertaking other projects at the plant site simultaneously with the Work to be completed under this project. Coordination with the contractors undertaking related work or un-related work within the plant is the responsibility of the Contractor.
- B. Electrical and Control System Integration: The Automation Group (TAG) is the Owner's Integrator-of-Record. TAG shall furnish and install new finished water and backwash pump VFDs, new MCC section and starter, new active harmonic filters, new control panel and new circuit breakers in MCCs as Owner-supplied equipment with disconnection, cabling, conductors installation by the Contractor. See Section 01140 and the Drawings for detailed Contractor installation requirements related to Owner-supplied equipment.

#### 1.05 SPECIFICATION LANGUAGE

- A. Specifications may be written in the imperative mood in streamlined form in accordance with practices and principals of the Construction Specifications Institute.
- B. Imperative language is directed to the Contractor unless specifically noted otherwise.
- C. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

#### 1.06 REGULATORY REQUIREMENTS

- A. Comply with all Federal, State, and local laws, regulations, codes, and ordinance applicable to the work.
- B. References in the Contract Documents to local codes shall mean those of the City of Sweet Home and Linn County.
- C. Other standards and codes that apply to the work are designated in the Specifications.

#### 1.07 ACCESS BY GOVERNMENT OFFICIALS

- A. Authorized representatives of governmental agencies shall have access to the work area at all times. Provide proper facilities for access and inspection.

#### 1.08 PROTECTION OF PUBLIC AND PRIVATE PROPERTY

- A. Contractor shall be responsible for all damage to streets, roads, driveways, highways, shoulders, ditches, embankments, culverts, bridges, and other public or private property, regardless of location or character, that may be caused by transporting equipment,

materials, or workers to or from the work or any part or site thereof, whether by Contractor or Contractor's subcontractors or suppliers.

- B. Keep fire hydrants and water control valves free from obstruction and available for use at all times.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01140

### WORK SEQUENCE AND CONSTRAINTS

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Schedule requirements, construction constraints, and a suggested Work sequence for specific elements of the Project.

##### 1.02 REFERENCED SECTIONS

- A. The following Section is reference in this Section
  - 1. Section 01999 – Reference Forms

##### 1.03 GENERAL SEQUENCING REQUIREMENTS

- A. The sequencing requirements and construction constraints described are critical elements of the Work and are presented to underscore the importance of proper management, planning, scheduling, coordination, and execution of the Work.
- B. Sequencing requirements and construction constraints have been defined in this Section for only certain structures, facilities, and elements of the Work. All work, whether or not addressed in this Section, shall be governed by applicable specified requirements. If additional shutdown constraints are necessary to allow implementation of Contractor's construction procedures and schedule, the Engineer will establish such constraints.
- C. Contractor's Construction Schedule:
  - 1. Clearly illustrate the proposed sequence of construction.
  - 2. Conform to the sequencing requirements and limitations specified in this Section.
  - 3. Modify or adapt the suggested sequencing as necessary to complete the project provided all environmental and service continuity requirements are met.

##### 1.04 OPERATIONAL CONTINUITY

- A. The City of Sweet Home owns and operates water treatment facilities. The Work under this project will interface with these existing facilities.
- B. Owner's personnel will be responsible for operating and maintaining the existing facilities throughout the execution of this Contract.
- C. Take particular care to avoid clutter and debris at the site of the work. This includes work areas and staging areas at the water treatment plant.
- D. Limit operations, storage of equipment, and materials and parking of employees to the areas designated on the Drawings.
- E. The existing water treatment plant and distribution system continuously receives raw water, and produces and distributes potable water throughout the City. Do not interrupt functions necessary to maintain operation of these facilities except as approved by the Engineer through review of the Contractor's Facility Outage Plan and as specified herein.

- F. Coordinate the Work to minimize interference and interruption of the normal operation of the Owner's existing facilities through proper planning and by making temporary connections.
- G. Except for allowable out-of-service periods as specified, maintain operation of water treatment plant processes and ancillary facilities at the Sweet Home Water Treatment Plant site.

#### 1.05 ACCESS

- A. The existing facility where Contractor's work is to be done will be occupied by the Owner throughout the construction period. Access to the site by the Owner's personnel is required for daily operations, maintenance, and administration. Additionally, regular traffic into and out of the site is to be expected.
- B. Contractor shall provide all necessary access to the Owner's personnel as required to safely and efficiently operate/maintain the facilities. At all times during the Contract duration, the Contractor is to provide the Owner's personnel and representatives safe and immediate access to all process control equipment.
- C. Contractor shall provide for unimpeded access for all delivery vehicles transporting materials, chemicals and equipment to the facility for the Owner's operations. Contractor shall coordinate the work to avoid interference with vehicular access to the existing plant site and normal operation of plant equipment and processes.

#### 1.06 FACILITY OUTAGE PLAN

- A. Prepare and submit a detailed Facility Outage Plan when removal of an existing facility from service is necessary to complete the Work. Facility Outage Plans shall be provided for installation of electrical equipment and clear well entry for core-drilling and installation of the new backwash pump.
- B. The Contractor shall employ key personnel knowledgeable and experienced in water treatment plant construction, including knowledge of treatment processes and facility operations, for development of the Facility Outage Plan. Examples of required knowledge include but are not limited to: water treatment terminology; water treatment plant functions; and actions that would adversely impact water treatment and water quality.
- C. The Facility Outage Plan shall describe, as applicable, a listing of existing facilities that will be taken out of service, methods for preventing bypassing of other treatment units, the length of time required to complete the operation, and the necessary personnel and equipment which will be provided in order to successfully complete the operation.
- D. Develop the Facility Outage Plan to satisfy the Work restrictions and conditions specified in this Section. Coordinate the outage schedule with the overall construction schedule.
- E. Submit the Facility Outage Plan to the Engineer for review and approval at least three (3) weeks prior to the scheduled outage. Develop the Facility Outage Plan to satisfy the Work Sequence restrictions and conditions specified in this Section. Do not proceed with any Work involving facility outages until the Outage Plan has been approved by the Engineer.
- F. A System Outage Request (SOR) form shall accompany each outage or bypass plan (See Section 01999). Coordinate the outage schedule with the overall construction schedule.
- G. The Contractor shall attend a meeting with the Construction Manager and Owner one (1) week before the scheduled outage to review the SOR. Any changes to the SOR must be approved by the Construction Manager and the Owner prior to the outage. Significant

changes shall, at the sole discretion of the Owner, cause the scheduled outage to be rescheduled for the nearest date acceptable to the Owner.

#### 1.07 REMOVING EXISTING FACILITIES FROM SERVICE

- A. Existing systems or individual equipment items shall be isolated, decommissioned, de-energized, or depressurized only by the Owner's operations personnel. This work will be done in accordance with the Facility Outage Plan and schedule prepared by the Contractor.
- B. The Contractor shall design and provide all necessary bulkheads, cofferdams, and support structures to allow isolation of work areas from tanks, pipes, and/or channels that are in service. Bulkheads, cofferdams, and support structures shall conform to applicable OSHA requirements.
- C. The Contractor shall provide all necessary temporary pumps, piping, power, electrical wiring, controls, and labor during and subsequent to all shutdown activities as required. Maintain adequate access to the plant facilities, utilities, and equipment during construction to allow continued operation and maintenance by Owner's personnel to take place.
- D. Prior to any shutdown or flow diversion, all materials, bypass pumps, fittings, supports, equipment and tools shall be on the site and all necessary skilled labor scheduled prior to starting any connection work.
- E. If valves or gates need to be opened or closed, or mechanical equipment turned off or turned on, or similar operations performed to allow construction to proceed, this is to be performed by the Owner's operations staff working in coordination with Contractor personnel. Valves and gates that may be used to isolate lines and facilities may not completely seal. Contractor shall allow for leakage in planning the Work. Contractor shall clean the work areas as required to perform the work.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### 3.01 WORK COORDINATION

- A. Schedule and coordinate the overall Work and construction operations, including the work of subcontractors and the timely provision of products and supplies.
- B. Perform Work in an orderly and logical sequence. Individual specification Sections may identify specific requirements that are related to Work sequence. These types of constraints are not repeated in this Section but shall be followed by the Contractor.

#### 3.02 WORK CONSTRAINTS

- A. General Requirements
  - 1. Connections to the existing treatment plant facilities, including piping, electrical, and/or control connections must be coordinated with the operation of the existing treatment plant. The following sub-sections are intended to describe the constraints and sequencing associated with these connections.
  - 2. Contractor is required to identify all work constraints and sequencing of all connections to the existing treatment plant. The schedule of dates for all connections to the existing treatment plant should be included in the Contractor's Baseline Schedule and all subsequent Updated Baseline Schedules.

3. Submission of Facility Outage Plans are required as specified for plant-wide or partial suspension of processes or utility services.
  4. Plant-Wide Outage
    - a. A plant-wide outage may be requested in an outage plan, but the maximum continuous length of the outage shall not exceed eight (8) hours duration.
  5. Stoppage of Water Treatment Process
    - a. Stoppage events shall occur for a period of no more than eight (8) hours.
    - b. Stoppage events shall occur between the hours of 10:00 PM and 5:00 AM.
    - c. There shall be at least two (2) days between the end of one stoppage event and the beginning of the next stoppage event.
    - d. Notify Owner of a stoppage event by submitting an SOR at least three (3) weeks prior to the time when a stoppage event is scheduled to begin.
- B. Work Hours
1. Except as otherwise required for the safety or protection of persons and except as otherwise stated in the Contract Documents, Work may only be performed Monday through Friday during the hours of 7:00 am and 6:00 pm. Contractor will not perform Work on a Sunday or any legal holiday defined by the City of Sweet Home without written consent from the Owner.
  2. Legal holidays are defined as:
    - a. New Year's Day on January 1.
    - b. Martin Luther King Jr. Day on the third Monday in January.
    - c. President's Day on the third Monday in February.
    - d. Memorial Day on the last Monday in May.
    - e. Independence Day on July 4.
    - f. Labor Day on the first Monday in September.
    - g. Veterans Day on November 11.
    - h. Thanksgiving Day on the fourth Thursday in November.
    - i. Christmas Day on December 25.
    - j. When a holiday falls on Sunday, the following Monday is recognized as the legal holiday. When a holiday falls on a Saturday, the preceding Friday is recognized as the legal holiday.
- C. Contractor shall undertake the Work in compliance with the constraints defined in the following paragraphs:
1. Clearwell Draining and Entry
    - a. Draining of and entry into the existing clearwell is anticipated to be required for the installation of the backwash pump.
    - b. Notify Owner of a clearwell draining event by submitting an SOR at least three (3) weeks prior to the time when entry into the clearwell is scheduled to begin.
    - c. Clearwell draining will take approximately 2-3 hours and will be completed by the Owner based on the schedule in the approved SOR.

- d. The Contractor shall disinfect all tools, equipment and clothing that will come in contact with the clear well surfaces or standing water prior to entry into the clearwell.
  - e. The clearwell interior surfaces shall be disinfected immediately upon completion of the work requiring entry into the clearwell so that the clearwell may be returned to service. The clearwell shall not be out of service for more than one (1) day.
  - f. The work shall be completed with one shutdown and draining of the clearwell. Any subsequent draining of the clearwell required to complete the Work shall be paid for by the Contractor.
2. Finished Water Pump Outage
- a. Outage of the finished water pumps needed for the installation and connection of the VFDs shall be coordinated to coincide with the clearwell shut down period to minimize the duration that finished water pumps are out of service.
  - b. Sequence work so that at least two finished water pumps are available for operation at all times during the construction period. More than one finished water pump may be out of service only during approved outage periods for the finished water pumps and clearwell.
3. Backwash Pipe Connection
- a. Backwash water supply is needed for 60 minutes once every 24 hours for filter backwashes. Coordinate with the Owner to schedule the connection to the existing backwash pipeline to minimize interference with the backwash water supply to the filters.
  - b. The backwash pump and discharge piping shall be tested and disinfected before it can be used to supply backwash water to the filters.

### 3.03 WORK SEQUENCE REQUIREMENTS AND CONSIDERATIONS

- A. Contractor shall coordinate with and support The Automation Group (TAG), Owner's Integrator-of-Record, for delivery and installation of Owner-supplied equipment as summarized below and in the Drawings:
- 1. New Variable Frequency Drives (VFDs): TAG will remove existing soft starters and install new VFD's for the existing finished water and new backwash pumps. Contractor shall disconnect and reconnect existing conductors and provide new ethernet cables to new control panel.
  - 2. New Motor Control Center (MCC) section – TAG will provide new MCC section and starter for the new backwash pump. Contractor shall install new section and provide all cabling and conduits as well as new ethernet cable to new control panel.
  - 3. New control panel - TAG will provide and install new circuit breakers. Contractor shall provide new conductors and conduits and connect to new circuit breakers.
  - 4. New Active Harmonic Filters (AHF's) and Current Transformers (CTs): TAG will provide new AHFs and CT's. Contractor shall install new AHF's and CT's and provide all cabling and conductors as well as new ethernet cables to new control panel.

5. New circuit breakers in MCC's: TAG will provide and install new circuit breakers for AHF's. Contractor shall provide all cabling and conductors for new circuit breakers.
- B. It is recommended the Contractor initiate discussions related to clearwell entry as soon as possible after Notice-to-Proceed, as Owner must carefully sequence clearwell draining with overall water system operations.
- C. It is recommended that the Contractor initiate submittal and shop drawing preparation for the vertical turbine backwash pump as soon as possible after Notice-to-Proceed, as the vertical turbine pump has a significant production and delivery time.

**END OF SECTION**

## SECTION 01170

### NOVEL CORONAVIRUS (COVID-19) SAFETY REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Section Includes: COVID-19 safety requirements in response to the need for work on essential construction projects that are permissible under the Linn County Health Services COVID-19 Safety Orders and applicable State and Federal guidelines/orders, to continue as safely as possible.
- B. These COVID-19 safety requirements are not all encompassing and may need to be modified by the Contractor to individual construction tasks and updated as the COVID-19 pandemic evolves.
- C. The Contractor and all its sub-tier level subcontractors and suppliers shall account in their Bid and sub-bids for all cost impacts whether affecting labor (including, but not limited to obtaining qualified workers, quantity of workers, as well as their productivity), deliveries, supervision, testing and/or procurement of materials and/or equipment and time caused by COVID-19 safety requirements found in this Section 01170 and also all public health and/or governmental directives in place at the time Bids are received by the Owner for this Project.

##### 1.02 COVID-19 EXPOSURE PREVENTION, PREPAREDNESS, AND RESPONSE PLAN

- A. Contractor's Responsibility
  - 1. The Contractor shall prepare a COVID-19 Exposure Prevention, Preparedness and Response Plan specific to this Project that describes how to prevent worker exposure to coronavirus, protective measures to be taken on the jobsite, personal protective equipment and work practice controls to be used, cleaning and disinfecting procedures, and what to do if a worker(s) shows symptoms of COVID-19 illness or tests positive for COVID-19. The Contractor should review the latest OSHA COVID-19 Workplace Safety Guidance document (<https://www.osha.gov/Publications/OSHA3990.pdf>) as a resource in preparation of their Site Specific Health and Safety Plan. Other reliable and current sources of COVID-19 information can be found at:  
  
Oregon Health Authority (OHA, State)  
<https://www.oregon.gov/oha/erd/pages/covid-19-news.aspx>  
  
Centers for Disease Control and Prevention (CDC, National)  
<http://www.cdc.gov/coronavirus/novel-coronavirus-2019.html>
  - 2. This plan shall at a minimum address the following COVID-19 safety guidelines:
    - a. COVID-19 Employee and Visitor training and check-list before entering worksite.
    - b. Employee distancing and strategies to maximize distancing when possible.
    - c. Limitations on gathering size.

- d. Personal Protective Equipment (PPE) requirements.
  - e. Identify “choke points” and “high risk areas” such as hallways, hoists and elevators, break areas and vehicles.
  - f. Stagger trades and modify work schedules to reduce worker density to maximize distancing opportunities.
  - g. COVID-19 employee good personal hygiene measures.
  - h. Disinfecting and cleaning requirements.
  - i. Personal prevention actions requirements for all employees.
  - j. Toolbox and Tailgate COVID-19 employee training.
  - k. Recognizing COVID-19 Symptoms.
  - l. Establish a COVID-19 Exposure Action and Notification Plan.
  - m. Establish daily screening protocols for arriving workers and visitors to ensure potentially infected workers and visitors do not enter the Site.
  - n. Maintain daily attendance log of all workers and visitors who enter the Site.
- 3. Also, as part of this Plan, the Contractor shall draft and implement a COVID-19 Code of Safe Practices that is posted in areas visible to all employees and visitors.
  - 4. The Contractor shall be prepared at each Progress and Coordination Meeting, if requested by the Construction Manager, to provide information relevant to the application, enforcement and implementation of such COVID-19 Safe Practices.
  - 5. All Contractor managers and supervisors (**from forepersons to project managers**) must be familiar with this Plan and be ready to answer questions from employees, subcontractors, suppliers and visitors. Managers and supervisors must set a good example by following this Plan at all times. This involves practicing good personal hygiene and jobsite safety practices to prevent the spread of the virus. Managers and supervisors must encourage this same behavior from all employees, subcontractors, suppliers and visitors.
  - 6. The Contractor shall immediately notify the Construction Manager if any person under the Contractor’s control on this Project has tested positive for COVID-19.

1.03 SUBMITTALS

- A. Provide following information in accordance with Section 01330, Submittal, after the Award of Contract and before any work begins at the Site:
  - 1. COVID-19 Exposure Prevention, Preparedness and Response Plan.
  - 2. COVID-19 Code of Safe Practices.
- B. To the extent that there are material amendments or modifications made to any of the above plans or practices during the performance of the Work, the Contractor shall provide to the Owner as soon as practicable the amendments and shall post them as part of the notification plan to all employees and visitors who enter the Site.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

## SECTION 01200

### MEASUREMENT AND PAYMENT

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Methods of measurement and payment for specific items of Work under this Contract. Refer also to General Conditions for administrative aspects of payments by the Owner to the Contractor.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Owner's Special Provisions
  - 2. Section 00700 – General Conditions

##### 1.03 BID COMPONENTS AND PAYMENT

- A. The Bid Form is comprised of the following components:
  - 1. Lump Sum Work
- B. Contractor's cost for "Lump Sum Work" shall cover all Work indicated by the Contract Documents with the exception of cash allowances and specific items of work that are to be paid on a Unit Price basis as indicated on the Bid Form. Lump Sum Work will be paid for on a progress payment basis in accordance with the provisions of the General Conditions.

##### 1.04 BID ITEMS

- A. Bid Item 1 – Mobilization and Demobilization
  - 1. Includes full compensation for all work, equipment, and materials, not included in other bid items, necessary to complete project.
  - 2. Contractor may apply for payment for mobilization on a percent complete basis as the items covered in Mobilization are being completed. Mobilization items shall include:
    - a. Obtaining all bonds and required insurance.
    - b. Submittal and approval of initial project schedule.
    - c. Obtaining required permits, licenses, agreements, and certifications.
    - d. Moving onto the site of all equipment, materials, and staff, including arranging for and setting up of Contractor's staging area.
    - e. Furnishing temporary construction utilities (e.g., temporary power, water, sanitation, etc.).
    - f. Furnishing and erecting all needed temporary construction facilities, fencing, project signage, project security.
    - g. All other work as required for the proper performance and completion of the Project, including documentation, progress schedules and reports, contract meetings, and maintaining record drawings.

3. Contractor may apply for payment of demobilization after the overall project substantial completion is achieved and the project begins to demobilize. Demobilization items shall include:
    - a. Disconnecting all temporary construction utilities.
    - b. Removal of all temporary construction facilities.
    - c. Post-construction meeting.
    - d. All other work as required for project closeout.
  4. Payment for mobilization shall not exceed five percent (5%) of the total bid price. Payment for mobilization in excess of this amount shall be paid after overall project substantial completion is achieved and demobilization begins.
- B. Bid Item No. 2 – All Other Work.
1. Includes providing all work called for in the plans and specifications not included in Bid Item No. 1.
  2. The work in this bid item is to be paid at the Contract lump sum price bid in the Bid Schedule.
  3. The lump sum price shall include full compensation for furnishing all labor, tools, equipment, materials, and incidentals and doing all work required to complete the project. The price shall include but not be limited to the cost of demolition, piping, concrete work, structural work, finishes, plumbing, equipment, equipment installation, electrical and instrumentation work, painting, equipment and system startup and testing, specialty items, and all appurtenant work.
  4. The Contractor may apply for payment of this Bid Item on a percent complete basis as the items covered are being completed.

#### 1.05 SCHEDULE OF VALUES

- A. Format: Identify each line item in the Schedule of Values with number and title of the major Specification sections. Submit typed schedule on 8½ x 11-inch paper; Contractor's standard form or media-driven printout will be considered on request.
- B. At the pre-construction meeting, submit a preliminary Schedule of Values to the Owner's Representative for review. The Contractor shall incorporate any review comments from the Owner's Representative, and submit a final Schedule of Values at least 21 days prior to submitting the first Application for Payment.
- C. The Schedule of Values shall assign a fair, reasonable and equitable dollar value for each activity on the Contractor's construction schedule. The Schedule of Values shall include anticipated progress payments for each item in the bid schedule through the final payment. In addition, a detailed breakdown of lump sum prices shall be included in the Schedule of Values.
- D. The Schedule of Values shall specifically indicate installed cost for materials and equipment for each bid and sub-bid item.
- E. Each activity's assigned value shall consist of labor, equipment and materials cost and a prorata contribution to overhead and profit. Breakdown shall be so organized as to facilitate assessment of work and payment of subcontractors.
- F. The sum of the assigned values shall equal the lump sum price of the activity.

- G. If, in the opinion of the Owner's Representative or Owner, the Schedule of Values is not balanced, the Contractor shall provide documentation substantiating the cost allocations of those activities believed to be unbalanced. Cost allocation will be considered unbalanced if an activity on the construction schedule has been assigned a disproportionate allocation of labor, direct, or overhead and profit costs which result in progress payment request(s) which would create a condition where insufficient funds are available to complete the unfinished work. Upon request by Owner, support values shall be given with data that will substantiate their accuracy. Upon Owner's request, the Contractor shall submit additional detailed cost information.
- H. Upon acceptance of the Schedule of Values, it shall be used as a basis for processing all progress payment requests.

1.06 PROGRESS PAYMENT REQUESTS

- A. Submit Progress Payment Requests during the course of the project in conformance with the Owner's Special Provisions and Section 00700.
- B. Submittal of record drawings of the project will be required at substantial completion of the project. This submittal shall accompany the payment request at substantial completion and will be a condition of processing payment requests.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01330

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 SUMMARY

- A. Requirements for the submittal of information that will enable determination of whether the Contractor's proposed materials, equipment or methods of work are in general conformance to the design concept and in compliance with the Contract Documents.
- B. Furnish drawings, specifications, descriptive data, certificates, samples, test results, methods, schedules, manufacturer's installation instructions and other information as indicated.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Section 01999 – Reference Forms
  - 2. Section 16000 –General Provisions (Electrical)

##### 1.03 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the materials and equipment incorporated into the Work, or the methods of performing the Work shall be as described in the accepted submittals.
- B. Verify that all features of all products conform to the specified requirements. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. Extraneous materials shall be crossed out or otherwise obliterated.
- C. Coordinate submittals among subcontractors and suppliers. Ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner, including those submittals complying with unit responsibility requirements specified in applicable technical sections.
- D. Coordinate submittals with the Work so that work will not be delayed. Coordinate and schedule different categories of submittals, so that one will not be delayed for lack of coordination with another. No extension of time will be allowed because of failure to properly schedule submittals.
- E. Do not proceed with work related to a submittal until the submittal process is complete and the submittal has received a response "No Exceptions Taken" or "Make Corrections Noted."
- F. Certify on each submittal document that the Contractor has reviewed the submittal, verified field conditions, and complied with the contract documents.
  - 1. Include a copy of the specification section with addendum updates, all referenced and applicable sections, and each paragraph check-marked to indicate specification

compliance or marked to indicate requested deviations from specification requirements.

- a. Use check marks (✓) to denote full compliance with a paragraph as a whole.
  - b. If deviations from the specifications are indicated and, therefore requested by the Contractor, underline each deviation and denote by a number in the margin to the right of the identified paragraph.
  - c. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications.
  - d. Include a detailed, written justification for each deviation.
2. Failure to comply with this paragraph is sufficient cause to reject the entire submittal.

G. For Electrical submittals, also comply with Section 16000.

#### 1.04 REVIEW COSTS

- A. The Owner's cost for review of submittals for the same proposed materials, equipment or work will be apportioned as follows:
  1. The cost of review of the initial submittal and the first revised submittal will be borne by the Owner.
  2. The cost to review all additional revised submittals after the first revised submittal will be charged to the Contractor. The cost of review shall include, without limitation, administrative, design and engineering activities directly related to review of submittals.

#### 1.05 SUBMITTAL INDEX

- A. Within 30 days of the Notice to proceed, submit a list, by specification section, of all submittals to be submitted.
- B. Update and resubmit the submittal index on a monthly basis where additional submittals are identified, or as necessary

#### 1.06 CATEGORIES OF SUBMITTALS

- A. General
  1. Submittals fall into two general categories;
    - a. Submittals for review and comment require action by the Engineer.
    - b. Submittals that are primarily for information only do not require Engineer's approval.
- B. Submittals for Review and Comment
  1. Transmit submittals for review and comment to the Engineer. The Engineer will review the submittal for compliance with the Contract requirements and will provide written comments regarding acceptability.
- C. Submittals for Information Only
  1. Where specified, furnish submittals to the Engineer for information only. The Engineer may, at the Engineer's option, review and comment on any product data.

2. Incomplete or inadequate product data will be returned to the Contractor for resubmittal.

## 1.07 TRANSMITTAL PROCEDURE

### A. General

1. Transmit submittals regarding material and equipment under cover of a Shop Drawing/Transmittal Form. See Section 01999.
2. Use a separate form for each specific item, class of material, equipment, and items specified in separate, discrete sections, for which the submittal is required.
3. Identify submittal documents common to more than one piece of equipment with all the appropriate equipment numbers.
4. Make submittals for various items with a single form when the items taken together constitute a manufacturer's package or are so functionally related that expediency indicates checking or review of the group or package as a whole.
5. Assign a unique sequential number on the transmittal form accompanying each item submitted.
  - a. Use the following format for original submittal numbers: "XXX"; where "XXX" is the sequential number assigned by the Contractor.
  - b. Use the following format for resubmittals: "XXX-Y"; where "XXX" is the originally assigned submittal number and "Y" is a sequential letter assigned for resubmittals, i.e., A, B, or C being the 1st, 2nd, and 3rd resubmittals, respectively. Submittal 25B, for example, is the second resubmittal of submittal 25.

### B. Electronic Submittals

1. Electronic submittals are preferred except as otherwise indicated.
2. Prepare electronic submittals and Shop Drawings in electronic (\*.pdf) format including half-sized and full-sized drawings, catalog information and other required submittal information.
3. Break down submittals that are larger than 10 megabytes into smaller sections, using logical division points to create sections.
4. Electronically bookmark electronic submittals greater than 30 pages in length by major submittal section to facilitate ease of navigation.

### C. Paper copy submittals are an acceptable alternative to electronic submittals if the Contractor demonstrates, to the satisfaction of the Engineer, that electronic submittals presents a hardship.

### D. Deviation from Contract

1. If the Contractor proposes to provide material, equipment, or method of work that deviates from the project manual, so indicate under "Proposed Deviations" on the transmittal form accompanying the submittal copies.

### E. Submittal Completeness

1. Submittals that do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.

## 1.08 SUBMITTAL CONTENT

- A. Prepare submittals in compliance with individual Specification Sections and as indicated herein.
- B. Shop Drawings:
  - 1. Develop project-specific, scaled drawings to fully identify materials and products that will be provided and their relationship to other products that will be furnished and installed.
  - 2. Do not utilize reproductions of the Contract Documents as the basis for the submittal.
  - 3. Identify products, assemblies, equipment and systems.
  - 4. Provide equipment identification numbers or tag numbers, wiring diagrams, and setting diagrams.
  - 5. Identify critical dimensions.
- C. Product Data:
  - 1. Provide information necessary to demonstrate conformance with the specified requirements. Include performance curves, specifications, and wiring diagrams.
  - 2. Product data may consist of manufacturer's standard catalog information and data sheets, marked to indicate the specific products that will be provided.
  - 3. Provide supplemental information as necessary to fully demonstrate how products will be modified from the manufacturer's standard products to meet the specification requirements.
- D. Manufacturer's Instructions: Written or published information that establishes the manufacturer's recommendations, guidelines and procedures for handling and installation of products, equipment and assemblies.
- E. Samples: Mount, display or package samples in a manner that will facilitate review and establish workmanship and quality of materials.

## 1.09 SUBMITTAL REQUIREMENTS

- A. When the Contract Documents require a submittal, submit the specified information as follows:
  - 1. Submittals for Review and Comment:
    - a. Electronic Submittal: Submit one electronic (\*.pdf) submittal.
  - 2. Submittals for Information Only:
    - a. Electronic Submittal: Submit one electronic (\*.pdf) submittal.

## 1.10 REVIEW PROCEDURE

- A. General
  - 1. The Engineer will review submittals within the processing time identified in paragraph "Processing Time" and return:
    - a. Electronic Submittal – a signed submittal response document, in (\*.pdf) format.

B. Submittals for Review and Comment

1. The returned submittal will indicate one of the following actions:
  - a. "NO EXCEPTIONS TAKEN" – The material, equipment or work method complies with the project manual.
  - b. "MAKE CORRECTIONS NOTED" – Limited corrections are required.
    - 1) Provide a corrected copy where:
      - a) The information is to be included in the O&M data.
      - b) If requested by the Engineer.
  - c. "AMEND AND RESUBMIT" – The submittal is insufficient or contains incorrect data.
  - d. "REJECTED – SEE REMARKS" – The material, equipment, or work method does not comply with the project manual. Submittals with deviations that have not been identified clearly may be rejected.
2. For submittals marked "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."
  - a. The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with any noted corrections.
3. For submittals marked "AMEND AND RESUBMIT" or "REJECTED – SEE REMARKS"
  - a. Contractor shall provide a typed letter responding to each of the Engineer's review comments with each resubmittal.
  - b. Except at its own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is submitted and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED."

C. Submittals for Information Only

1. The returned submittal will indicate "ACCEPTED FOR RECORD" if the submittal is complete and adequate.
2. Engineer may return comments on information submittals to identify concerns with what was submitted, in such case, Contractor shall address concerns in writing and return a revised submittal.

1.11 PROCESSING TIME

- A. Prepare submittals and transmit to Engineer for review in sufficient time to allow Engineer's review; manufacture, fabrication or assembly of materials and systems; and shipping of material to the site in time for installation in accordance with the Contractor's schedule.
- B. Engineer's time for review will begin upon receipt of a complete and comprehensive submittal containing all required information.
- C. Engineer will review submitted information and transmit a response to Contractor within 15 working days after receipt, subject to the following:

1. In some instances, review times for specific submittals may be modified by the individual specification Section.
  2. Resubmittals will be subject to the same review time.
- D. No adjustment of Contract Time or Contract Price will be allowed due to delays in the progress of the Work that are caused by rejected submittals and subsequent resubmittals.

#### 1.12 EFFECT OF REVIEW OF CONTRACTOR'S SUBMITTALS

- A. The purpose of submittals is to demonstrate how Contractor intends to conform to the Contract Documents and design concepts. Engineer is entitled to rely upon the accuracy and completeness of designs, calculations, or certifications made by licensed professionals whether or not a stamp or seal is required by the Contract Documents.
- B. The review procedure is based on the Contractor's guarantee that all features and characteristics not requiring submittals conform to the contract documents.
- C. Review of contract drawings, methods of work, or information regarding materials or equipment the Contractor proposes to provide, does not relieve the Contractor of its responsibility for
1. Fulfilling the requirements of the Contract,
  2. Proper operation of the equipment,
  3. Correction of defective work
- D. Reviews shall not be regarded as an assumption of risk or liability by the Engineer or the Owner.
- E. A mark of "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED" means that the Owner has no objection to the Contractor, upon its own responsibility, using the plan or method of work proposed, or providing the materials or equipment proposed.
- F. The Engineer's review of shop drawings, samples, or test procedures will be only for conformance with design concepts and for compliance with information given in Contract Documents. The Engineer's review does not extend to:
1. Accuracy of dimensions, quantities, or performance of equipment and systems designed by Contractor.
  2. Contractor's means, methods, techniques, sequences, or procedures except when specified, indicated on the Drawings, or required by Contract Documents.
  3. Safety precautions or programs related to safety which shall remain the sole responsibility of the Contractor.
- G. Review of a separate item does not indicate approval of the assembly in which the item functions.

#### 1.13 SUBSTITUTIONS OR "OR EQUAL" ITEMS

- A. Named or Sole Source Times
1. Whenever materials or equipment are specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the naming of the item is intended to establish the type, function, and quality required.

2. Unless the name designated a “sole source” and/or is followed by words indicating that no substitution is permitted, materials, or equipment of other Suppliers may be accepted by Engineer if sufficient information is submitted by Contractor to allow Engineer to determine that the material or equipment proposed is equivalent or equal to that named.

**B. Initiating Substitution Request**

1. To propose to furnish or use a substitute item of material or equipment, Contractor shall use the Proposed “Or Equal” Substitution Submittal Transmittal Form found in Section 01999.
2. Submit the Substitution Submittal form to Engineer for acceptance, certifying that the proposed substitute will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified.
3. State that the evaluation and acceptance of the proposed substitute will not prejudice Contractor’s achievement of Substantial Completion on time, whether acceptance of the substitute for use in the Work will require:
  - a. A change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for Work on the Project) to adapt the design to the proposed substitute.
  - b. Incorporation or use of the substitute in connection with the Work is subject to payment of any license fee or royalty.
4. Identify all variations of the proposed substitution from that specified
5. Identify available maintenance, repair, and replacement service
6. Provide an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute, including costs of redesign and claims of other contractors affected by the resulting change
7. The Owner, or Engineer may require Contractor to furnish at Contractor’s expense additional data about the proposed substitute.
8. If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the Contract Documents, Contractor may propose to furnish or utilize a substitute means, method, sequence, technique or procedure of construction. Submit sufficient information to allow Engineer to determine that the proposed substitution is equivalent to that indicated or required by the Contract Documents.

**C. Review Procedure**

1. The procedure for review of substitutions by Engineer will be similar to that provided in this Section.
2. Requests for substitutions may only be submitted by the Contractor.
3. All requests for substitution shall be submitted within fourteen (14) calendar days after the date of Notice to Proceed unless the Owner has agreed in writing to a later submittal date and the Contractor agrees to comply with all conditions of the Owner for the late submittal.
4. The Owner’s agreement to a later submittal date shall not be construed as favorable review or acceptance of the proposed “or equal” substitution.

5. The Engineer will respond to all requests for substitutions within fourteen (14) days following receipt of an acceptable substitution submittal, unless the Engineer notifies the Contractor within fourteen (14) days after receipt of the proposed “or equal” substitution submittal that more time is needed to complete a thorough review.
  6. The Engineer and Owner will be the sole judge of acceptability, and no proposed “or equal” substitution item or service will be ordered, installed or utilized without Engineer’s prior written acceptance that will be evidenced by either a Change Order or an accepted Shop Drawing.
  7. As a condition of acceptance, the Owner may require Contractor to furnish, at Contractor’s expense, a special performance guarantee or other surety with respect to a proposed “or equal” substitution item or service.
- D. Modification due to Substitutions
1. All costs for redesign required by the implementation of the proposed substitute shall be borne by the Contractor.
  2. All costs associated with incorporating a substitution into the project shall be borne by the Contractor.

#### 1.14 OPERATION AND MAINTENANCE MANUALS

- A. Submit one electronic copy and three complete sets.
- B. Provide operation and maintenance manuals and parts list for all equipment furnished under this contract. Comply with the detailed requirements in Technical Specification sections. Include instructions for delivery, storage, assembly, installation, lubrication, adjusting, startup, operation and maintenance.
  1. For all equipment include:
    - a. Startup instructions
    - b. Normal operation instructions.
    - c. Trouble shooting instructions.
    - d. Lubrication instructions.
    - e. Maintenance and reinstallation instructions.
    - f. Parts identification.
    - g. List of spare parts recommended to have on hand.
    - h. Operator safety instructions.
  2. For all Electrical Equipment, provide the following additional information:
    - a. Equipment ratings.
    - b. Calibration curves and rating tables if appropriate.
  3. For Complex Equipment provide in addition:
    - a. Alternate specified operating modes.
    - b. Emergency shutdown instructions.
    - c. Normal shutdown instructions.
    - d. Long-term shutdown instructions.

4. Operation and maintenance manuals for systems composed of separate pieces of equipment shall include a system explanation of Items 1, a, b, and c, and 3a through c, as well as the instructions for each separate piece of equipment.
- C. Submit at least 15 days prior to Facility Startup and Commissioning.

#### 1.15 RECORD DRAWINGS

- A. Record Drawings are documents maintained and annotated by the Contractor during construction to illustrate the final location of piping, equipment, electrical conduits, outlet boxes and cables.
- B. Record changes or deviations that vary from the details indicated on the original Contract Documents. Identify buried or concealed construction and utility features that are revealed during the course of construction. Record the horizontal and vertical location of buried utilities that differ from the locations indicated, or which were not indicated on the Contract Documents.
- C. When the configuration and arrangement of the Work is changed from that indicated on the Contract Drawings or specified in the Project Manual, the authorizing document for the change, such as a Request for Information, Change Order, Shop Drawing, or Field Order, shall be clearly referenced on the Record Drawings as a comment.
- D. Supplement the Record Drawings with detailed layout sketches, schedules, installation drawings and fabrication drawings.
- E. Record Drawings shall be full-size and maintained in a clean and legible condition. Engineer will provide one set of full-size Drawings for use as a Record Drawing set.
- F. Do not use the Record Drawing set for construction purposes.
- G. At the completion of the work, but prior to final payment, submit the Record Drawing set to the Engineer.
- H. Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed.
- I. Annotations to the Record Drawings shall be legible and shall be made with an erasable colored pencil conforming to the following color code:
  1. Additions and Final Dimensions – Red
  2. Deletions – Green
  3. Comments – Blue
- J. Engineer will review the Contractor's updated Record Drawing mark-ups on a monthly basis during the evaluation of each progress payment.
- K. Progress payment approval is contingent upon complete and up-to-date Record Drawing mark-ups.
- L. Payment approval will be delayed if mark-up drawings are not up-to-date.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

#### **END OF SECTION**

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## SECTION 01500

### CONSTRUCTION FACILITIES AND UTILITIES

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Requirements for Contractor's temporary facilities at the job site and for the prosecution of the Work.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section:
  - 1. Section 01330 – Submittals
  - 2. Section 01725 – Protection of Existing Facilities

##### 1.03 SUBMITTALS

- A. Comply with Section 01330.
- B. Submit the following items:
  - 1. Proposed plan and layout for all temporary offices, sanitary facilities, designated parking areas, staging areas, storage areas, and access roads.
  - 2. Proposed plan for temporary water service and distribution, sewer connections, phone service, internet service, and power service and distribution.
  - 3. Proposed layout (site and floor plan) of Contractor's office trailer, if required. Include manufacturer's name and product literature.

##### 1.04 STAGING AREA

- A. Before starting the work, submit a proposed plan and layout for all temporary offices, sanitary facilities, storage areas, temporary water service and distribution, and temporary power service and distribution.
- B. Store only those materials and equipment that are related to the construction of the Work within the staging area.

##### 1.05 SECURITY

- A. The site is not secured and does not have controlled access.
- B. Erect temporary security fence as appropriate. Contractor is responsible for the security of the staging area. The Owner and Engineer shall not have any liability for loss of or damage to materials, tools, equipment, or personal property of the Contractor or of those employed by the Contractor by contract or otherwise.

- C. The Contractor shall make adequate provisions for protection of the Work against fire, theft, and vandalism and for protection of public against exposure to injury.

#### 1.06 ACCESS ROADS AND PARKING AREAS

- A. Access Roads: Use the existing site access roads for transporting equipment and materials for construction. Make arrangements to ensure that the access roads are not blocked.
- B. Parking: Parking areas that may be used by Contractor personnel are shown on the Drawings. The Contractor shall arrange for offsite parking if additional parking is needed.

#### 1.07 TRAFFIC REGULATION

- A. Conduct operations so as to offer the least possible obstruction and inconvenience to public traffic. Do not overload or damage paved or improved surfaces, sidewalks, curbs, or gutters.

#### 1.08 BARRICADES, FENCES, AND ENCLOSURES

- A. Barricades
  - 1. Provide temporary guardrails, guards, and barricades to protect persons in accordance with applicable regulations, including OSHA.
- B. Fences
  - 1. Existing fences enclose the present facilities site and are for the protection and security of the present operating facilities. If it is necessary for the Contractor to remove some of the fences for installation of new work, the Contractor shall provide equivalent temporary protection and security.
  - 2. Replace fencing removed by the Contractor with existing or new fencing of equivalent quality prior to project completion.
- C. Enclosures
  - 1. Provide protective dust coverings at doors and other openings to contain dust within the construction area.
  - 2. Provide temporary partitions to prevent dust and moisture from entering Owner-occupied areas and to prevent damage to existing materials and equipment. Temporary partitions shall be of non-combustible construction
  - 3. Provide temporary, watertight enclosures for openings in exterior surfaces as required to protect interiors from weather, moisture, humidity, and extreme temperatures.

#### 1.09 PROTECTION OF EXISTING AND NEW INSTALLATIONS

- A. Provide temporary and removeable protection of existing facilities and installed products. Control activity to minimize damage in immediate work area.

- B. Protect existing floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects by covering surfaces with plywood or moisture resistant building paper with joints continuously taped.
- C. Prohibit traffic or storage on waterproofed or roofed surfaces. If traffic or activity is unavoidable, provide adequate protection to prevent damage to waterproof membranes and comply with recommendations for protection of the waterproofing or roofing material manufacturer.
- D. Provide heavy planking to protect curbs, gutters, culverts, paving, and similar surfaces from damage by heavy equipment or vehicles.
- E. Restore any facilities damaged by construction activities to its original condition or better. See Section 01725 for additional requirements.

#### 1.10 TEMPORARY CONSTRUCTION

- A. The Contractor is solely and exclusively responsible for the design, construction, and maintenance of all temporary construction, including forms, falsework, shoring, scaffolding, stairs, ladders, and all similar items.
- B. Design and construct temporary forms, falsework, bridges, and decking in accordance with applicable regulations and codes.

#### 1.11 TEMPORARY UTILITIES

- A. Temporary Electric Power
  - 1. Provide all temporary power required for the Contractor's and Engineer's use on the project.
  - 2. Cost of electric power shall be borne by the Contractor.
  - 3. Make power arrangements with the electric company. Connection to the City's plant power will be allowed.
  - 4. The temporary electric power installation shall meet the construction safety requirements of OSHA, state, and other governing agencies.
- B. Temporary Telephone and Internet Service
  - 1. Provide telephone and internet services for the Contractor's field office.
  - 2. The Contractor is not permitted to use the Owner's telephone service.
- C. Temporary Sanitary Facilities
  - 1. Provide and maintain toilet and wash-up facilities for Contractor's, sub-contractor's, Engineer's, and Owner's use at the site of work.
  - 2. Facilities shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of construction field offices, dwellings, and camps.
  - 3. Facilities shall be serviced, cleaned, and disinfected frequently.

D. Temporary Water Service

1. Use potable water for pipeline pressure testing, disinfection, and other construction uses.
2. Obtain approvals and authorizations from the Owner for use of water and pay all fees associated with consumption of the potable water.
  - a. Coordinate with Owner on specific withdrawal points.
  - b. Make the necessary connections to the public water supply and install all conveyance piping and truck filling facilities that are required to transport water for the work.
  - c. Temporarily install valves, flow meters, air gaps, backflow preventers and other appurtenances required by the owner of the public water distribution system to maintain the integrity of the existing water systems.
  - d. Remove temporary water facilities when no longer needed.

E. Temporary Heat

1. Provide temporary heat for enclosed spaces as needed for proper installation of finishes.
2. Protect all work and moisture sensitive electrical equipment against damaged, dampness, and cold.
3. Fuel, equipment, and installation shall comply with all applicable codes and regulations.

F. Temporary Ventilation

1. Provide equipment to ventilate enclosed areas to facilitate curing of concrete, dissipate humidity, and prevent accumulation of dust, fumes, or gases.
2. Use existing or new ventilation equipment as appropriate or applicable and supplement with temporary fans to maintain clean air and safe conditions for construction operations.
3. Replace and clean filters on existing or new equipment on project completion.

G. Temporary Lighting

1. Provide and maintain lighting for construction operations to achieve a minimum lighting level of 20-foot candles for rough work and 60-foot candles for finish work.

H. Temporary Fire Protection

1. Provide and maintain fire protection equipment, including extinguishers, fore hose, and other equipment required by law, insurance carriers, or necessary for proper fire protection during the course of the Work.
2. Fire protection equipment (e.g., hoses) shall be used for fighting fires only.

3. Locate fire extinguishers in field offices, storage sheds, temporary buildings, and throughout the construction site in accordance with the requirements of the Oregon Fire Code, Oregon Health Association, and Oregon OSHA.

#### 1.12 CONTRACTOR'S CONSTRUCTION OFFICE

- A. The Contractor may use space at the Owner's water treatment plant, if available. Otherwise, Contractor shall furnish suitable temporary office space required for completion of the project.
- B. Temporary office will be considered as the headquarters of the Contractor's representative whom is authorized to receive drawings, instructions, or other communication or articles. Any communication given to the representative or delivered at Contractor's temporary office at the site in his absence is deemed to have been delivered to the Contractor.
- C. Maintain copies of the Drawings, Specifications, and other Contract documents at Contractor's temporary office at the site and make these available for use at all times.

**PART 2 - (NOT USED)**

**PART 3 - (NOT USED)**

**END OF SECTION**

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## SECTION 01610

### SEISMIC ANCHORAGE AND BRACING

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Requirements for seismic anchorage and bracing for equipment, tanks and nonstructural components.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  1. Section 01330 – Submittals
  2. Section 01611 – Seismic Design Requirements
  3. Section 05501 – Anchor Bolts and Anchoring Devices
  4. Section 11000 – General Requirements for Equipment

##### 1.03 AREAS OF DESIGN RESPONSIBILITY

- A. The Contractor shall be responsible for designing all seismic attachments, braces, and anchors to the structure for tanks, mechanical equipment and electrical equipment included in the Work that weigh more than 20 pounds.
- B. Equipment manufacturers may provide standard design calculations and details for their specific pieces of equipment as part of the submittal for that equipment. Project-specific design calculations and details need not be produced unless the manufacture does not already have standard designs already prepared.

##### 1.04 REFERENCES

- A. The following is a list of standards which may be referenced in this section.
  1. International Code Council (ICC)
    - a. International Building Code (IBC)
    - b. Evaluation Service (ICC-ES) Reports and Legacy Reports
  2. American Society of Civil Engineers (ASCE)
    - a. ASCE 7, Minimum Design Loads for Building and Other Structures.

##### 1.05 SUBMITTALS

- A. Comply with Section 01330.
- B. Seismic Anchorage and Bracing Calculations
  1. Submit manufacturer's engineered seismic hardware data and installation requirements.
  2. Provide calculations for seismic attachments, braces and anchorages clearly showing the criteria used for the design. Calculations for anchorage of components shall be signed and sealed by a registered Professional Engineer.

- C. Shop Drawings: Show details of seismic attachment assemblies including connection hardware, bracing, and anchor bolts.

#### 1.06 DESIGN AND PERFORMANCE REQUIREMENTS

- A. In accordance with IBC, tanks, mechanical and electrical components, and other elements of the Work that are permanently attached to structures shall be designed and constructed to transfer the component seismic forces specified in ASCE 7, Chapter 13 to the structure.
- B. Seismic attachments, braces, and anchorages shall be designed in accordance with the provisions of the IBC and the site-specific seismic criteria in Section 01611
- C. Comply with Section 11000.
  - 1. Do not use more than 60 percent of the weight of tanks and mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
  - 2. Do not use friction to resist sliding due to seismic forces.
- D. In accordance with ASCE 7, the following are exempt from the requirements of this Section:
  - 1. Mechanical and electrical components with a Component Importance Factor of = 1.0 that weigh 400 pounds or less, are mounted 4 feet or less above the adjacent finished floor elevation, and are provided with flexible connections between the components and any associated ductwork, piping, or conduit.
  - 2. Mechanical and electrical components with a Component Importance Factor of = 1.0 that weigh 20 pounds or less, are mounted at any height, and are provided with flexible connections to attached ductwork, piping, and conduit.

### PART 2 - PRODUCTS

#### 2.01 MATERIALS

- A. Attachments and supports transferring seismic loads to the structure shall be constructed of materials and products suitable for the application and designed and constructed in accordance with the design criteria shown on the Drawings and nationally recognized standards.
- B. Do not use powder driven fasteners and sleeve anchors for seismic attachments and anchorages where resistance to tension loads is required.
- C. Anchor Bolts: In accordance with Section 05501.

### PART 3 - EXECUTION

#### 3.01 GENERAL

- A. Design seismic anchorage systems to provide restraint in all directions, for each component or system so anchored.
- B. Anchor tall and narrow equipment such as motor control centers and electrical control panels at the base and within 12 inches from the top of the equipment.
- C. Mechanical and electrical components shall not be attached to more than one element of a building structure at a single restraint location where such elements may respond

differently during a seismic event. Such attachments shall also not be made across building expansion and contraction joints.

- D. Provide and install seismic attachments and braces in accordance with the size and number of braces determined by the design calculations prepared by the Contractor.
- E. Provide and install anchor bolts and concrete and masonry anchors for the anchorage of equipment in accordance with the bolt sizing, minimum embedment, and spacing requirements determined by the calculations prepared by the Contractor.

**END OF SECTION**

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## SECTION 01611

### SEISMIC DESIGN REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. The following primary and secondary structural system elements, non-structural components, and/or equipment supported by structures.
  - 1. Mechanical, electrical, and plumbing equipment and appurtenances.
  - 2. Un-buried Conduit, piping, cable trays, raceways, ducts and similar systems.
  - 3. Un-buried tanks and vessels (include contents), including support systems.
  - 4. Storage racks, suspended ceilings, light fixtures, raised floors, partitions, store-fronts, windows, louvers, architectural features and other non-structural components.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Section 01330 – Submittals
  - 2. Section 05501 – Anchor Bolts and Anchoring Devices

##### 1.03 REFERENCES

- A. 2019 Oregon Structural Specialty Code (OSSC)

##### 1.04 DEFINITIONS

- A. Engineer of Record: The Engineer responsible for the preparation of Contract Documents.
- B. Specialty Engineer: Structural or Civil Engineer provided by the Contractor licensed in the State where the project is being built responsible for specific elements of the primary structural system, the secondary structural system, non-structural elements and/or equipment supported by structures.

##### 1.05 GENERAL DESIGN REQUIREMENTS

- A. The Contractor is responsible for producing designs that resist the total seismic forces in accordance with the seismic design criteria.
- B. The Contractor is responsible for coordinating between the Engineer of Record and the Specialty Engineer.
- C. The seismic design for non-structural components and equipment shall be in accordance with the OSSC Chapter 16, and the required coefficients and factors for determining the total design seismic forces are provided in the Seismic Design Criteria in Paragraph D below.
- D. Coordinate the layout so that adequate space is provided between items for relative motion. Provide additional supports and restraints between items of different systems when necessary to prevent seismic impacts or interaction.

- E. Seismic forces shall be determined in accordance with the following seismic design criteria:
1. Site-Specific Spectral Response Coefficients
    - a. Short Period Mapped Maximum Considered Earthquake, 5 Percent Damped:  $S_s=0.628g$
    - b. Short Period Mapped Maximum Considered Earthquake, 5 Percent Damped:  $S_1=0.340g$
    - c. Short Period Design Spectral Response Acceleration, 5 percent Damped:  $SDS = 0.543$
    - d. 1 Second Period Design Spectral Response Acceleration, 5 percent Damped:  $SD_1 = 0.400$
  2. Site Class: D
  3. Seismic Design Category: D, unless noted otherwise
  4. Risk Category: IV, unless noted otherwise
  5. Component Importance Factor,  $I_p$ :
    - a. Mechanical and Electrical Equipment: Use 1.5.
    - b. Tanks and Tank Anchorage: Use 1.5.
    - c. Components that contain hazardous materials: Use 1.5.
    - d. Components that are required for life safety: Use 1.5.
    - e. Components that must remain functional after an earthquake, such as fire protection sprinkler systems: Use 1.5.
  6. Do not use more than 60 percent of the weight of tanks and mechanical and electrical equipment for designing anchors for resisting overturning due to seismic forces.
  7. Do not use friction to resist sliding due to seismic forces.

#### 1.06 DESIGN REQUIREMENTS FOR PIPING, CONDUIT, AND DUCTS

- A. The Contractor is responsible for producing designs for support of piping, conduit, duct or other systems to resist total seismic forces based on the seismic design criteria coefficients specified above, unless shown on the Contract Documents. Except where the technical specifications give specific exemption from resistance of seismic forces, all supports shall be designed to meet seismic criteria.
- B. Where possible, pipes, conduit, and their connections shall be constructed of ductile materials (e.g., copper, ductile iron, steel or aluminum and brazed, welded or screwed connections). Pipes, conduits and their connections, constructed of nonductile materials (e.g., cast iron, no-hub pipe and plastic), shall have the brace spacing reduced to one-half of the spacing allowed for ductile material.
- C. Seismic restraints may be omitted for the following conditions, where flexible connections are provided between components and the associated ductwork, piping and conduit:
1. Where the nominal pipe size is 1 in. or less.
  2. Piping, conduit or ducts suspended by individual hangers 12 inches or less in length from the top of the component to the bottom of the structural support. Where rod hangers are used, they shall be equipped with swivels.

3. Air-handling ducts less than 6 square feet in cross-sectional area.
  4. See the OSSC for additional requirements related to the omitting of seismic bracing.
- D. All trapeze assemblies supporting pipes, ducts and conduit shall be braced to resist the total seismic forces considering the weight of the elements on the trapeze. Pipes, ducts and conduit supported by a trapeze where none of those elements would individually be braced need not be braced if connections to the pipe/conduit/ductwork or directional changes do not restrict the movement of the trapeze. If this flexibility is not provided, bracing will be required when the aggregate weight of the pipes and conduit exceed 10 pounds/foot. The weight shall be determined assuming all pipes and conduit are filled with water.
- E. As an alternative to designing the supports and anchorage, where an approved national standard provides a basis for the earthquake-resistant design, submit standard, data, and details for piping, conduit, duct or other systems:
1. For ductwork, mechanical piping, process piping and electrical conduits, follow Guidelines for Seismic Restraints of Mechanical Systems by SMACNA modified as follows:
    - a. Seismically brace piping regardless of size or location. Provide transverse braces at all changes in direction and at the end of all pipe runs. Space transverse braces not more than 20 feet apart. Provide longitudinal braces at 40-foot centers.
    - b. Seismically brace all ductwork regardless of size or location. Provide transverse braces at all changes in direction and at each end of run. Space braces not over 20 feet apart. Provide longitudinal braces at 40-foot centers.
  2. For fire protection systems, follow NFPA 13 modified as in Paragraph 1.b above. Ensure that no seismic interaction occurs with items of other systems.

#### 1.07 DESIGN REQUIREMENTS FOR UNDERWATER ITEMS

- A. To allow for water sloshing, design rigid items such as piping or equipment supports for twice the lateral force, computed as if the item were above water. Alternatively, include seismic forces due to hydrodynamic forces in the analysis.
- B. Design flexible items to accommodate sloshing motions without damage to rigid machinery.
- C. Provide retainers to hold items from falling and damaging rotating equipment below, if bolted connections will fail because of ground motion displacing the supports.

#### 1.08 SUBMITTALS

- A. Comply with Section 01330.
- B. Shop Drawings: Submit signed and sealed structural calculations and detailed drawings for the following listed elements and where required in Divisions 2 through 16 of the primary structural system and their attachments, the secondary structural system and their attachments, permanent non-structural components and their attachments, and the attachments and anchorage for all permanent equipment supported by the structures.
  1. Backwash Pump
  2. MCC Section for Backwash Pump Soft Starter

3. Two (2) Active Harmonic Filters
- C. Structural calculations and detailed drawings shall be prepared by a Specialty Engineer licensed in the State where the project is being built.
- D. Structural calculations and detailed drawings shall clearly show the total design seismic forces which will be transferred from the elements of the structural system, non-structural components, and/or equipment and their attachments to the primary structure.
- E. The Engineer's review of items within a Specification Section cannot be completed until all related items have been coordinated and submitted for review.
- F. Quality Assurance Submittals
  1. Test Reports: Submit test reports for tension testing of anchors.
  2. Where required in the equipment specifications in Divisions 2 through 16 submit certification that the equipment itself is designed to resist all internal seismic forces based on the seismic design criteria for the project.
  3. Where required in the equipment specifications in Divisions 2 through 16, submit signed and sealed structural calculations and detailed drawings from a specialty Structural or Civil Engineer licensed in the State where the project is being built for the attachments and anchorage to the primary structure.
  4. Where required in the equipment specifications in Divisions 2 through 16, submit certification that the attachments and anchorage are designed to resist all seismic forces based on the seismic design criteria for the project.

#### 1.09 QUALITY ASSURANCE

- A. Qualifications: The Contractor is responsible for submitting signed and sealed structural calculations and detailed drawings from a Specialty Structural or Civil Engineer licensed in the State where the project is being built.
- B. Regulatory Requirements: Comply with the State of Oregon adopted and amended versions of 2019 Oregon Structural Specialty Code (OSSC) Chapter 16 - Earthquake Design plus clarifications and additions specified in this Section.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### 3.01 FIELD QUALITY CONTROL

- A. Site Tests:
  1. Tension testing of expansion or adhesive anchors utilized for anchorage shall be done in the presence of the special inspector and a report of the test results shall be submitted. See Section 05501 for additional requirements.
- B. Inspection:
  1. Provide special inspection for high strength bolting or bolts installed in concrete.
  2. See Section 05501 for additional requirements.

### **END OF SECTION**

**SECTION 01735**  
**CUTTING AND PATCHING**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Cutting and patching existing and new construction.

1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section
  - 1. Section 01330 – Submittals

1.03 GENERAL REQUIREMENTS

- A. Perform Work in compliance with Oregon OSHA Standards and other standards as applicable.
- B. Cutting and patching shall be completed to the satisfaction of the Engineer.

1.04 SUBMITTALS

- A. Submit in accordance with Section 01330.
- B. Cutting and Patching Plan
  - 1. Submit details of proposed construction before cutting and patching construction commences affecting:
    - a. Work of Owner or of others.
    - b. Structural integrity of element of Project.
  - 2. Cutting and Patching Plan shall include the following for Engineer's approval:
    - a. Identification of Work.
    - b. Description of affected construction.
    - c. Necessity for cutting, patching, alteration, or excavation.
    - d. Description of proposed construction.
    - e. Scope of cutting, patching, alteration, or excavation.

**PART 2 - PRODUCTS**

2.01 MATERIALS

- A. Comply with specifications and standards for products involved.

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Provide adequate temporary support as necessary to ensure structural integrity of affected portion of Work.
- B. Provide devices and methods to protect other portions of Project from damage and persons from injury.
- C. Provide protection from elements for that portion of Project which may be exposed by cutting and patching, and maintain excavations free from water.

### **3.02 CUTTING AND PATCHING**

- A. Cut, Fit, and Patch when required to
  - 1. Make its several parts fit together properly.
  - 2. Remove and replace construction not conforming to Contract Documents.
  - 3. Remove samples of installed construction as specified for testing.
  - 4. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
- B. Execute cutting and demolition by methods which will prevent damage and will provide proper surfaces to receive installation of repairs.
- C. Openings in Existing Concrete and Masonry
  - 1. Locate existing reinforcing bars and adjust openings as much as possible within tolerance to miss cutting as many reinforcing bars as possible. Field verify rebar locations before cutting existing concrete.
  - 2. Create openings by:
    - a. Saw cutting completely through concrete or masonry, or
    - b. Scoring edges of opening with saw to at least 1-inch depth on both surfaces (when accessible) and removing concrete or masonry by chipping.
  - 3. Do not allow saw cuts to extend beyond limits of opening.
  - 4. Make corners square and true by combination of core drilling and grinding or chipping.
  - 5. Prevent debris from falling into adjacent tanks or channels in service or from damaging existing equipment and other facilities.
- D. Sizing of Openings in Existing Concrete or Masonry
  - 1. Make openings sufficiently large to permit final alignment of pipe and fittings without deflections.
  - 2. Allow adequate space for packing around pipes and conduit to ensure watertightness.

- E. Grouting Pipes in Place
  - 1. Sandblast concrete surfaces and thoroughly clean sand and other foreign material from surfaces prior to placing grout.
  - 2. Grout pipes, sleeves, castings, and conduits in place by pouring grout under a head of at least 4 inches. Vibrate grout into place. Completely fill the spaces occupied by pipes, sleeves, castings, and conduits.
  - 3. Water cure the grout.
- F. Connections to Existing Pipes
  - 1. Cut existing pipe square.
  - 2. Properly prepare the ends for the connection indicated on the Drawings.
  - 3. Repair any damage to existing lining and coating.
- G. Rehabilitate all areas affected by removal of existing equipment, equipment pads and bases, piping, supports, electrical panels, electric devices, and conduits such that little or no evidence of the previous installation remains.
  - 1. Fill areas in existing floors, walls, and ceilings from removed piping, conduit and fasteners with non-shrink grout and finish smooth.
  - 2. Remove concrete bases for equipment and supports by:
    - a. Saw cutting clean, straight lines with a depth equal to the concrete cover over reinforcement minus 1/2 inch below finished surface. Do not cut existing reinforcement on floors.
    - b. Chip concrete within scored lines and cut exposed reinforcing steel and anchor bolts.
    - c. Patch with non-shrink grout to match adjacent grade and finish.
      - 1) Terminate abandoned piping and conduits with blind flanges, caps, or plugs.
- H. Treat Existing Concrete Reinforcement as follows:
  - 1. Where existing reinforcement is to remain, protect, clean, and extend into new concrete.
  - 2. Where existing reinforcement is not to be retained, cut off as follows:
    - a. Where new concrete joins existing concrete at the removal line, cut reinforcement flush with concrete surface at the removal line.
    - b. Where concrete surface at the removal line is the finished surface, cut reinforcement 2 inches back from the surface, paint ends with epoxy, and patch holes with dry pack mortar.

**END OF SECTION**

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## SECTION 01770

### CONTRACT CLOSEOUT PROCEDURES

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Administrative and procedural requirements for contract closeout.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  1. Section 00700 – General Conditions
  2. Section 01330 – Submittals

##### 1.03 FINAL CLEANING

- A. Immediately prior to submittal of a request for inspection for Substantial Completion, clean the project site and make ready for Owner's use and occupancy.
- B. Employ experienced workers or professional cleaners for final cleaning.
- C. Complete the following cleaning operations:
  1. Clean the project site, yard and grounds which were disturbed by construction activities. Remove rubbish, waste material, litter and other foreign material.
  2. Sweep paved areas, remove oil stains, grease, dust and dirt.
  3. Remove tools, construction equipment, machinery, storage sheds, temporary fences and surplus material.
  4. Broom clean sidewalks and concrete floors.
  5. Vacuum carpets, spot clean or if necessary, shampoo to remove visible soil or stains.
  6. Clean glass in doors and windows, remove glazing compounds, replace chipped and broken glass, clean door and window frames.
  7. Patch, touch up and repair marred surfaces and finishes. Replace finishes and surfaces that cannot be satisfactorily repaired or restored.
  8. Wipe surfaces of mechanical and electrical equipment, remove excess lubrication, paint splatter and mortar droppings.
  9. Clean plumbing fixtures and mirrors.
  10. Clean light fixtures, lamps and bulbs. Replace burned-out bulbs and defective or noisy starters in fluorescent and mercury vapor fixtures.

##### 1.04 SUBSTANTIAL COMPLETION

- A. Complete final cleaning operations before requesting inspection for Substantial Completion.

- B. Prior to requesting inspection for Substantial Completion, complete and submit the following:
  - 1. List of items to be completed or corrected (punch list). Organize list by facility, space, system and piece of equipment.
  - 2. Specific warranties, bonds, maintenance service agreements, final certifications and similar documents.
  - 3. Delivery of spare parts, special tools, extra materials and similar items to designated locations.
  - 4. Make final changeover of permanent locks and deliver keys to Owner.
- C. Inspection for Substantial Completion:
  - 1. Engineer, Owner and Contractor shall jointly walk through and inspect the project site to determine whether the Work is satisfactory and Substantially Complete.
  - 2. The Contractor's punch list will be reviewed and additional items identified during the inspection requiring corrective actions will be added to the list as determined by the inspection.
  - 3. Once Substantial Completion has been achieved, Engineer will prepare a Certificate of Substantial Completion.

#### 1.05 FINAL COMPLETION

- A. Final Completion Submittals:
  - 1. Prior to submitting final Application for Payment, complete and submit the following:
    - a. Project Record Drawings. Refer to Section 01330.
    - b. Guaranty and Warranties.
    - c. Operation and Maintenance Information. Refer to Section 01330.
    - d. Punch List with all corrective actions completed and ready for Final Inspection.
    - e. Releases from Agreements with property owners or public agencies.
    - f. Releases or Waivers of Liens and Claims.
    - g. Evidence of final, continuing insurance coverage complying with insurance requirements.
    - h. Consent of Surety to Final Payment.
- B. Final Inspection:
  - 1. Submit written request for final inspection for Project Acceptance.
  - 2. Engineer will either proceed with the inspection or advise Contractor of unfulfilled requirements.
  - 3. Engineer will prepare a Certificate of Final Completion after satisfactory inspection of the Work.

1.06 FINAL APPLICATION FOR PAYMENT

- A. Following a satisfactory Final Inspection and receipt of a signed Certificate of Final Completion from the Engineer, Contractor shall submit the final Application for Payment in accordance with the procedures and requirements specified in Sections 00700.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01810

### FACILITY START-UP AND COMMISSIONING

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Project requirements for facility start-up and overall commissioning.

##### 1.02 RELATED SECTIONS

- A. Section 16001 – Commissioning

##### 1.03 DEFINITIONS

- A. Start-up: The initial operation of the facility and/or plant, using the finished water pumps with variable speed drives and the backwash pump for plant operation.
- B. Overall Commissioning: A confirmation that equipment, systems and facilities operate in accordance with the design intent and satisfy the detailed requirements of the technical specifications. The duration of the overall commissioning period shall be not less than 14 consecutive days.

##### 1.04 SERVICES OF MANUFACTURER

- A. Manufacturer's services for inspection, physical checkout, field adjustment, field testing, and start-up shall comply with the requirements of this Section, requirements of the particular equipment or product technical specifications contained in Divisions 2 through 16.
- B. Manufacturer's services for training and instruction of the Owner's personnel shall comply with the requirements of the particular equipment or product technical specifications contained in Divisions 2 through 16.

##### 1.05 ROLES AND RESPONSIBILITIES

- A. Contractor's Responsibilities
  - 1. Review specific start-up plan(s) provided by the Engineer in order to:
    - a. Schedule and coordinate with the Engineer for start-up of equipment and systems.
    - b. Review procedures for facility start-up.
  - 2. Review preliminary punch list items with the Engineer 15 days prior to the scheduled start-up; and complete, correct, or resolve at the option of the Engineer, any items which impact or interfere with the facility start-up.
  - 3. Attend meetings related to the review of start-up plan(s).
  - 4. Clarify submittals, testing requirements, schedules, or other items related to the start-up of the equipment and facilities specified and indicated in the Contract Documents.

5. Provide all start-up materials and operating supplies for 30 operating days. Supplies include lubricants, chemicals, gases, and specialized fluids to maintain operation for 30 days.
  6. Provide Manufacturer's authorized representatives as required to supervise placing equipment or systems in operation and to provide guidance during the start-up period.
  7. Provide to the Engineer a list of 24 hour, "on call" representative supervisory persons who will monitor the facility start-up, and serve as a liaison for the Engineer.
  8. Provide the necessary craft or labor assistance full time during the day shift and as required at other times in the event of an emergency requiring immediate attention. An emergency is defined as a failure which precludes the further operation of a critical segment of the Work. The response time shall be not less than four hours from the time of notification.
  9. Correct all failures or equipment problems identified during start-up. Repairs deemed the responsibility of the Contractor shall be made at no additional cost to the Owner.
- B. The responsibilities of the Owner's O&M staff during the 14-day facility start-up period include the following:
1. Provide staff to operate equipment, systems, and facilities requiring start-up.
  2. Provide all utilities including power, natural gas, and water.
- C. The Engineer's responsibilities for the facility start-up period include the following:
1. Coordinate the Contractor's start-up activities with plant operations staff.
  2. Verify the results of performance tests and any retesting.
  3. Direct the Contractor to repair defective workmanship, materials, and equipment.

#### 1.06 OVERALL COMMISSIONING

- A. The electrical systems commissioning shall be completed prior to the 14-day operational demonstration. See Section 16001.
- B. The Owner's Operations and Maintenance staff will initiate the overall commissioning period and will operate the facility throughout the duration of the overall commissioning period. All equipment must operate properly and operate continuously 24 hours per day, if applicable, for the test period. If any item malfunctions during the test, the item shall be repaired and the test restarted at day zero with no credit given for the operating time before the malfunction.
- C. The purpose of this 14-day operational demonstration is to:
1. Provide the environment by which the Owner's O&M staff can place equipment and systems into service.
  2. Expose flaws or defects in workmanship, equipment, or materials, not previously discovered that are the responsibility of the Contractor to repair, correct, modify, or replace prior to Final Acceptance.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

**END OF SECTION**

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## SECTION 01999

### REFERENCE FORMS

The forms listed below and included in this section are referenced from other sections of the project manual. Contractor may submit equivalent forms for Owner's approval prior to use. If Owner does not approve substitute form, Contractor must use forms found in this Section. Owner will provide Contractor electronic files of prescribed forms upon request.

<b>Referenced In Section</b>	<b>Title of Form</b>
11060	Extended Warranty Form
01110	Landowner Release
11000, 11352	Manufacturer's Installation Certification Form
11352	Manufacturer's Instruction Certification Form
11060, 11352	Motor Data Form
15996	Pipe Test Record Form
01330	Proposed "Or Equal" Substitution Transmittal
01330	Submittal Transmittal
01140	System Outage Request (SOR)
11352	Unit Responsibility Certificate

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**EXTENDED WARRANTY FORM**  
(For Equipment, Material, Process)

Extended Warranty For: Product Name  
Specification Section No. \_\_\_\_\_  
Product Manufacturer \_\_\_\_\_  
Project: \_\_\_\_\_  
Location: \_\_\_\_\_

We hereby guarantee the Product Name that we have constructed for a period of # of Years (#) year(s), as specified in the Section noted above, from Date, the date of acceptance of the work/substantial completion and the assumption of occupancy and beneficial use by the Name of Owner.

The following are excluded from the provisions of this warranty:

We agree that if any of the equipment, material, or process designated for Product Name should fail due to any reason other than improper maintenance or improper operation, or should any portion of the work fail to fulfill any of the requirements of the Specifications, we will, within ten days after written notice of such defects, commence to repair or replace the same together with any other work which may be damaged or displaced in so doing.

In the event of our failure to comply with the above mentioned conditions within a reasonable time after being notified, or should exigent circumstances require repairs or replacements to be made before we can be notified or respond to notification, we do hereby authorize the Name of Owner to proceed to have the defect repaired and made good at our expense, and we will pay the cost therefor upon demand.

The warranty provided herein shall not be in lieu of, but shall be in addition to any warranties or other obligations otherwise imposed by the Contract Documents and by law.

Manufacturer: _____	Contractor: _____
Signed: _____	Signed: _____
Title: _____	Title: _____
Date: _____	Date: _____
Phone: _____	Phone: _____
E-mail: _____	E-mail: _____

LANDOWNER RELEASE FORM

Property: Portion of APN [XXX-XXX-XXX] (as shown on Assessor's Map [XX-XX])  
Location: [Property Address]  
Owner: [Property Owner's Name]  
User: [Contractor]

[Contractor] used the abovementioned property from [Start Date] through [End Date].

[Contractor] has concluded its final restoration of the property.

The Undersigned releases and discharges [Contractor], its parent company and affiliated companies, its officers, directors, employees and agents, the City of [City], the [County, or other entity], the State of California, and West Yost Associates from any and all claims, actions, causes of actions, or demands for damages, costs, loss of services, expenses, compensation, and consequential damages, and any and all liens of any nature whatsoever on account of, or in any way, growing out of [Contractors'] use of the abovementioned property.

The Undersigned has read the foregoing Release and knows the contents thereof.

\_\_\_\_\_ Date \_\_\_\_\_  
[Property Owner's Name]  
[Property Owner's Address]

Distribution:

# MANUFACTURER'S INSTALLATION CERTIFICATION FORM

Contract No: \_\_\_\_\_ Specification Section: \_\_\_\_\_

Equipment Name \_\_\_\_\_

Contractor: \_\_\_\_\_

Manufacturer of Equipment Item: \_\_\_\_\_

*The undersigned manufacturer of the equipment item described above hereby certifies that he has checked the installation of the equipment and that the equipment, as specified in the project manual, has been provided in accordance with the manufacturer's recommendations and that the trial operation of the equipment item has been satisfactory.*

**Comments:**

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\_\_\_\_\_  
Date

\_\_\_\_\_  
Manufacturer

\_\_\_\_\_  
Signature of  
Authorized Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Signature of  
Authorized Representative

# MANUFACTURER'S INSTRUCTION CERTIFICATION FORM

Contract No: \_\_\_\_\_ Specification Section: \_\_\_\_\_

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

Contractor: \_\_\_\_\_

Manufacturer of Equipment Item: \_\_\_\_\_

*The undersigned manufacturer certifies that a service engineer has instructed the owner's staff in the proper maintenance and operation of the equipment designated herein.*

## **Operations Check List** (check appropriate spaces)

Start-up procedure reviewed

Shutdown procedure reviewed

Normal operation procedure reviewed

Others: \_\_\_\_\_

\_\_\_\_\_

## **Maintenance Check List** (check appropriate spaces)

Described normal oil changes (frequency)

Described special tools required

Described normal items to be reviewed for wear

Described preventive maintenance instructions

Described greasing frequency

Others \_\_\_\_\_

\_\_\_\_\_

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Manufacturer: \_\_\_\_\_

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Owner's Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Signature of Contractor's Representative

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# MOTOR DATA FORM

Equipment Name: \_\_\_\_\_ Equipment Number: \_\_\_\_\_

Site Location: \_\_\_\_\_

## Nameplate Markings

Mfr \_\_\_\_\_ Mfr Model \_\_\_\_\_ Frame \_\_\_\_\_ HP \_\_\_\_\_

Volts \_\_\_\_\_ Phase \_\_\_\_\_ RPM \_\_\_\_\_ Service Factor \_\_\_\_\_

FLA \_\_\_\_\_ LRA \_\_\_\_\_ Freq \_\_\_\_\_ Amb temp rating \_\_\_\_\_ degrees C

Time rating \_\_\_\_\_ Design letter \_\_\_\_\_

(NEMA MG1-10.35) (NEMA MG-1.16)

KVA code letter \_\_\_\_\_ Insulation class \_\_\_\_\_

The following information is required for explosionproof motors only:

A. Approved by UL for installation in Class \_\_\_\_\_, Div \_\_\_\_\_

B. UL frame temperature code \_\_\_\_\_, Group \_\_\_\_\_ Atmosphere

(NEC Tables 500-2 and 500-2(b))

The following information is required for high efficiency motors only:

A. Guaranteed minimum efficiency at full load or NEMA efficiency index

(NEMA MG1-12.53b)

B. Nameplate or nominal efficiency \_\_\_\_\_

## Data Not Necessarily Marked on Nameplate

Type of enclosure \_\_\_\_\_ Enclosure material \_\_\_\_\_

Temp rise \_\_\_\_\_ degrees C (NEMA MG1-12.41,42)

Space heater included? \_\_\_\_\_ Yes \_\_\_\_\_ No, if Yes \_\_\_\_\_ watts \_\_\_\_\_ volts

Type of motor winding overtemperature protection, if specified:

Use the space below to provide additional information on other motor modifications, if specified:

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# PIPE TEST RECORD

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

Project Name: \_\_\_\_\_ Project No.: \_\_\_\_\_

Contractor: \_\_\_\_\_

Pipeline Size & Name	Pipe Type	Pipe Location/Description
(SL), SN, IA, etc.)	(DI, PVC, Steel, Copper, etc.)	(Attach sketch if needed)
<b>Section Tested:</b> From: _____ To: _____	<b>First Test</b> <input type="checkbox"/> <b>Or</b> <b>Re-Test</b> <input type="checkbox"/>	<b>Length of Pipe Tested:</b> _____ Ft.

Test Specifications	Actual Test Results
Type of Test: _____	Start pressure: _____
Type of Test: _____	End Pressure: _____
Duration: _____	Start time      Stop time      Duration _____      _____      _____
Allowable loss: _____	Actual loss: _____

**Comments:**

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<b>Test Passes</b>	<input type="checkbox"/>
<b>Test Fails</b>	<input type="checkbox"/>

**Tested By:** \_\_\_\_\_  
Contractor

**Test Witnessed By:** \_\_\_\_\_  
Construction Inspector

## PROPOSED "OR EQUAL" SUBSTITUTION SUBMITTAL TRANSMITTAL

**Proposed "Or Equal Substitution Submittal Description"**

\_\_\_\_\_

\_\_\_\_\_

Priority Level:  Low     Medium     High     **On Critical Path**

<b>Submittal No.</b>	
<input type="checkbox"/> 1st Submission	<input type="checkbox"/> Re-Submittal
Spec Section	
Dwg/Detail No.	

	Routing	Date Sent	Date Received
Owner:			
Project Name:	Contractor/CM		
	CM/Design Consultant		
Contractor:	Design Consultant/CM		
	CM/Contractor		

**Proposed "Or Equal" Substitution Item or Service**

- A. When the first specified item is followed by a second maker's name and "or equal," the Contractor may submit Proposed Equivalent items for the Engineer's review. Proposed "Or Equal" Substitution items that are in the Engineer's judgment equal to the first specified item in quality, utility, and appearance, will be Favorably Reviewed. Where a product description and first maker's name is followed by "or equal" with no second maker's name, it means the Engineer knows of no equivalent product and the Contractor may submit Proposed Equivalent products by other makers for review. Where the term "or equal" is omitted, it means that the named item is required to meet the Owner's needs; no products or makers other than those specified will be considered.
- B. This request shall include adequate technical information to fully describe the function and quality of the item. Submittals of Proposed "Or Equal" Substitution items that are not made within thirty (30) calendar days of the Notice to Proceed date will be rejected unless the Owner has agreed in writing to a later submittal date and the Contractor agrees to comply with all conditions of the Owner for the late submittal. If the Contractor's second attempt to obtain Favorable Review of a Proposed "Or Equal" Substitution item is unsuccessful, the Contractor shall submit the first specified item.
- C. Inclusion of a second maker's name indicates the maker is acceptable but does not necessarily indicate the maker offers a standard product equal to the first specified item. Items by the second named maker are subject to the same conditions of review and compatibility as other Proposed "Or Equal" Substitution items. Inclusion of a maker's name and/or model number after a specification description is not a representation that the maker will furnish an item meeting the Contract requirements at bid time or at time of need. It is the Contractor's sole responsibility to furnish items meeting the Contract requirements.
- D. The Engineer's review of Proposed "Or Equal" Substitution items is based solely on information provided by the Contractor and on the Contractor's warranty that the proposed item is equal in quality, utility, function and appearance to the first specified item. Favorable Review of a Proposed "Or Equal" Substitution item has the same meaning and is subject to the same limitations that apply to the Favorable Review of Product Data and Shop Drawings described in the Contract Documents.
- E. Submit with proposal:
  - 1. Description of item being proposed including the Manufacturer's model or product number.
  - 2. Manufacturer's representation that the proposed "or equal" substitution item or service is equal to or superior to specified item in all respects.
  - 3. Manufacturer's product data.
  - 4. Information about several recent similar installations, including project name, owner's name, address, telephone number, and name of knowledgeable person to contact for information on performance of the product.

5. Whether a reduction in the Contract Price is being proposed. If so, provide a detailed cost breakdown substantiating the cost reduction. Consideration should be given to all extra costs and expenses necessary to make the proposed "or equal" substitution meet or exceed the all requirements found in the Contract Documents.
6. Whether a reduction in the Contract Time is being proposed. If so, provide schedule analysis substantiating the reduction in contract time and assumptions made in the schedule analysis.
7. Explain all known differences between the product specified and the Proposed "Or Equal" Substitution. Explanation to consider such items as:
  - a) Does the substitution affect dimensions shown on Drawings?
  - b) Are the manufacturer's guarantees and warranties on the proposed substitution items identical to those on the specified items? If there are differences, please specify each and every difference in detail.
  - c) Does the proposed "or equal" substitution impact other contractors, trades or suppliers?
  - d) Is the proposed "or equal" substitution compatible with all other interrelated equipment, materials and products?
  - e) Any differences in Operations and Maintenance costs?
  - f) Any differences in available factory authorized repair centers with regards to response times and geographic location?
  - g) Will use of proposed "or equal" substitution be subject to any license fee or royalty?
  - h) Are there any color or pattern differences? If so, provide color and pattern samples?

The undersigned hereby:

1. Certifies that he/she has thoroughly investigated the Proposed "Or Equal" Substitution item or service and has determined that the function/utility, appearance and quality of the Proposed "Or Equal" Substitution item or service are equivalent or superior to those of the specified item;
2. Certifies that the Proposed "Or Equal" Substitution item or service is compatible with all interrelated equipment, materials, products and services unless otherwise explained in specific detail in this submittal;
3. Agrees to coordinate installation and make all other changes that may be required for Work to be complete in all respects at no additional cost to the Owner;
4. Waives all claims for additional costs and contract time due to late ordering of the specified products or services caused by requests for "Or Equal" Substitutions that are subsequently rejected by the Engineer;
5. Represents and warrants that the Contractor is solely responsible for any extra cost or expense necessary to make the Proposed "Or Equal" Substitution item or service fully equivalent to and compatible with the Contract Documents and will meet or exceed the Engineer's design intent;
6. Agrees to compensate the Owner for all additional redesign costs associated with the Proposed "Or Equal" Substitution item or service and the cost of the Engineer's review of the Proposed "Or Equal" Substitution item or service;
7. Waives all claims for additional costs and contract time which may subsequently become apparent; and
8. Agrees to comply with all additional requirements imposed by the Owner and Engineer should the Proposed "Or Equal" Substitution item or service is approved.

Submitted by: \_\_\_\_\_

Contractor: \_\_\_\_\_

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

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

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

## SUBMITTAL TRANSMITTAL

Submittal Description \_\_\_\_\_

Priority Level:  Low     Medium     High     On Critical Path

<b>Submittal No.</b>	
<input type="checkbox"/> 1st Submission	<input type="checkbox"/> Re-Submittal
Spec Section	
Dwg/Detail No.	

Owner:	Routing	Date Sent	Date Received
Project Name:	Contractor/CM		
	CM/Design Consultant		
Contractor:	Design Consultant/CM		
	CM/Contractor		

We are sending you:     Attached                       Under separate cover via \_\_\_\_\_  
 Submittals for review and comment  
 Product Data for information only \_\_\_\_\_

No. Copies	Description	Manufacturer	Reviewer Action	Reviewer Initials

<p>The Action Designated Above is in Accordance with the Following Legend:</p> <p>A – No Exceptions Taken          B – Make Corrections Noted          C – Amend and Resubmit          D – Rejected          E – Review not Required</p>	<p><b>CONTRACTOR:</b> Must certify one of the following statements pertaining to the transmittal or submittal sent for review:</p> <p><input type="checkbox"/> As the General Contractor for this project we certify that the material or equipment contained in this submittal meets all the requirements, including coordination with all related work specified (no exceptions)</p> <p><input type="checkbox"/> As the General Contractor for this project we certify that the material or equipment contained in this submittal meets all the requirements specified except for the attached deviations.</p>
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Comments:

Certified by: \_\_\_\_\_  
 (Contractor's Signature)

## SYSTEM OUTAGE REQUEST FORM

**System to be Shutdown:** \_\_\_\_\_

**SOR No.:** \_\_\_\_\_

Date of Shutdown: \_\_\_\_\_ Beginning at: \_\_\_\_\_ am/pm

Duration of Shutdown: \_\_\_\_\_ Critical Path Activity?  yes  no

Owner:		<b>Routing</b>	<b>Date Sent</b>	<b>Date Received</b>
Project:		Contractor/CM		
Contractor:		CM/Owner-Operations		
Regulatory Agency Notification Required? <input type="checkbox"/> yes <input type="checkbox"/> no      Is a Dry Run Required? <input type="checkbox"/> yes <input type="checkbox"/> no Combustible/Hazardous Gases Present? <input type="checkbox"/> yes <input type="checkbox"/> no      Confined Space Entry? <input type="checkbox"/> yes <input type="checkbox"/> no				
Describe work to be performed including detailed sequence of events, safety plan, protection of existing facilities, equipment to be used and contingency plan. Use additional sheets as necessary.				
Will you require assistance from Owner Operations? <input type="checkbox"/> yes <input type="checkbox"/> no Note: <i>Existing valves and controls shall be operated by Owner staff only</i>				
Outage Contact Information	Name of Person on Call/Duty	Home Phone	Cell Phone	
Contractor				
Construction Manager				
Owner Operations				
Design Consultant				
Additional Contractor Comments:		<b>CM / Owner / Design Consultant Review Action</b>  <input type="checkbox"/> SOR Acceptable with comments noted on attached.  <input type="checkbox"/> SOR Not Acceptable with reasons noted on attached. Re-Submittal is required.		
Certified by: _____ (Contractor's Signature)		_____ (Construction Manager's Signature)		_____ Date

Name of Owner

**CERTIFICATE OF UNIT RESPONSIBILITY  
For Specification Section**

Section Number and Title

***In accordance with the contract documents, the undersigned manufacturer accepts unit responsibility for all components of equipment furnished under specification Section Section #. We hereby certify that these components are compatible and comprise a functional unit suitable for the specified performance and design requirements.***

\_\_\_\_\_  
Name of Corporation

\_\_\_\_\_  
Street Address

\_\_\_\_\_  
City, State and Zip Code

\_\_\_\_\_  
Notary Public

\_\_\_\_\_  
Commission Expiration Date

Seal:

By: \_\_\_\_\_  
Duly Authorized Official

\_\_\_\_\_  
Name

\_\_\_\_\_  
Title

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

**\*\*END OF SECTION\*\***

## SECTION 03301

### CAST-IN-PLACE CONCRETE

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Requirements for cast-in-place concrete work.

##### 1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section
  - 1. Section 01330 – Submittals

##### 1.03 REFERENCES

- A. NSF International (NSF) and American National Standards Institute (ANSI)
  - 1. NSF/ANSI Standard 61 Drinking Water System Components – Health Effects

##### 1.04 SUBMITTALS

- A. Comply with Section 01330.
- B. Shop Drawings
  - 1. Reinforcing Steel: Prepare shop fabrication and field installation drawings in accordance with CRSI Manual of Standard Practice and ACI SP.
  - 2. Layout drawings for construction joints.
- C. Product Data: Waterstops, curing, form release agent compound data.
- D. Concrete Mix Design: Data on the concrete mix, including aggregate gradations and admixtures, in accordance with ASTM C94.
- E. Quality Control Submittals
  - 1. Manufacturer's application instructions for curing compound.
  - 2. Ready-mix delivery tickets for each truck in accordance with ASTM C94.
- F. NSF/ANSI Standard 61 Certification: Submit the complete mix design and certification of each component of Concrete, form-release agent, and curing compound for review and potentially certify by review, or if required by qualified certification agency, submit test cylinders of concrete for testing and certification by NSF, Underwriters Laboratory (UL), or an equal that can test and certify concrete batches in accordance with NSF/ANSI Standard 61. Submit certification results to the Engineer.

##### 1.05 QUALITY ASSURANCE

- A. Supplier Qualifications: A minimum of 5 years' experience manufacturing ready-mixed concrete and that complies with ASTM C94 for production facilities and equipment.
- B. Source Limitations: Use the same brand of cement from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

- C. Concrete and Reinforcement: Unless otherwise specified, meet the requirements of ACI 301 and 318.
- D. Hot Weather Concreting: Conform to ACI 305R.

## **PART 2 - PRODUCTS**

### **2.01 FORMWORK**

- A. Exposed Areas: Use hard plastic or finished plywood.
- B. Unexposed Areas: Use new ship lap or plywood.
- C. Earth cuts may be used for forming footings.

### **2.02 CONCRETE**

- A. Ready-mixed meeting ASTM C94, Option A.
- B. Portland Cement: ASTM C150, Type II.
- C. Aggregates: Furnish from one source.
  - 1. Natural Aggregates
    - a. Free from deleterious coatings and substances in accordance with ASTM C33, except as modified herein.
    - b. Free of materials and aggregate types causing pop outs, discoloration, staining, or other defects on surface of concrete.
  - 2. Non-Potentially Reactive: In accordance with ASTM C33, Appendix XI, paragraph X1.1.
  - 3. Aggregate Soundness: Test for fine and coarse aggregates in accordance with ASTM C33 and ASTM C88 using sodium sulfate solution.
  - 4. Fine Aggregates
    - a. Clean, sharp, natural sand.
    - b. ASTM C33.
    - c. Materials Passing 200 Sieve: 4 percent maximum.
    - d. Limit deleterious substances in accordance with ASTM C33, Table 1 with material finer than 200 sieve limited to 3 percent, coal and lignite limited to 0.5 percent.
  - 5. Coarse Aggregate
    - a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).
    - b. Materials Passing 200 Sieve: 0.5 percent maximum.
- D. Admixtures: Do not use admixtures that contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
  - 1. Air-Entraining: ASTM C260.
  - 2. Water-Reducing: ASTM C494, Type A or D.

3. Superplasticizers: ASTM C494, Type F or G.
4. Fly Ash: ASTM C618, Class C or F.
5. Color Pigments: Inert mineral or metal oxide pigments, natural or synthetic; resistant to lime and other alkalies.

E. Concrete Mix Design

1. Minimum Compressive Field Strength: 4,000 psi at 28 days when cured and tested in accordance with ASTM C31 and C39.
2. Coarse Aggregate Size: 1-1/2 inches and smaller.
3. Slump Range: 3 to 5 inches.
4. Air Entrainment: Between 3 and 6 percent by volume.
5. Water Reducers: Use in concrete without plasticizers.

F. Proportions

1. Design mix to meet aesthetic and structural concrete requirements.
2. Water-cement ratio (water-cement plus fly ash ratio) shall control amount of total water added to concrete as follows:

Coarse Aggregate Size	W/C Ratio
1-1/2 inch	0.50
1 inch	0.45

3. Minimum Cement Content (Combined Cement Plus Fly Ash Content):
  - a. 517 pounds per cubic yard for concrete with 1-1/2 inch maximum size aggregate.
  - b. 540 pounds per cubic yard for 1 inch maximum size aggregate.
4. Increase cement content (combined cement plus fly ash content), as required meeting strength requirements and water-cement ratio.
5. Fly Ash Content: minimum 20 percent, maximum 50 percent by weight of total cement content.

- G. Mixing: Minimum 70 and maximum 270 revolutions of mixing drum. Non-agitating equipment is not allowed.

## 2.03 REINFORCING STEEL

- A. Deformed Bars: ASTM A615, Grade 60.
- B. Welded Wire Reinforcement: ASTM A185, fabricated from as-drawn steel wire into flat sheets.
- C. Bar Supports:
  1. For Slab Rebar: Concrete blocks or plastic bar supports.
  2. For Rebar in Walls, Beams, Columns, and Slabs Exposed to View: Galvanized steel chairs with plastic tips or plastic bar supports and side form spacers.

## 2.04 ANCILLARY MATERIALS

### A. Curing Compound

1. Material: Solvent based containing chlorinated rubber solids in accordance with ASTM C309, with additional requirement that the moisture loss not exceed 0.030 gram per centimeter squared per 72 hours.
2. Manufacturers and Products
  - a. Master Builders Co.; Masterkure CR
  - b. Euclid Chemical Co.; Euco Super Floor Coat
  - c. Atlas Quantum-Cure 61 (NSF/ANSI Standard 61-certified product)
  - d. Dayton Superior (NSF/ANSI Standard 61-certified product)

### B. Epoxy Bonding Agent and Adhesives (for Binding New Concrete to Existing Concrete)

1. Epoxies: Two component material for use on dry or damp surfaces and conforming to the requirements of ASTM C881.
2. Apply in accordance with manufacturer's recommendations.
3. Epoxy Bonding Agent for water-containing structures at potable water treatment or storage tanks shall have NSF/ANSI Standard 61 certification for contact with water for the water-containing structure's area/volume ratio.
4. Manufacturers: One of the following or equal:
  - a. Sika Armatex 110 EPOCEM; Sika Chemical Corporation.
  - b. CCS Bonder Paste LWL; Chemco Systems.

### C. Waterstops

1. General: Place hydrophilic and/or rubber dumbbell type or center bulb type waterstops at construction joints and other joints as specified and indicated on the Drawings.
2. Hydrophilic Waterstops:
  - a. Use: For concrete repairs or when attaching new concrete to existing structures.
  - b. Manufacturers: One of the following or equal:
    - 1) Greenstreak, Hydrotite CJ.
    - 2) Tremco, Parastop II.
  - c. Installation: As indicated on the Drawings and in accordance with manufacturer's instructions.
3. Rubber Waterstops
  - a. Use: At new construction joints where indicated on the Drawings.
  - b. Material: PVC or rubber waterstops manufactured by one of the following, or equal:
    - 1) Greenstreak.
    - 2) Progress Unlimited.
    - 3) Williams Products.

- c. Size:
      - 1) Construction and Contraction Joints. 6-inch flat dumbbell type.
      - 2) Expansion Joints: 9-inch wide dumbbell with hollow center bulb.
- D. Vapor Barrier
  - 1. Material: 15 mil, multilayer plastic, 0.01 minimum permeance rating.
  - 2. Manufacturers: One of the following or equal:
    - a. StegoWrap, Stego Industries.
    - b. Premoulded Membrane Vapor Seal with Plasmatic Corel, W. R. Meadows.
- E. Form-Release Agent
  - 1. Water-based, high solids content non-yellowing curing compound meeting requirements of ASTM C309 and C1315.
  - 2. Moisture Loss: 0.40 kg/square m/72 hours maximum.
  - 3. Capable of meeting moisture retention at manufacturer's specified application rate.
  - 4. Manufacturers and Products:
    - a. Atlas; Bio-Guard.
    - b. Dayton Superior; Clear Strip J1EF.

## **PART 3 - EXECUTION**

### 3.01 FORMWORK

- A. Design, construct, erect, brace and maintain formwork in accordance with ACI 301.
- B. Form Ties
  - 1. Fixed conical or spherical type inserts that remain in contact with forming material and allow for dry packing of form tie holes.
  - 2. Space ties to withstand pressures and to limit deflection of forms to acceptable limits.
  - 3. Wire ties are not acceptable.
- C. Construction
  - 1. In accordance with ACI 347.
  - 2. Make joints tight to prevent escape of mortar and to avoid formation of fins.
  - 3. Brace as required to prevent distortion during concrete placement.
  - 4. On exposed surfaces locate form ties in uniform pattern or as shown.
  - 5. Construct so ties remain embedded in the wall with no metal within 1-inch of concrete surface when forms, inserts, and tie ends are removed.
- D. Form Removal
  - 1. Remove after concrete has attained 28 day strength, or approval is obtained in writing from Engineer.
  - 2. Remove forms with care to prevent scarring and damaging the surface.

### 3.02 PLACING REINFORCING STEEL

- A. Place reinforcing steel in accordance with CRSI Recommended Practice for Placing Reinforcing Bars.
- B. Field bending or welding of reinforcing bars will not be allowed.
- C. Bar Supports: Provide in sufficient quantity to prevent sagging and to support bars during concrete placement.
- D. Splices and Laps
  - 1. Top Bars: Horizontal bars placed such that 12 inches of fresh concrete is cast below in single placement.
  - 2. Horizontal wall bars are considered top bars.
  - 3. Bar lap splices shall conform to General Structural Notes on the Drawings.
  - 4. Tie splices with 18-gauge annealed wire as specified in CRSI Standard.

### 3.03 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Before placing concrete:
  - 1. Check reinforcing steel for proper placement and correct discrepancies.
  - 2. Remove excessive rust, mill scale, dirt, oil and other material from rebar that may adversely affect bonding to concrete.
  - 3. Remove water from excavation and debris and foreign material from forms.
- C. Before depositing new concrete on existing concrete, clean surface using sandblast or other mechanical means to obtain a 1/4 inch rough profile, and apply epoxy bonding agent in accordance with the manufacturer's instructions.
- D. Place concrete as soon as possible after leaving mixer, without segregation or loss of ingredients, without splashing forms or steel above, and in layers not over 2 feet deep. Place within 1-1/2 hours after adding cement to mix.
- E. Placement Limitations: 8 feet maximum vertical drop to final placement, when not guided with chutes or other devices to prevent segregation due to impact with reinforcing.
- F. Hot Weather
  - 1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 305R.
  - 2. Maintain concrete temperature below 80 degrees F at time of placement, or furnish test data or provide other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking due to heat of hydration. Ingredients may be cooled before mixing to maintain fresh concrete temperatures at 80 degrees F or less.
  - 3. Make provisions for windbreaks, shading, fog spraying, sprinkling, ice, or wet cover, or other means to provide concrete with temperature specified.
  - 4. Maximum allowable temperature differential between reinforcing steel and concrete: Not greater than 20 degrees F at the time of concrete placement.

### 3.04 COMPACTION

- A. Vibrate concrete as follows:
  - 1. Apply approved vibrator at points spaced not farther apart than vibrator's effective radius.
  - 2. Apply close enough to forms to vibrate surface effectively but not damage form surfaces.
  - 3. Vibrate until concrete becomes uniformly plastic.
  - 4. Vibrator must penetrate fresh placed concrete and into previous layer of fresh concrete below.

### 3.05 CONSTRUCTION JOINTS

- A. Locate as shown or as approved.
- B. Maximum Spacing Between Construction Joints: 40 feet, unless otherwise indicated.

### 3.06 CRACK CONTROL JOINTS

- A. Provide crack control joints in concrete slabs on grade, curbs, gutters, sidewalks and other concrete flatwork as follows:
  - 1. Install crack control joints by use of grooving tool on fresh concrete or saw-cut by use of a saw designed for crack control joints as soon as the concrete hardens sufficiently to support the saw, however, no longer than 12 hours after concrete placement.
  - 2. Depth: 1/4 the thickness of the slab.
  - 3. Frequency: Unless otherwise indicated,
    - a. At least 2 times the slab thickness in feet (6-inch slab = 12 foot on center).
    - b. Rectangular slabs: Maximum spacing 1-1/2 to 1

### 3.07 FINISHING FLOORS AND SLABS

- A. Unexposed Slabs: Screed to true surface, bull float with wood float, and wood trowel to seal surface and to provide a uniform surface.
- B. Exposed Slabs to Receive Grout: Screed to indicated elevation and leave without special finish.
- C. Exposed Floors and Slabs: Screed to true surface and use bull float to form a uniform surface with minor texture then apply final surface finish.
- D. Final Surface Finishes for Exposed Floors and Slabs: Apply final surface finish as scheduled.
  - 1. Walkway finish: Apply to concrete surfaces that will be used for foot traffic such as walkways around basins and sidewalks. Apply steel trowel surface, then a light hairbroom finish to produce a profile that is parallel to the slab drainage.
  - 2. Scratch Finish: Apply to surfaces receiving concrete floor topping and other bonded cementitious floor finishes, unless otherwise indicated on the Drawings. Use brushes or brooms with stiff bristles to produce 1/4-inch deep scratches.

3. Float Finish: Apply to slabs of water-bearing basins and channels and to roof surfaces to receive membrane roofing. Use power-driven floats or hand floats to produce a surface that is uniform and smooth.
  4. Trowel Finish: After applying float finish, trowel surface until surface is uniform in texture and appearance and free of trowel marks. Apply trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet or tile.
  5. Non-slip Finish: After concrete has been screeded level and slightly hardened, sprinkle abrasive onto surface, wood float into concrete, and trowel abrasive into surface to obtain the proper non-slip finish with the exposed abrasive.
- E. Tolerances: Exposed surfaces shall not vary from level or true plane more than 1/4 inch in 10 feet when measured with a straightedge.

### 3.08 FINISHING AND PATCHING FORMED SURFACES

- A. Unexposed Surfaces: Provide rough-formed concrete texture as imparted by form-facing material, fill form tie holes with nonshrink grout and grind off projections, fins, and rough spots.
- B. Exposed Surfaces: Provide smooth-formed concrete texture as imparted by form-facing material, arranged in an orderly and systematic manner with a minimum number of seams. Fill form tie holes with nonshrink grout and grind off projections, fins, and rough spots. Where scheduled, apply rubbed surface as follows:
1. Smooth Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive to produce a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes.
    - a. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces.
    - b. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
  3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout.
    - a. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces.
    - b. Compress grout into voids by grinding the concrete surface in a swirling motion, then finish the surface with a cork float.:
- C. Patching Defective Areas: Contact Engineer for direction prior to patching defective areas. Patch defective areas and repair rough spots resulting from form release agent failure or other reasons to provide smooth uniform appearance.
1. Cut out honeycombed and defective areas.

2. Cut edges perpendicular to surface at least 1-inch deep. Do not feather edges. Soak area with water for 24 hours.
3. Finish surfaces to match adjacent concrete.
4. Keep patches damp for minimum 7 days or spray with curing compound to minimize shrinking.

### 3.09 PROTECTION AND CURING

- A. Protect fresh concrete from direct rays of sunlight, drying winds, and wash by rain.
- B. Keep concrete slabs continuously wet for a 7 day period. Intermittent wetting is not acceptable.
- C. Use curing compound only where approved by Engineer. Cure formed surfaces with curing compound applied in accordance with manufacturer's directions as soon as forms are removed and finishing is complete.
  1. Do not use curing compound on concrete surfaces that will be painted.
- D. Remove and replace concrete damaged by freezing.

### 3.10 FIELD QUALITY CONTROL

- A. Concrete Samples:
  1. Provide concrete for making composite samples for testing slump, air content, and for making five (5) cylinders for determination of compressive strength.
  2. Prepare samples in accordance with ASTM C172. Select trucks or batches of concrete on a random basis.
  3. Samples may be obtained at the discharge chute of the truck or at the point of discharge into forms.
- B. Sampling Frequency: One composite sample for each 100 cubic yards of structural concrete, or fraction thereof, of each concrete mixture placed in any one day.
- C. Evaluation will be in accordance with ACI 301, Chapter 17 and Specifications.
- D. Slump tests and concrete cylinders will be made by the Owner. Owner will handle cured test cylinders, transport to the testing laboratory and pay testing costs.
- E. Enforcement of Compressive Strength Requirements:
  1. Compressive strength of concrete will be considered acceptable if the following conditions are satisfied:
    - a. Averages of all sets of 3 consecutive strength test results are greater or equal to the specified compressive strength.
    - b. No individual strength test (average of 2 cylinders) falls below specified compressive strength by more than 500 pounds per square inch.
  2. Whenever one, or both, of 2 conditions stated above is not satisfied, provide additional curing of affected portion of structure, then obtain test cores from the affected area.
    - a. Obtain 3 test cores in accordance with ASTM C42 and ACI 318.
    - b. Concrete will be considered acceptable if the average compressive strength of the 3 test cores is equal to at least 90 percent of the specified

- 28-day compressive strength and no single core is less than 80 percent of the specified 28-day compressive strength.
- c. Concrete will be designated as defective when the specified conditions are not achieved.
  - d. Fill core holes with concrete.
3. Engineer may require the Contractor to strengthen defective concrete by means of additional concrete, additional reinforcing steel, or replacement of defective concrete, all of the Contractor's expense.

**END OF SECTION**

## SECTION 03600

### GROUT

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Grout for uses other than masonry construction, including:
  - 1. Dry pack grout
  - 2. Cement grout
  - 3. Nonshrink grout, non-metallic
  - 4. Nonshrink grout, metallic
  - 5. Pressure grout
  - 6. Epoxy grout
  - 7. Polymer concrete

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Section 01330 – Submittals
  - 2. Section 03301 – Cast-in-Place Concrete

##### 1.03 SUBMITTALS

- A. Conform to Section 01330.
- B. Product Data
  - 1. Manufacturer's product data of all materials proposed for use in the Work.
  - 2. Manufacturer's literature containing instructions and recommendations on the mixing, handling, placement and appropriate uses for each type of grout used in the Work
- C. Laboratory Test Reports
  - 1. Test reports on previously tested materials shall be accompanied by the manufacturer's statement that the previously tested material is the same type, quality, manufacture, and make as that proposed for use in this project.
  - 2. Test reports are required for the following:
    - a. Cement
    - b. Aggregates
    - c. Bonding compounds
    - d. Admixtures
- D. Certifications that all grout used on the project are free of chlorides or other chemicals that may cause corrosion.

1.04 QUALITY ASSURANCE

A. Field tests

1. Compression test specimens will be taken during construction from the first placement of each type of grout and at intervals thereafter as selected by the Owner to insure compliance with the Contract Documents.
2. The test specimens will be obtained, tested, and paid for by the Owner except the Contractor will be charged the cost of any additional tests on work which does not meet the Specifications.
3. Compression tests for grout and non-shrink grout:
  - a. Per ASTM C109.
  - b. Obtain three samples.
  - c. At a minimum test at 7 and 28 days.
4. Compression test for epoxy grout:
  - a. Per ASTM C579 Method B.
  - b. Obtain three samples.
  - c. At a minimum test at 7 days.

**PART 2 - PRODUCTS**

2.01 GENERAL

- A. Use grouts indicated in the grout schedule whether called for on Drawings or not.

2.02 CEMENT GROUT

- A. Minimum Compressive Strength: 5,000 psi at 28 days when cured and tested in accordance with ASTM C31 and C39.
- B. Portland cement ASTM C150 Type II or Type V
- C. Low alkali, containing less than 0.60 percent alkalies.
- D. Aggregate
1. Nonreactive and washed before use.
  2. Fine Aggregate
    - a. Hard, dense, durable particles of either sand or crushed stone regularly graded from coarse to fine and shall conform to ASTM C33 as modified herein.
    - b. Gradation (ASTM C136): 100 percent by weight will pass a standard No. 8 mesh sieve and no less than 45 percent by weight will pass a standard No. 40 mesh sieve.
    - c. Tolerance: The average of three consecutive tests fall within the limits listed below:

US standard sieve size	Permissible variation in individual tests, percent
30 or coarser	2.0
50 or finer	0.5

3. Meet the requirements of the following specifications:

Test	Test Method	Requirements
Organic Impurities	ASTM C40	Color lighter than standard
Amount of Material Passing No. 200 Sieve	ASTM C117	3% maximum by weight
Soundness	ASTM C88	10% maximum loss with sodium sulfate
Reactivity	ASTM C289	Innocuous aggregate
Sand Equivalent	ASTM D2419	Minimum 80

4. Admixtures

a. General

- 1) Compatible with the grout.
- 2) Do not use calcium chloride or admixtures containing calcium chloride.
- 3) Follow the manufacturer's recommendations for use.
- 4) Add separately to the grout mix.

b. Water Reducing Retarder

- 1) ASTM C494 Type D.
- 2) Manufactured by:
  - a) Master Builders MasterSet R 300,
  - b) Sika Corporation Plastiment,
  - c) Or equal.

c. Lubricant for Cement Pressure Grouting

- 1) Manufactured by:
  - a) Intrusion Prepakt Intrusion Aid,
  - b) Sika Intraplast N,
  - c) Or equal.

5. Water

- a. Free from oil and deleterious amounts of acids, alkalies, and organic materials;
- b. Do not use water containing more than 500 mg/1 of chlorides as Cl, nor more than 800 mg/1 of sulfates as SO<sub>4</sub>;
- c. Do not use water containing impurities that may cause a change of more than 25 percent in the setting time of the cement nor a reduction of more than five percent in the compressive strength of the grout at 14 days when compared with the result obtained with distilled water.
- d. Do not use water for curing that discolors the grout.

E. Drypack Grout

1. A mixture of approximately one part cement, 1-1/2 to 2 parts sand, water reducing retarder, and sufficient water to make a stiff workable mix.

2. Consistency: Plastic and moldable but does not flow.
- F. Cement Grout
1. Mixture of one part cement, two parts sand, proportioned by volume, admixtures for pressure grouting, and sufficient water to form workable mix.
  2. Maximum slump: 4 inches.

## 2.03 PREPACKAGED GROUT

- A. Non-shrink Grout
1. Cementitious non-shrink, non-metallic grout
  2. Conform to ASTM C827 and C1107.
  3. Manufactured by:
    - a. Sika Corporation, SikaGrout 212
    - b. Five Star Products, Inc. Five Star Grout
    - c. Chemrex Inc. Masterflow 928
    - d. Euclid Chemical Co. High-Flow Grout
    - e. Or equal.
- B. Epoxy grout bonding/grouting adhesive
1. Multi-purpose, two-component, 100% solids, moisture-tolerant, structural adhesive.
  2. Conform to ASTM C881, Types I, II and V, Grade-2.
  3. Manufactured by:
    - a. Sika Corporation, Sikadur 32, Hi-Mod
    - b. Chemrex Inc. MasterFlow 649
    - c. Or equal.
- C. Epoxy grout paste adhesive
1. High modulus, two-component, moisture insensitive, 100 percent solids, thermo-setting modified polyamid epoxy compound.
  2. Paste form consistency capable of not sagging in horizontal or overhead anchoring configurations.
  3. Conform to ASTM C881 Type 1, Grade 3
  4. Heat deflection temperature: In excess of 130 degrees F.
  5. Manufactured by:
    - a. Chemrex Inc. Concessive Paste LPL
    - b. Sika Corporation Sikadur Hi-Mod Series
    - c. Adhesive Technology Corporation Ultrabond 1350
    - d. Or equal,

- D. Epoxy grout for pressure grouting
1. Two component, 100% solids, moisture-tolerant, epoxy adhesive. Low-viscosity, high-strength adhesive formulated specifically for injection grouting.
  2. Consistency as necessary to achieve complete penetration in hairline cracks and larger.
  3. Conform to ASTM C881 Type 1 and 2, Grade 1.
  4. Manufactured by:
    - a. Sika Corporation Sikadur 52
    - b. Chemrex Inc. Coneresive LV1
    - c. Adhesive Technology Corporation SLV 300 series
    - d. Or equal.
- E. Polymer concrete grout
1. Liquid binder and dry aggregate mixed together to make a mortar or grout of a consistency as necessary for the application.
  2. Liquid binder: Chemical and oil resistant, stress relieved, low modulus, moisture insensitive, two-component epoxy-resin compound.
  3. Consistency similar to lightweight oil for proper mixing with aggregate.
  4. Conform to ASTM C881 Type 3 Grade 1,
  5. Aggregate:
    - a. Size and consistency compatible with recommendations of manufacturer of liquid binder for intended application.
    - b. Keep aggregate oven dry in sealed packages until time of mixing.
  6. Manufactured by:
    - a. Sika Corporation Sikadur Lo-Mod series
    - b. Adhesive Engineering Coneresive 1470
    - c. Adhesive Technology Corporation 400 series
    - d. Or equal.

#### 2.04 PRESSURE GROUTING EQUIPMENT

- A. Mixer and holdover agitator tanks
- B. Designed to place grout at pressures up to 50 psi.
- C. Provide gages to indicate pressure grout pressure during application.
- D. Provide mixer with a meter capable of indicating to one-tenth of a cubic foot the volume of grout used.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Conduct mixing, surface preparation, handling, placing, consolidation, and curing for prepackaged grouts according to the instructions and recommendations of the grout manufacturer.
- B. Mix grouts in a mortar mixer.
- C. Bonding compound for use with grout is specified in Section 03301.
- D. Provide primer, if required, for polymer concrete, per manufacturer's recommendation.

### **3.02 DRYPACK GROUT**

- A. Roughen surfaces to be built up with drypack grout by brushing
- B. Clean, and coat surface with bonding compound in conformance to Section 03301 before the application of the grout.
- C. Apply drypack grout immediately following the application of the bonding compound in layers to the required thickness.
- D. Finish the surface smooth.
- E. Where construction joints are necessary, slope face of construction joints and clean and wet the existing grout before application is resumed.
- F. Cure drypack grout in accordance with Section 03301.
- G. Do not place drypack grout during freezing weather unless adequate protection is provided.

### **3.03 CEMENT GROUT**

- A. Except for the specialized equipment for pressure grouting, mixing and placing apparatus use equipment similar to that normally used for cast-in-place concrete.
- B. Mix grout for a period of at least 1 minute.

### **3.04 NONSHRINK GROUT**

- A. Place in accordance with manufacturer's instructions.

### **3.05 EPOXY GROUT**

- A. Prime surface to be grouted in accordance with the grout manufacturer's instructions.

### **3.06 PRESSURE GROUTING**

- A. Prior to grouting, Wash clean surfaces and holes to be grouted, prior to grouting.
- B. Washing is not required for grouting soil voids outside pipe cylinders or casing pipes.
- C. Once commenced, continue grouting to completion without stoppage.
- D. In case of breakdown of equipment, wash out the grouting system sufficiently to ensure fresh grout and adequate bond and penetration will occur upon restarting the grouting operation.
- E. Maintain grout pressure until grout has set.

### 3.07 GROUT SCHEDULE

A. Use grout type indicated in the table below unless otherwise indicated.

Grout	Application
Drypack Cement Grout	Built-up surfaces, setting miscellaneous metal items and minor repairs.
Cement Grout	Filling nonbearing portions of equipment pads and pressure grouting.
Non-shrink Grout	Bearing surfaces of machinery and equipment bases, column base plates, and bearing plates, and setting handrail, guardrail, or fence posts in pipe sleeves.
Epoxy Grout	Reinforcing steel set in grout, repairing cracks in concrete, concrete repair.
Pressure Grout	Repairing cracks in concrete.
Polymer Cement Grout	Repair of concrete floors, patching.

**END OF SECTION**

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## SECTION 05501

### ANCHOR BOLTS AND ANCHORING DEVICES

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Anchor bolts, concrete anchors, adhesive anchors, and other anchoring devices.

##### 1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section
  - 1. Section 01330 – Submittals

##### 1.03 SUBMITTALS

- A. Comply with Section 01330.
- B. Product Data: Manufacturer's data for nuts, bolts, concrete anchors, chemical anchors and other fasteners.
- C. Catalog data and ICC-ES reports for each type of anchor bolt.

##### 1.04 QUALITY ASSURANCE

- A. For applications that require special inspection in accordance with building codes, coordinate the progress of the Work with the required inspection activities.

#### PART 2 - PRODUCTS

##### 2.01 MATERIALS

- A. Unless otherwise specified or indicated on the Drawings, materials of construction for anchoring devices shall conform to the following:
  - 1. Anchor bolts and other anchoring devices, nuts and washers installed indoors: Type 304 stainless steel.
  - 2. Anchor bolts and other anchoring devices, nuts and washers installed outdoors or in locations exposed to wastewater: Type 316 stainless steel.
    - a. Locations exposed to wastewater includes:
      - 1) Below tops of walls of water-containing structures.
      - 2) Underside of roof, slab or walkways of enclosed water-containing structures.
      - 3) Dry side of walls on water-containing structures.

##### 2.02 CAST-IN-PLACE ANCHOR BOLTS

- A. Locations for use of cast-in-place anchor bolts:
  - 1. In locations indicated on the Drawings.

2. To anchor engine-driven equipment and equipment with motors 3 horsepower and larger.
- B. Cast-in-Place Anchor Bolts
1. Material: Stainless steel conforming to ASTM A320.
  2. Minimum Length of Bolt: As indicated on the Drawings. When not indicated, provide bolt length such that the length of the embedded anchor is at least 10 bolt diameters.
  3. Minimum length of 90-degree hook: 4 bolt diameters.

### 2.03 CONCRETE ANCHORS

- A. Concrete Anchors: Drilled in place wedge-type anchors with threaded stud body, stainless steel expansion clip, nut and washer.
- B. Materials: Type 304 or Type 316 stainless steel, depending upon installed location.
- C. Code Compliance: Test in accordance with, and comply with requirements of, ASTM E488 and ICC-ES AC193.
- D. Manufacturers: One of the following or equal:
  1. Hilti Kwik Bolt 3.
  2. ITW Redhead, Trubolt Wedge Anchor.
  3. DeWalt, Power-Stud SD4 or SD6.
  4. Simpson Strong Tie, Strong Bolt 2.

### 2.04 STUDS

- A. Material: Conforming to ASTM A108 with 50,000 pounds per square inch minimum yield strength, and 60,000 pounds per square inch minimum tensile strength.
- B. Manufacturers: One of the following or equal:
  1. Nelson Stud Welding Company, S3L Shear Connectors or H4L Concrete Anchors.
  2. Stud Welding Products, Headed Concrete Anchors and Shear Connectors or Concrete Anchors.

### 2.05 ADHESIVE ANCHORS

- A. Applications: Use for bonding threaded rods and concrete reinforcing bars to hardened concrete and grouted cement masonry. Do not use in overhead applications, in chlorine gas environments, or where anchor may be exposed to machine oil or diesel oil.
- B. Code Compliance: Test in accordance with, and comply with requirements of, ASTM E488 and ICC-ES AC58.
- C. Materials
  1. Epoxy Adhesive: Two component, injectable epoxy adhesive.
  2. Concrete Reinforcing Bars: Grade 60.
  3. Threaded Rods: Type 304 stainless steel all-thread rod conforming to ASTM F593.

- D. Manufacturers: One of the following or equal:
  - 1. Hilti HIT-HY-200 Adhesive Anchor System.
  - 2. ITW Redhead G5 Adhesive Anchoring System.
  - 3. DeWalt PE1000+ Epoxy Anchoring System.
  - 4. Simpson Strong Tie SET-XP Epoxy Adhesive Anchoring System.

## **PART 3 - EXECUTION**

### **3.01 GENERAL ANCHORING REQUIREMENTS**

- A. Use equipment shop drawings, anchorage layout drawings, and anchor bolt layout templates to accurately position anchor bolts.
- B. Install anchor bolts, concrete anchors and other anchoring devices with at least 2 threads projecting beyond the nut, but no more than 1/2-inch projecting beyond the nut.
- C. Prior to installing nuts, coat threads of stainless steel bolts with material to prevent galling of threads.
  - 1. Manufacturers: One of the following or equal:
    - a. Never Seez Compound Corporation, Never-Seez.
    - b. Oil Research, Inc., WLR No. 111.
- D. Tighten nuts on anchor bolts, concrete anchors and other anchoring devices to the "snug-tight" condition, defined as tightness attained by a few impacts of an impact wrench or the full effort of a man using an ordinary wrench.

### **3.02 CAST-IN-PLACE ANCHOR BOLTS**

- A. Do not use expansion type concrete anchors or adhesive anchors as substitution for cast-in-place anchor bolts.
- B. Accurately place anchor bolts to be embedded in concrete within the formwork and perpendicular to surface from which they will project. Secure in correct position while concrete is placed.
- C. Do not allow anchor bolts to touch reinforcing steel. Where anchor bolts are within 1/4 inch of reinforcing steel, isolate with a minimum of 4 wraps of 10 mil polyvinyl chloride tape in area adjacent to reinforcing steel.
- D. In anchoring machinery bases subject to heavy vibration, use 2 nuts, with 1 serving as a locknut.
- E. Where bolts are indicated on the Drawings for future use, first coat thoroughly with non-oxidizing wax, then turn nuts down full depth of thread and neatly wrap exposed thread with waterproof polyvinyl tape.
- F. Where indicated on the Drawings, set anchor bolts in metal sleeves having inside diameter approximately 2 inches greater than the bolt diameter and a minimum of 10 bolt diameters deep. Fill sleeves with grout when equipment is grouted in place.

### **3.03 CONCRETE ANCHORS AND ADHESIVE ANCHORS**

- A. Cast-in-place anchor bolts may be used in place of concrete anchors and adhesive anchors at Contractor's option.

B. Installation

1. Drill holes using concrete drill bits and impact type drill motors. Hole diameter shall be in accordance with the manufacturer's recommendations.
2. Clean drilled hole using compressed air to dislodge and remove drilling dust.
3. Accurately locate concrete anchors and set anchors with axis perpendicular to surfaces from which they will project.
4. Do not disturb adhesive anchors until cure time has elapsed.
5. Unless otherwise indicated on the Drawings or as required by structural calculations prepared by the equipment supplier, comply with minimum embedment lengths identified in the following table.

Minimum Embedment Lengths for Concrete and Adhesive Anchors

Diameter of Anchor or Bar, inches	Embedment Length for Concrete Anchors, inches	Embedment Length for Adhesive Anchors or Reinforcing Bars
1/4	1-3/4	As indicated on the Drawings
3/8	1-7/8	
1/2	2-1/4	
5/8	2-3/4	
3/4	3-1/4	
(1) Provide longer embedment where otherwise indicated		

**END OF SECTION**

## SECTION 11000

### GENERAL REQUIREMENTS FOR EQUIPMENT

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. General requirements applicable to mechanical equipment and systems.
- B. Ensure mechanical equipment meets the requirements of this Section in addition to the specific requirements of the individual equipment specification Sections.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Section 01330 – Submittals
  - 2. Section 01610 – Seismic Anchorage and Bracing
  - 3. Section 01999 – Reference Forms

##### 1.03 GENERAL REQUIREMENTS

- A. Equipment shall be of new construction and comply with the following requirements:
  - 1. Designed for all stresses that may occur during fabrication, transportation, erection, and during continuous or intermittent operations.
  - 2. Adequately anchored, leveled, aligned, and ready for operation without binding or overloading of critical components or motors.
  - 3. Installed with necessary appurtenances required for proper operation and installation in a neat and workmanlike manner.
  - 4. Tested by factory trained service mechanics or engineers.

##### 1.04 UNIT RESPONSIBILITY

- A. Equipment systems shall be assembled as a unit by a single manufacturer responsible for the entire unit.
  - 1. Responsibility extends to selecting components of the system to assure compatibility, proper operation, and compliance with specified performance requirements.
  - 2. Unit responsibility does not relieve Contractor of responsibility to Owner for performance of the Work.

##### 1.05 QUALITY ASSURANCE

- A. Arrangement
  - 1. The arrangement of equipment shown on the Drawings is based upon information available at the time of design and is not intended to show exact dimensions peculiar to a specific manufacturer.

2. Some features of the illustrated equipment installation may require revision to meet actual equipment installation requirements.
  3. Structural supports, foundations, connected piping, and valves shown may have to be altered to accommodate the equipment provided. Additional payment will not be made for such revisions and alterations.
- B. Balance: Fully assemble all rotating elements in motors, pumps, blowers and centrifugal compressors before performing static and dynamic balance. Where specified, submit balancing reports, demonstrating compliance with this requirement.

#### 1.06 SUBMITTALS

- A. Comply with Section 01330.
- B. General: Provide separate submittals for each equipment item or group of related equipment items.
- C. Equipment Anchorage: Submit anchor bolt sizing calculations.
- D. Bearing Life Calculations: Submit bearing L-10 life calculations in accordance with AFBMA requirements.
- E. Operation and Maintenance manuals for each equipment system

#### 1.07 PROTECTION DURING SHIPMENT

- A. Shipping: Ship equipment in sealed, weather-tight, enclosed conveyances, and protected against damaging stresses during transport and handling.
- B. Bearing Housings: Wrap or otherwise seal to prevent contamination by grit and dirt, and tape closed ventilation and other types of openings.
- C. Repair any damaged materials to conform to the requirements of the Contract before the assembly is incorporated into the Work. The Contractor shall bear the costs arising out of dismantling, inspection, repair, and reassembly.

### **PART 2 - PRODUCTS**

#### 2.01 PIPING CONNECTIONS ON EQUIPMENT

- A. Flanges on Equipment: Conform to dimensions and drilling specified in ANSI B16.1, Class 125 unless otherwise required by Division 15 pipe specifications or the Drawings.
- B. Pipe Flanges: Conform to dimensions and drilling specified in AWWA C207, Class D, 125 lb flanges provided on connection pipe.
- C. Threaded Flanges: Flat faced with standard taper pipe thread conforming to ANSI B1.20.1.
- D. Pipe Threads: Conform in dimension and limits of size to ANSI B1.1, coarse thread series, Class 2 fit.
- E. Flange Assembly Bolts and Nuts
  1. Heavy pattern, hexagonal head, carbon steel machine bolts with heavy pattern, hot pressed, hexagonal nuts conforming to ANSI B18.2.1 and B18.2.2.
  2. Threads: Unified Screw Threads, Standard Coarse Thread Series, Class 2A and 2B, ANSI B1.1.

## 2.02 BEARINGS

- A. Service: Unless otherwise specified, equipment bearings shall be oil or grease lubricated, ball or roller type, designed to withstand the stresses of the service specified.
- B. Rating
  - 1. L-10 Rating Life: Minimum 50,000 hours unless otherwise specified. Determine rating life using the maximum equipment operating speed.
  - 2. Determine rating in accordance with the latest revisions of AFBMA Methods of Evaluating Load Ratings of Ball and Roller Bearings.
  - 3. Where individual equipment Sections specify higher bearing life ratings, those requirements supersede the minimum bearing life specified above.
- C. Grease Lubricated Bearings
  - 1. Fit with easily accessible grease supply, flush, drain and relief fittings, except those bearings specified to be factory sealed and lubricated.
  - 2. Extend non-accessible grease fittings to an easily accessible location using 1/4-inch diameter stainless steel tubing as an extension tube.
  - 3. Grease supply fittings: Standard hydraulic Alemite or Zerk type.
- D. Oil Lubricated Bearings
  - 1. Equip with either a pressure lubricating system or a separate oil reservoir type system.
  - 2. Size oil lubrication systems to safely absorb the heat energy normally generated in the bearing under a maximum ambient temperature of 60°C.
  - 3. Equip with a filler pipe and an external level indicator gage.
- E. Incorporate bearing housings with sufficient cooling to maintain surface temperature at 65 degrees C or less for continuous operation at bearing rated load and a 50 degrees C ambient temperature, or install appropriate shielding on bearings that are accessible to touch.
- F. Bearing Isolators
  - 1. Provide for bearing where the shaft exits the bearing housing.
  - 2. Motor Bearings: Provide Inpro/Seal style VBX vapor blocking isolators.
  - 3. Gears: Provide Inpro/Seal “Double Runner” bearing isolator for shafts exiting the gear casing.
  - 4. Pumps, Blowers and Compressors: Provide Inpro/Seal style VBX blocking bearing isolators where shafts exit casings/housings.
  - 5. Pillow Block Bearings: Provide Inpro/Seal “Pop-In” style bearing isolators.

## 2.03 SHAFT COUPLINGS

- A. Type and Rating: Non-lubricated, designed for a minimum of 50,000 hours operating life.
- B. Equipment with a driver greater than 1/2 horsepower, and where the input shaft of a driven unit is directly connected to the output shaft of the driver, shall have its two shafts connected by a flexible coupling which can accommodate angular misalignment, parallel

misalignment and end float, and which cushions shock loads and dampens torsional vibrations.

- C. Provide couplings recommended by the coupling manufacturer for the specific application, considering horsepower, speed of rotation, and type of service.
- D. Install couplings in conformance to the manufacturer's instructions.

## 2.04 GUARDS AND CAUTION SIGNS

### A. Guards

- 1. Enclose exposed moving parts with guards that meet the requirements of federal and state OSHA requirements.
- 2. Enclose drive shafts to at least 7 feet above floors or operating platforms.

### B. Materials

- 1. Fabricate guards of 14 gauge steel and expanded metal screen to provide visual inspection of moving parts without removal of the guard.
- 2. Galvanize after fabrication and paint with the equipment.
- 3. Fasteners: Type 304 stainless steel.

### C. Warning Sign

- 1. Provide warning signs near equipment with moving parts that operate automatically or by remote control.

## 2.05 PRESSURE TAPS AND GAUGES

- A. Pressure Taps and Gauges: Unless otherwise indicated, provide on the discharge and suction sides of pumps, blowers and compressors.
- B. Pressure Gauges: 4-1/2-inch size, range as specified, stainless steel case, liquid filled, safety glass, weather proof, bronze tube and brass socket, industrial grade stainless steel movement with brass hairspring, 1.5% accuracy, and 1/2-inch NPT lower connection. Supply with 1/2-inch brass gauge cock.

## 2.06 NAMEPLATES AND LIFTING EYES

### A. Nameplates

- 1. Provide on each item of equipment with the specified equipment name or abbreviation and equipment number.
- 2. Engrave or stamp (not painted) on stainless steel and fastened to the equipment in an accessible location with stainless steel screws or drive pins.

### B. Lifting Eyes

- 1. Provide on equipment weighing over 80 lbs.

## 2.07 SPARE PARTS AND LUBRICANTS

- A. Spare Parts: Provide for each item of mechanical, electrical, and instrumentation equipment a supply of spare parts and special tools required for the starting, testing, adjustments, and initial operation. Pack spare parts required by individual equipment specifications:

1. Pack spare parts with individual weights less than 50 pounds in a heavily constructed painted wood box with hinged cover and a locking clasp.
  2. Provide a typed inventory of spare parts stapled to the underside of the cover.
  3. Tag and wrap each part in a waterproof container. Spare bearings shall be encapsulated in an airtight plastic film.
- B. Lubricants: Provide for each item of mechanical equipment of the type recommended by the equipment manufacturer a supply of the lubricant for startup, testing, and initial operation.
1. Provide a list showing the required lubricants for each item of mechanical equipment. List estimated quantity of lubricant needed for a full year's operation, assuming the equipment will operate continuously.
  2. Lubricants shall be products of the Owner's current lubricant supplier.
  3. Limit the various types of lubricants by consolidating them, with the equipment manufacturer's approval, into the least number of different types.

#### 2.08 ANCHOR BOLTS

- A. Size anchor bolts and concrete anchors for equipment in accordance with Section 01610.

#### 2.09 FACTORY APPLIED COATINGS

- A. Ship each item of equipment to the site of the work with a shop applied coating prepared in accordance with the requirements of the individual specification sections. Provide touch-up coating products for field touch-up.
- B. Finish Painting of Motors: Factory-apply finish coats using manufacturer's standard coating.

#### 2.10 SPECIAL TOOLS AND ACCESSORIES

- A. Furnish with each piece of equipment all tools, instruments, or accessories of a special nature that are required to assemble, disassemble, maintain, or repair any item of equipment.
1. Tag and mark each piece indicating their service and the piece of equipment for which their use is intended.
  2. Include a list and description or pictorial representation of all special tools required for a given piece of equipment for insertion into the equipment operation and maintenance manual.

#### 2.11 FASTENERS AND DIELECTRIC ISOLATION

- A. Fasteners for Aluminum: Stainless steel.
- B. Isolate steel surfaces, other than stainless steel, from aluminum with stainless steel, neoprene, non-metallic washers or other acceptable material.
- C. Dissimilar Metals: Protect from galvanic corrosion by means of pressure tapes, coatings, or isolators.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Install, align and test each item of equipment within the tolerances recommended by the equipment manufacturer.
- B. When specified in individual Sections, install and test equipment under the direction of installation engineers who have been factory trained by the equipment manufacturer.
- C. Perform all work in accordance with manufacturer's recommendations.

### **3.02 QUALITY CONTROL**

- A. Test equipment in accordance with the individual equipment Section.
- B. Furnish written certification from the equipment manufacturers that each item has been installed, aligned, and tested correctly and that the installation meets the manufacturer's requirements for efficient, trouble-free operation. Utilize Manufacturer's Installation Certification Form provided in Section 01999.
- C. Equipment manufacturer's certification shall not be construed as relieving the Contractor of his overall responsibility for this portion of the work.

**END OF SECTION**

**SECTION 11060**  
**ELECTRIC MOTORS**

**PART 1 - GENERAL**

**1.01 SECTION INCLUDES**

- A. Low-voltage alternating current induction motors, 250 horsepower or less.
- B. This section does not specify medium voltage (over 600 volts) motors and specialty motors such as submersible motors, hoist motors, valve operator motors or torque rated motors.
- C. Unless specified otherwise, require electric motors to be provided by the manufacturer of the driven equipment per of Section 11000.
- D. Unless specified otherwise in the particular equipment specifications, comply with these specifications.

**1.02 REFERENCED SECTIONS**

- A. The following Sections are referenced in this Section
  - 1. Section 01330 – Submittals
  - 2. Section 01999 – Referenced Forms
  - 3. Section 11000 – General Requirements for Equipment

**1.03 QUALITY ASSURANCE**

- A. Unit Responsibility
  - 1. Comply with Section 11000.
  - 2. Unless otherwise specified, assign unit responsibility for motors to the individual manufacturers of the driven equipment.
- B. Basic Standards
  - 1. Manufacture per UL 674, UL 1004, NEMA Standard MG 1, and the requirements specified.

**1.04 ENVIRONMENTAL CONDITIONS**

- A. Refer to individual equipment sections and drawings for installation locations.

**1.05 SUBMITTALS**

- A. Comply with Section 01330.
- B. Include a copy of the contract document control diagrams and process and instrumentation diagrams, with addenda updates, that apply to the equipment in this section.

1. Mark to show specific changes necessary for the equipment proposed in the submittal.
  2. If no changes are required, mark the drawing or drawings “No Changes Required”.
  3. Failure to comply with this paragraph is sufficient cause to reject the entire submittal.
- C. Include the following items:
1. Completed Motor Data Form (Section 01999).
  2. For motors 100 horsepower and larger, a motor heating curve.
  3. Motor outline, dimensions, and weight.
  4. Manufacturer's descriptive information relative to motor features.
  5. Where a winding over-temperature device is required, provide a response curve for the temperature device.
  6. For all inverter duty motors, the motor manufacturer's certification that the motor is compatible with the adjustable frequency drive to be used with the motor as specified in this section.
  7. Motor performance data showing motor full load current, efficiency, and power factor for the motor operating at 25, 50, 75, 100 and 125 percent of full load.
  8. Operating and maintenance information specified in Section 01330.
  9. Overhaul instructions for each motor 5 horsepower and above.

#### 1.06 DESIGN REQUIREMENTS

- A. NEMA “B” design, unless otherwise specified.
- B. NEMA Class B temperature rise above 40 degrees C ambient.

#### 1.07 WARRANTY

- A. Provide two-year warranty from date of substantial completion unless manufacturer’s standard warranty is longer.
- B. Complete the Extended Warranty Form in Section 01999.

### **PART 2 - PRODUCTS**

#### 2.01 MANUFACTURERS

- A. General
  1. The Owner and Construction Manager believe the following candidate manufacturers are capable of producing equipment and/or products that will satisfy the requirements of this section.

2. Do not construe the preceding statement, as an endorsement of a particular manufacturer's products or that named manufacturers' standard equipment or products will comply with the requirements of this section.
  3. The below listed manufacturer's motors generally meet the class and performance requirements of this specification when furnished with appropriate modifications and additional features as specified.
- B. Horizontal Motors
1. Types 1 and 2 – Premium efficiency motors manufactured by General Electric Inc., Type KS; and Reliance Electric Co., Type XEX, or equal.
  2. Type 3 – Premium efficiency explosionproof motors manufactured by General Electric Inc., Type KS, Class I, Group D; and Emerson US Motor, Type LCE, or equal.
- C. Vertical Motors
1. Types 1 and 2 – Premium efficiency motors manufactured by General Electric Inc., Type KS; and Emerson US Motors, Type TUCE Corroduty, or equal.
  2. Type 3 – Premium efficiency explosionproof motors manufactured by General Electric Inc., Type KS, Class I, Group D; and Emerson US Motors, Type LUCE, or equal.
- D. Inverter Duty Motors
1. Baldor, Inverter Motor; General Electric, ASD; Reliance, RPM-AC (XT) and US Motors Varidyne Inverter Duty, or equal.

## 2.02 MATERIALS

- A. Cast iron frames for motors 1/2 horsepower and larger. Steel frames for motors smaller than 1/2 horsepower. Aluminum frame motors will not be permitted.
- B. Cast metal fan blades and shrouds.
- C. Stainless steel hardware.
- D. Nonhygroscopic leads.

## 2.03 NAMEPLATES

- A. Material: Engraved or stamped stainless steel or brass.
- B. Information: Include items listed in NEMA Standard MG 1, Paragraph 10.37, 10.38 or 20.60, as applicable.
- C. For motors 1/2 horsepower and larger, indicate the ABMA L-10 rated life for the motor bearings.
- D. For motors 2 horsepower and larger, list the nominal efficiency.
- E. For explosionproof motors, indicate UL frame temperature limit code.

F. Permanently fasten to the motor frame and position for easy visible inspection.

## 2.04 MOTORS LESS THAN 1/2 HORSEPOWER

### A. General

1. Type: Squirrel cage, single phase, capacitor start, induction run type.
2. The equipment manufacturer may provide normally supplied materials in lieu of those specified in Paragraph 2.02
3. For single phase motors provide Class B insulation.
4. Small fan motors may be split-phase or shaded-pole type.
5. Provide with copper windings.

### B. Rating

1. 115 volts, single phase, 60 hertz.
2. Continuous-time rated per NEMA Standard MG 1, Paragraph 10.35.
3. Nonoverloading at all points of the equipment operation.

### C. Enclosures

1. Comply with NEMA MG 1.
2. Unless otherwise specified, provide totally enclosed fan cooled or totally enclosed nonventilated enclosures.
3. Explosion Proof Motors
  - a. Furnish with UL Label for Class I, Division 1, Group D hazardous locations.
  - b. Provide an over temperature device in the enclosure to detect and automatically de-energize the motor if the enclosure surface temperature exceeds 260 degrees C.
  - c. Mark nameplate with UL frame temperature limit code T2B.

## 2.05 MOTORS 1/2 HORSEPOWER THROUGH 250 HORSEPOWER

### A. General

1. Type: Three phase, squirrel cage, full voltage start induction type.
2. Unless otherwise specified, provide a NEMA MG 1-1.16 design for the duty service imposed by the driven equipment such as frequent starting, intermittent overload, high inertia, mounting configuration, or service environment.

### B. Rating

1. 460 volts, three phase, 60 Hz.
2. Continuous time rated per NEMA Standard MG 1, paragraph 10.40.

3. Unless specified otherwise, provide a service factor of 1.15, but size not to exceed the nameplate rating at any point on the operating curve (non-overloading) of the driven equipment.

C. Classifications

1. General:
  - a. Comply with the requirements specified in the following paragraphs.
  - b. Definition of terms: Per NEMA MG 1.
  - c. Temperature rise: for all motor types, do not exceed that permitted by Note II, paragraph 12.42, NEMA MG 1. The insulation shall be nonhygroscopic.
2. Type 1 Motors:
  - a. Drip-proof guarded enclosures
  - b. Class F insulation and Class B temperature rise at the motor's nominal rating.
3. Type 2 Motors:
  - a. Totally enclosed, fan cooled.
  - b. Class F insulation and Class B temperature rise at the motor's nominal rating.
  - c. Conform to IEEE 841.
  - d. Coat all internal surfaces with an epoxy paint.
4. Type 3 Motors
  - a. Explosion proof motors, UL listed per UL 674 for Class I, Group D hazardous atmospheres.
  - b. Class F insulation.
  - c. Conform to IEEE 841.
  - d. Provide UL-approved breather/drain device in the motor drain hole.
  - e. Provide a frame temperature thermostat which meets the UL frame temperature limit code T2B (260 degrees C). Include automatically reset, normally closed contact rated 2 amperes at 115 volts AC.

D. Thermal Protection

1. Unless specified otherwise, provide thermal protection as defined in NEMA MG 1-12.53.1, as follows:

Motor type	Thermal Protection	
	Type 2 - Thermostats	Type 1 - RTDs
Noninverter duty	50-150 HP	200-250 HP
Inverter duty	1-60 HP	75-250 HP

2. Provide thermal protection in each stator winding.
  - a. Thermostats: Bimetallic switch type, self-resetting.
  - b. Resistance temperature detectors (RTDs): 10-ohm copper type (two per phase).
  - c. On larger frame sizes where the motor manufacturer does not offer copper type RTDs, provide 100-ohm platinum type (two per phase).
3. For explosion proof motors, provide the motor winding thermal protection as specified above in addition to the motor frame thermostat specified in Paragraph 2.05.c.4.e.

E. Inverter Duty Motors

1. Use with adjustable frequency controllers employing Pulse Width Modulation (PWM) technology.
2. Do not exceed NEMA MG 1, Class B, temperature rise when operating over the specified speed range on the specified load speed/torque characteristics required by the associated driven equipment
3. Provide certification from the motor manufacturer of compatibility with the adjustable frequency controller to be used with the motor.
4. Designed to operate over the speed or frequency range specified.
5. Insulation: Meet NEMA MG 1, Part 31 (1600 volt peak at a minimum of 0.1 microsecond rise time).
6. Provide with thermal protection as specified above.
7. Provide Grounding Unit
  - a. Provide with a shaft grounding unit mounted on the fan housing with stub shaft extended from the motor shaft.
  - b. Equip with two brushes, totally enclosed and sealed against environmental contamination.
  - c. Exception: Grounding unit and brushes not required for vertical turbine pumps.
8. Totally Enclosed, Air-Over, Blower-Cooled (TEBC) Type
  - a. Provide where specified or required by the specified application requirements.
  - b. Blowers: Driven at constant speed by 460-volt, 3-phase motors meeting Type 2 requirements specified in Paragraph 2.04 C.3.
  - c. Manufacture blower and ducting as an integral part of the main motor frame.
  - d. Provide air intake filter.
  - e. Construct scroll case of cast aluminum or iron, and fan wheel of Type 304 stainless steel.
9. Inverter duty motors may be NEMA MG1-1.16, design A.

F. Vertical Motors

1. Provide solid-shaft P-base type specifically designed for vertical installation.
2. Universal position motors are not acceptable.
3. Comply with Type 2, Type 3, and/or Inverter Duty Motor requirements as specified.
4. Thrust bearing rating: Demonstrate compatibility with the loads imposed by the driven equipment.

G. Minimum Nameplate Efficiency

1. Determine per IEEE 112B testing procedures, when operating on a sinusoidal power source.
2. Comply with the following:

Motor Horsepower	Motor Minimum Efficiency, percent			
	900 rpm	1200 rpm	1800 rpm	3600 rpm
1	72.0	82.5	83.0	84.0
1.5	75.5	84.0	85.0	84.0
2	81.5	85.5	82.5	82.5
3	86.5	88.5	89.5	87.5
5	87.5	89.5	89.5	89.1
7.5	88.5	91.0	91.7	90.2
10	89.5	91.1	91.7	91.0
15	89.8	91.7	92.4	91.7
20	90.2	91.7	93.0	91.7
25	91.0	92.4	93.5	92.0
30	91.0	93.0	93.6	92.4
40	91.7	93.6	94.1	93.0
50	92.4	93.6	94.1	93.0
60	93.0	93.9	94.5	93.6
75	93.0	94.5	95.0	94.1
100	93.6	94.5	95.4	94.5
125	94.5	94.5	95.4	94.9
150	94.5	95.4	95.8	95.0
200	94.5	95.4	95.8	95.4
250	94.5	95.4	95.8	95.4

H. Conduit Boxes

1. Type: Cast iron, split construction with threaded hubs.
2. Conform to IEEE 841.

3. Furnish at least one size larger than NEMA standard for the given motor size.
4. Design to rotate in order to permit installation in any of four positions 90 degrees apart.
5. Furnish with petroleum-resistant gaskets at the base of the conduit box and between the halves of the conduit box.
6. Provide grounding lug located within the box for the ground connection.
7. Minimum length of pigtail leads:
  - a. 12 inches for motors up to 50 horsepower.
  - b. 16 inches for motors larger than 50 to 250 horsepower.

I. Bearings

1. Type: Oil or grease lubricated ball or angle contact roller bearings.
2. Rating: Minimum L-10 life of 100,000 hours per ABMA 9 or 11 at the ambient temperature specified.
3. Motor designs employing cartridge type bearings will not be accepted.
4. Fit with lubricant fill and drain or relief fittings.

J. Lifting Eyes

1. Fit motors weighing more than 50 pounds with at least one lifting eye.

K. Current Imbalance

1. Base upon the lowest value measured.
2. Do not exceed the values tabulated below when the motor is operating at any load within its service factor rating and is supplied by a balanced voltage system:
  - a. Under 5 horsepower: 25 percent
  - b. 5 horsepower and above: 10 percent

L. Space Heaters

1. Where specified, size and design to prevent condensation inside the motor enclosure after shutdown.
2. Type: Cartridge or flexible wraparound type.
3. Power Requirements: 120 volts, single phase, 60 Hz.
4. Mark the rating in watts and volts on the motor nameplate or on a second nameplate.
5. Bring terminals to a separate terminal block or to pigtails in the conduit box.

## **PART 3 - EXECUTION**

### **3.01 TESTING**

- A. Perform winding insulation resistance and current imbalance testing as specified in Division 16.
- B. Test for correct rotation during preoperational checkout.

**END OF SECTION**

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## SECTION 11352

### VERTICAL TURBINE PUMPS

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Product-lubricated vertical turbine lineshaft pumps, complete with electric motors, discharge heads and all accessories and appurtenances as specified or shown on the Drawings.
- B. Designed for pumping clean water, free of solid material

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section
  - 1. Section 01330 – Submittals
  - 2. Section 01810 – Facility Start-Up and Commissioning
  - 3. Section 01999 – Reference Forms
  - 4. Section 05501 – Anchor Bolts and Anchoring Devices
  - 5. Section 11000 – General Requirements for Equipment
  - 6. Section 11060 – Electric Motors

##### 1.03 QUALITY ASSURANCE

- A. General
  - 1. All components of the pumping unit must be supplied by and warranted by the pump manufacturer including bowls, impellers, column, shafting, discharge heads, couplings, seals, suction barrels (if applicable) and motors.
- B. Unit Responsibility
  - 1. Assign unit responsibility, as specified in Section 11000, to the pump equipment manufacturer for the equipment specified in this Section and other referenced sections.
  - 2. Submit a certificate of Unit Responsibility.
- C. ISO 9001 Quality System
  - 1. Comply with ISO 9001 Quality System
  - 2. Submit documentation of compliance prepared by independent certification agency approved by International Organization for Standardization.
  - 3. Do not ship equipment before compliance documentation has been reviewed and approved.
- D. Governing Standards
  - 1. Conform to the applicable requirements of AWWA E-103 - Horizontal and Vertical Line-Shaft Pumps, latest edition.

2. Conform to the applicable requirements of ANSI/HI 9.6.4, Rotodynamic Pumps for Vibration Analysis and Allowable Values, latest edition.
  3. Testing: Conform to ANSI/HI 14.6 Rotodynamic Pumps for Hydraulic Performance Acceptance Tests, latest edition, Level 1U
- E. Manufacturer:
1. Shall have supplied complete units that have been in successful operation, at similar installations, for at least ten (10) years.
  2. Provide products of a single manufacturer who has been regularly engaged in the design and manufacture of the equipment.
- F. NSF61 CERTIFICATION
1. Certify complete pump assembly to NSF/ANSI Standard 61. Certification shall cover all wetted components of the pump, including but not limited to the bowl assembly, column assembly, discharge head assembly & suction barrel (when applicable).
  2. Submit documentation of NSF-61 certification.
- G. Natural Frequency Analysis
1. Engage a licensed professional engineer to perform a natural frequency analysis (vibration analysis) of the discharge head, motor stand (if applicable), and electric motor, and of the lineshaft, using FEA software, to demonstrate that no natural frequencies occur within +/-20% of the operating speed range.
    - a. If the pump manufacturer so recommends, include below ground components in the analysis.
    - b. Represent all pump assembly components including the motor as solid elements, and if idealizations are used in place of solid elements, include a complete description of the idealization method in the report.
    - c. Include all modes of interest and pictorially represent them in a fringe plot format. Modes of interest are defined as those structural frequencies that exist below 120% of the maximum operating speed.
  2. When significant modifications are required to lower the system's natural frequency, the pump structure's stresses and deflections shall also be reviewed.
  3. Submit documentation of the analysis, stamped and signed by the licensed engineer who performs the analysis work.

#### 1.04 DESIGN AND PERFORMANCE REQUIREMENTS

- A. Design pumps to operate:
1. Continuously under the specified conditions without damage to pump or motor.
  2. In a stable fashion and without cavitation over the full range of operating conditions.
  3. With head/capacity curves which slope continuously with no flat areas or slope reversals which could cause operating problems in variable frequency drive applications.
  4. At shutoff head for durations up to 30 seconds without overloading or damage.

5. Without encroaching on the motor's service factor at any point on the pump's speed/capacity curve.
- B. Design the pumping unit to safely operate free of resonant frequency. Conform to the vibration requirements of ANSI/HI 9.6.4.
- C. Comply with the following.

Design Requirements	
Parameter	Pumps
Number of Pumps	1
Minimum Pump Column Diameter, inches	14 <sup>(a)</sup>
Minimum Discharge Diameter, inches	14
Minimum Line Shaft Diameter, inches	1.94
Motor	
Maximum Nominal Motor Speed, rpm	1800
Horsepower, Maximum	100
Voltage/Cycle/Phase	460/60/3
Service Factor	1.15
Inverter Duty Rating Required	No
Insulation Rating	Class H
Enclosure <sup>(a)</sup>	TEFC
<sup>(a)</sup> Pump column shall be able to fit through the existing penetration in the clearwell suspended slab. See Drawings.	
<sup>(b)</sup> TEFC = Totally Enclosed Fan Cooled	

- D. Design pumps for long-term operation under the following environmental conditions:

Equipment Location	Indoors
Ambient Temperature	20-115 °F
Ambient Relative Humidity	30-80%
Pumped Fluid	Clear Water
Pumped Fluid Temperature	35-70 °F
Duty	Continuous
Suction Bowl Submergence	4 feet minimum
Site Elevation	586 feet

- E. Performance Criteria

1. Comply with the following: The specified heads represent required pressure at the discharge flange and include static lift, distribution system pressure and friction head loss in piping external to the pump. Shaft losses and pump column headloss are to be calculated and taken into account by the pump manufacturer, and are not included.

Performance Requirements	
Parameter	Pump
Nominal pump speed, rpm:	1770
Condition A <sup>(a)</sup>	
Capacity, gpm	4,200
Total head, feet	70
Min. Efficiency, %	82%
Condition B <sup>(b)</sup>	
Capacity, gpm	1,400
Total head, feet	117
<sup>(c)</sup> Condition A: The rated, continuous-duty operating performance, guaranteed in accordance with Hydraulic Institute Acceptance Level 1U. <sup>(d)</sup> Condition B is provided to indicate the general shape of the pump curve. The pump shall be able to operate intermittently (5-15 minutes, once per day) at the Condition B capacity.	

2. Select pumps such that the primary design point (Condition A) is greater than 95 % of the pump best efficiency point flow, and less than 105% of the pump best efficiency point flow.

## 1.05 SUBMITTALS

- A. Comply with Section 01330.
- B. Include a copy of this specification section with addendum updates, all referenced and applicable sections, and each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements.
  1. Use check marks (✓) to denote full compliance with a paragraph as a whole.
  2. If deviations from the specifications are indicated and, therefore requested by the Contractor, underline each deviation and denote by a number in the margin to the right of the identified paragraph.
  3. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications.
  4. Include a detailed, written justification for each deviation.
  5. Failure to comply with this paragraph is sufficient cause to reject the entire submittal.
- C. Include a copy of the contract document control diagrams and process and instrumentation diagrams, with addenda updates, that apply to the equipment in this section.
  1. Mark to show specific changes necessary for the equipment proposed in the submittal.
  2. If no changes are required, mark the drawing or drawings “No Changes Required”.
  3. Failure to comply with this paragraph is sufficient cause to reject the entire submittal.

- D. Include the following items
1. Complete scope of supply indicating all components to be furnished.
  2. Materials of construction
  3. Performance data curves showing head, capacity, horsepower demand, NPSH required, recommended NPSH margin, and pump efficiency over the entire operating range of the pump.
    - a. Indicate separately:
      - 1) The minimum submergence required at the rated flow condition and at the maximum and minimum flow conditions.
      - 2) Head
      - 3) Capacity
      - 4) Horsepower demand
      - 5) Pump efficiency
      - 6) Manufacturer's recommended maximum and minimum flow conditions
    - b. Submit performance curves at intervals of 100 rpm from minimum speed to maximum speed for each pump equipped with a variable speed drive.
  4. Fully dimensioned assembly and installation drawings including shaft size, seal, coupling, bearings, anchor bolt plan, part nomenclature, material list, outline dimensions, and shipping weights.
  5. On shop drawings or elsewhere indicate:
    - a. Pump model and size
    - b. Design rotation speed
    - c. Number of stages
    - d. Type of bowl bearings
    - e. Type of line shaft bearings
    - f. Shaft size
    - g. Pump column size
    - h. Discharge size
    - i. Outside diameter of pump bowls
  6. Vibration analysis stamped and signed by a licensed professional engineer demonstrating that the critical speeds of the discharge head assembly and of the shaft are either 20 percent above the maximum speed, or 20 percent below the minimum speed.
  7. Anchor bolt design calculations and details signed by a Oregon-registered Civil or Structural Engineer, and additional anchorage information specified in Section 05501.
  8. Electric motor information specified in Section 11060.
    - a. Submit a Motor Data Form (Section 01999)
  9. Wiring diagram
  10. Coating information

11. ISO 9001 Certification
  12. NSF-61 Certification
  13. Unit Responsibility Form (Section 01999)
  14. Manufacturer's standard warranty
- E. Submit operating and maintenance (O&M) information as specified in Section 01330 a minimum of 10 days before equipment shipment.
  - F. Submit factory test reports as specified under "Source Quality Control" a minimum of 10 days prior to equipment shipment and receive approval prior to equipment shipment. Include factory test reports in final O&M manual.
  - G. Submit forms required following startup and training. Include forms in final O&M manual. Refer to Part 3 below.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. One of the following:
  1. Goulds Water Technology
  2. Pentair Fairbanks Nijhuis
  3. Weir-Floway Inc.
  4. or equal as specified in Section 01330
- B. Modify as necessary to meet the requirements of this section.

### **2.02 MATERIALS OF CONSTRUCTION**

- A. Pump Bowls – Cast-Iron, ASTM A48, Class 30
- B. Impellers - Bronze, ASTM B584, nickel-aluminum-bronze alloy (C95200) or Type 316 stainless steel
- C. Bowl Wear Rings: Bronze, ASTM B148
- D. Bowl Shaft: Type 416 Stainless Steel, ASTM A582
- E. Bowl and Suction Bearings - Bronze, ASTM B505, product lubricated
- F. Sand Collar – Bronze
- G. Line Shafts: Stainless Steel, Type 416, ASTM 582
- H. Line Shaft Couplings: Stainless Steel, Type 316 or 416.
- I. Line Shaft Bearings: Neoprene with bronze or ductile iron retainers
- J. Pump Column: ASTM A53, Grade B, Schedule 30 Steel Pipe with flanged couplings
- K. Impeller Wear Ring: Bronze, ASTM B505, Alloy C95200
- L. Anchor Bolts: ASTM A276 Type 316 Stainless Steel
- M. All Hardware and Fasteners: Type 316 Stainless Steel
- N. Discharge Head: Fabricated Steel

## 2.03 EQUIPMENT FEATURES

### A. Bowls

1. Maximum number of stages: 1.
2. Joints: threaded or flanged for registered fit.
3. Cast free of blow holes, sand holes, and all other faults.
4. Accurately machine and fit to close dimensional tolerance.
5. Polish and porcelain-line flow passages.
6. Include a shaft sleeve bearing for each pump bowl.
7. Provide bowl wear rings, securely locked in place.

### B. Suction Case

1. Design to provide conservative entrance velocities and evenly distribute flow to the impeller.
2. Inner surface: smooth and free from projections or cavities.
3. Set pump shaft lower bearing in a streamlined casing, centered and held in place by means of rigid, cast vanes.
4. Include Type 316 Stainless Steel suction strainer and anti-vortex baffles.

### C. Impellers

1. Type: enclosed, with the shroud designed to rotate against wearing rings installed in the bowl assembly.
2. Construct free from projections, cavities, or abrupt transitions. Machine and polish impeller surfaces.
3. Statically and dynamically balanced.
4. Securely fasten to the bowl shaft with a tapered bushing or lock collet.
5. Adjustable by means of a solid adjustable spacer coupling.
6. Impeller shaft: supported by bronze bearings located on both sides of each impeller
7. Lock wearing rings in place so that they will not move or loosen during any condition of operation or handling, including reverse rotation.

### D. Shaft

1. Diameter: not less than the minimum permitted by AWWA E103 for the applicable motor horsepower.
2. First critical speed: Not less than 20% above maximum operating speed.
3. Provide a two-piece head shaft, solid intermediate line shafts supplied in maximum 10' lengths, and a single pump shaft extending from the suction case through a discharge case or upper bowl containing an upper pump shaft bearing.
4. Machine all rotating parts accurately to achieve as nearly perfect rotational balance as practicable.
5. Provide product lubricated lineshaft with intermediate spider bushings to align and support the shaft.

- E. Discharge Column Assembly
  - 1. Provide total length required for installation as shown on the drawings.
  - 2. Flanged column assembly in sections not over 10 feet in length.
  - 3. Top and bottom sections: maximum 5 feet in length.
- F. Discharge Head
  - 1. Type: Fabricated steel, with discharge above base plate/flange
  - 2. For wet well pumps: Minimum thickness of 1.25 inches.
  - 3. Provide a separate steel sole (sub-base) plate manufactured expressly for the discharge head provided. Minimum thickness 1.25 inches.
  - 4. Provide ANSI 150-lb. discharge flange.
  - 5. Provide adequate space to access and dismantle the shaft coupling without removing the motor.
  - 6. Provide OSHA-approved guards, manufactured of 14 gauge expanded stainless steel, and designed for visual inspection of moving parts and ease of removal.
  - 7. Pressure Tap
    - a. Provide a pressure tap on the discharge head.
    - b. Size: 3/4-inch, with reduction to 1/4-inch at gauge connection.
  - 8. Construct such that the reed critical frequency of the discharge head and motor assembly is a minimum of 20% above the maximum pump speed, or 20% below the minimum pump speed.
  - 9. Provide a stainless steel nameplate attached to the discharge head containing the following information at a minimum:
    - a. Pump model number
    - b. Design flow
    - c. Design head
    - d. Horsepower
    - e. Speed
    - f. Number of stages
    - g. Serial number
- G. Mechanical Seals
  - 1. Cartridge type
  - 2. Materials
    - a. Metal parts: Type 316 or 316L stainless steel.
    - b. Springs: Hastelloy C or Type 316 stainless steel.
    - c. Rotary faces: carbon, tungsten carbide, or silicon carbide.
    - d. Stationary faces: ceramic, tungsten carbide, or silicon carbide.
  - 3. Manufacturer
    - a. John Crane
    - b. Chesterton

- c. Burgmann
  - d. Or approved equal
4. Seal flush
- a. Clean water seal flush: provide piped flushing connection from a pressurized clean water source and route to sump through discharge head connection (API Plan 32 seal flush). Use Type 316 stainless steel tubing and Type 316 stainless steel needle valve to adjust flushing rate.

H. Coatings

- 1. Provide fusion bonded, NSF-61 approved, epoxy coatings on pump bowl exterior, column interior and exterior, below base plate exterior surfaces, and discharge head waterways. Submit materials for approval.
- 2. Factory coat all exposed metal surfaces of the discharge head and sole plate with an amidoamine epoxy. Submit materials for approval.
- 3. Correct damage to the lining or coating to the satisfaction of the Construction Manager if in his or her opinion it is repairable. Return equipment with coating and/or lining damaged beyond repair to the manufacturer for recoating.
- 4. Do not coat line shaft.
- 5. Coordinate coating color selection with Owner.

2.04 MOTORS

- A. Premium Efficiency Type 2, per Section 11060.
- B. Submit a Motor Data Form (Section 01999)
- C. Provide space heaters to mitigate condensation where specified, or recommended by manufacturer. Refer to Section 11060.
- D. Provide with a nonreversible ratchet device to prevent backspin of the pump.

2.05 ACCESSORIES

- A. Anchor Bolts
  - 1. Comply with Section 05501
  - 2. Submit calculations stamped and signed by a Oregon-registered Civil or Structural Engineer.
  - 3. Minimum diameter: 3/4-inch.
  - 4. Type 316 stainless steel
- B. Provide lifting lugs on motor and on discharge head
- C. Provide seal leakage collector with a 1/2-inch tapped drain opening.
- D. Provide vibration and temperature monitors. Xylem/Goulds i-Alert2 temperature and vibration module; or equal. Provide adapter as needed to mount on pump motor.

E. Spare Parts:

1. Provide the following spare parts for each model of pump supplied, packed and labeled for warehouse storage:
  - a. (1) Full set of manufacturer's special tools necessary for the replacement of parts and adjustment of equipment.
  - b. (1) suction case bearing set.
  - c. (1) set of bowl and discharge case bearings.
  - d. (1) set of line shaft bearings.
  - e. (2) complete mechanical seals
  - f. (2) sets of all gaskets and O-rings.
2. Furnish spare parts and lubricants per Section 11000.

2.06 SOURCE QUALITY CONTROL

A. Factory assemble each pump.

B. Performance Testing

1. Conduct factory performance testing to demonstrate compliance with this Section and submitted performance curves.
2. Owner does not currently anticipate the need for a witnessed factory performance test for this project. However, Contractor shall notify Owner and Engineer one week before planned performance testing to permit Engineer to witness test, at Owner's discretion.
3. Conduct testing per Hydraulic Institute Level "1U" standards.
  - a. Test each pump.
  - b. Plot curves of head, input horsepower, and efficiency against flow from shutoff to 150 percent of rated flow.
  - c. Take a minimum of six points, including shutoff, for each test run.
  - d. Take one of the six points as near to the rated condition as possible.
  - e. For pumps in variable speed applications, plot curves at 100 rpm intervals from minimum speed to maximum speed.
4. Summarize results in a written report, stamped and signed by a registered Professional Engineer.
  - a. Include copies of the testing log originals.
  - b. Include curves showing pump total head, driver input and output horsepower, pump efficiency, and rpm, plotted against capacity.
  - c. Include calculated field performance curves, based on shop tests and corrected for head losses in all portions of the pump column and for shaft bearing losses not included in the shop tests.
  - d. If the pump cannot be tested at the rated speed, include performance charts with both test and calculated speed curves.

C. Discharge Head

1. Test the discharge head to 200 psi or 150% of shutoff head, whichever is greater. Maintain test pressure for a minimum of five minutes.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. Install, align and connect each pump in strict conformance with manufacturer's installation instructions. Set impeller clearances, lubricate, and perform all adjustments and other tasks specified by the manufacturer.
- B. Anchor bolts: Place accurately using equipment templates.
- C. Leveling
  - 1. Set pump barrels plumb within a tolerance of 1/4 -inch from top of barrel to bottom of barrel. Barrel flange shall be level within a tolerance of 1/32- inch across the barrel flange. Field machine barrel flange as required to attain tolerances.
  - 2. Level sole plate by means of leveling nuts and steel wedges with taper not greater than 1/4 inch per foot.
  - 3. Use double wedges to provide a level sole plate bearing surface for the discharge head pump and driver base.
  - 4. Install wedges so that there is no change of level or springing of the sole plate when the anchor bolts are tightened. Set discharge head and pump assembly onto sole plate and bolt to sole plate.
  - 5. Adjust pump assemblies such that the driving units are properly aligned, plumb, and level with the driven units and all interconnecting shafts and couplings. Do not compensate for misalignment by use of flexible couplings.
  - 6. After the pump and driver have been set in position, aligned, and shimmed to the proper elevation, back off leveling nuts and grout the space between the bottom of the sole plate and the concrete foundation with non-shrink grout.
    - a. Remove wedges after grout is set and pack void with non-shrink grout.
  - 7. Connect discharge piping without imposing strain on pump flanges.

### **3.02 FIELD QUALITY CONTROL AND TESTS**

- A. General
  - 1. Perform field quality control and inspections during installation. Replace or repair work to eliminate defects, deficiencies and irregularities.
  - 2. Comply with Section 01810 for start-up.
  - 3. Conduct field performance tests to demonstrate that pump operation and controls meet the specified requirements.
  - 4. Test complete pump assemblies for correct rotation, proper alignment and connection, and quiet operation. Monitor bearing areas on pump and motor for abnormally high temperatures.
- B. Vibration Tests
  - 1. Conduct tests all with units installed, over entire operating speed range, and discharging to the connected piping systems at rates between the high and low discharge head conditions specified.

2. Criteria: Do not develop, at any frequency or in any plane, peak-to-peak vibration amplitudes in excess of Hydraulic Institute standards.
  3. If units exhibit vibration in excess of the limits specified, adjust or modify as necessary. Replace units which cannot be adjusted or modified to meet specifications.
- C. Sound Test
1. Conduct tests with pumps fully installed and discharging to the connected piping systems.
  2. Maximum: 75 DBA within 25 feet at rated speed.
  3. If pump units exhibit noise in excess of the limits specified, adjust or modify as necessary. Replace units which cannot be adjusted or modified to meet specifications.

### 3.03 MANUFACTURER'S FIELD SERVICES

- A. For each set of pumps (pumps having common design and performance characteristics), provide field inspection and instruction services by a factory-trained service technician or factory-trained authorized agent of the manufacturer. Sales representatives without factory training are not acceptable.
- B. Provide minimum 1 (one) visit of 8 (eight) hours each for each set of pumps, excluding travel time, to witness the following; to perform field adjustments to ensure that the equipment installation and operation comply with the specified requirements; and to certify in writing that the equipment and controls have been properly installed, aligned, lubricated, adjusted, and readied for operation.
  1. Installation of the equipment
  2. Inspection, checking and adjusting the equipment
  3. Startup and field testing for proper operation
- C. Provide minimum 1 (one) visit of 4 (Four) hours, excluding travel time, to train operation and maintenance staff on two different shifts.
- D. Complete and submit the following forms:
  1. Manufacturer's Installation Certification (Section 01999)
  2. Manufacturer's Instruction Certification (Section 01999)

**END OF SECTION**

## SECTION 11500

### DISINFECTION

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Furnish materials, tools, equipment, and labor required to disinfect all inside surfaces where water may come in contact with the following structures, pipelines, equipment, accessories:
  - 1. Water Storage Facilities (Clearwell)
  - 2. Disinfection of newly installed potable water pipelines, fittings, valves, and other components.
- B. Provide required testing.
- C. Dechlorinate and dispose of disinfection solution.

##### 1.02 REFERENCED SECTIONS

- A. The following Section is referenced in this Section:
  - 1. Section 01330 – Submittals
  - 2. Section 01500 – Construction Facilities and Utilities

##### 1.03 REFERENCE STANDARDS

- A. The standards listed below are a part of this section as specified and modified. In case of conflict between the requirements of this section and those of the listed documents, the requirements of this section shall prevail.

Reference	Title
AWWA B300	Hypochlorites
AWWA B301	Liquid Chlorine
AWWA C651	Disinfecting Water Mains
AWWA C653	Disinfection of Water Treatment Plants
AWWA C652	Disinfection of Water Storage Facilities
AWWA C654	Disinfection of Wells
AWWA C655	Field Dechlorination
NSF/ANSI 60	Drinking Water Treatment Chemicals

##### 1.04 SUBMITTALS

- A. Comply with Section 01330.
- B. Submit product data for disinfectant.
- C. Submit product data for appurtenances that will be permanently installed.

- D. Submit a disinfection plan that identifies the procedures, methods, materials, schedule, and testing that will be used to disinfect the pipelines, including the membrane filter unit piping, in accordance with the AWWA Standards and this Specification. The plan shall include, but not be limited to the following:
  - 1. Methods and procedures
  - 2. Type of disinfectant
  - 3. Sample locations
  - 4. Testing laboratory
  - 5. Method of disposing spent disinfectant solution
  - 6. Schedule for performing disinfection and testing
- E. Submit product information for disinfectant and dichlorination chemicals that will be used.
- F. Submit test results.

#### 1.05 REQUIREMENTS

- A. Disinfection shall be performed in accordance with AWWA Standards.
- B. Demonstrate through analytical testing that the pipelines are disinfected and meet the requirements in AWWA C651 and C653.
- C. Perform disinfection verification in accordance with the AWWA Standards.
  - 1. Enlist the services of a certified testing laboratory to perform the bacteriological sampling and testing for disinfection verification.
  - 2. Testing arrangement and expenses shall be borne by the Contractor.

### **PART 2 - PRODUCTS**

#### 2.01 GENERAL

- A. Furnish all pumps, tanks, hoses, valves, sample connections, and other equipment and appurtenances needed to perform disinfection.

#### 2.02 DISINFECTANT

- A. Forms of chlorine that may be used for the disinfection operation are sodium hypochlorite solution and calcium hypochlorite granules or tablets.
- B. The chlorine used for the disinfection operation shall meet the requirements of AWWA C651 and C653 and shall conform to AWWA B300.
- C. The chlorine used for the disinfection operation shall be certified, in accordance with NSF/ANSI 60.

## 2.03 DILUTION WATER

- A. Use potable water for pressure testing pipelines. Obtain water from the source identified in Section 01500.

## PART 3 - EXECUTION

### 3.01 SCHEDULING

- A. Disinfection shall be conducted after completing all construction activities, including application of protective coating systems and allowing for the minimum days required for coating to cure.
- B. Disinfection of pipelines shall follow successful pressure testing.
- C. Schedule and coordinate the disinfection work with the Owner.
- D. When disinfection of a facility has been satisfactorily completed, no further entry to the interior of the facility will be allowed. See Paragraph 3.06 below for requirements is re-entry is required.

### 3.02 PREPARATION

- A. Provide and install all necessary appurtenances required for the disinfection procedure, including taps, temporary piping, connections, and shutoff valves. Submit data on appurtenances that will be permanently installed to the Engineer for review.
- B. The Contractor is advised to take precautions to keep surfaces clean during construction and prevent entry of deleterious substances during construction of the facility to facilitate achieving the disinfection requirements.
- C. Prior to disinfection, thoroughly clean accessible surfaces to remove dust, dirt, foreign matter, and deleterious substances.
  - 1. Remove any oil and grease by contact with absorbents.
  - 2. Use water sprays, steam cleaning, vacuum cleaning, swabbing, hand brushing, or a combination of other methods and rinsing to clean the surfaces, but do not use any methods that will damage the finished surfaces.
  - 3. Flush accessible surfaces clean.
- D. Isolate systems to be disinfected from operating components of the water treatment plant prior to disinfection. Protect existing systems from backflow during the disinfection procedures.
- E. Disinfect all tools, equipment and clothing that will come in contact with the clearwell or standing water in the clearwell prior to clearwell entry.

### 3.03 APPLICATION

- A. After completing all construction activities, disinfect the required surfaces with chlorine solutions in accordance with the following procedures. Following disinfection and flushing, the testing laboratory shall obtain water samples for

bacteriological analysis of the water. If the specified bacteriological requirements are not satisfied, repeat disinfection procedure until the requirements are met.

- B. Disinfect surfaces as required with chlorine solution in accordance with the following procedures.
- C. Water Storage Facilities
  - 1. Standard: AWWA C652, as amended herein
  - 2. Forms of Chlorine: Sodium hypochlorite or calcium hypochlorite.
  - 3. Method: Brush or Spray (Method 2, as described in AWWA 652).
- D. Large Pipelines ( $\geq$  4-inch)
  - 1. Standard: AWWA C651, as amended herein.
  - 2. Forms of Chlorine: Sodium hypochlorite or calcium hypochlorite.
  - 3. Method: Continuous feed.
- E. Small Pipelines ( $<$  4-inch)
  - 1. Preparation: Provide a 1-inch minimum service cock or valve or other means to inject chlorine solution at point within 2 or 3 feet of its junction with the supply source. When the system is complete, thoroughly flush it by fully opening every outlet until clear water flows from all outlets.
  - 2. Disinfectant: Sodium hypochlorite or calcium hypochlorite in sufficient quantities to produce chlorine concentration of at least 50 parts per million (ppm) in the system.
  - 3. Disinfection Procedure
    - a. Connect a hand-operated pump or other means of injecting the disinfectant into the service cock or injection device.
    - b. When the system is completely full of water, adjust every outlet so that a trickle of water flows from each outlet
    - c. Inject the disinfectant slowly at an even rate until the free chlorine residual concentration at each outlet reaches at least 50 ppm, as verified by a test at each outlet.
    - d. Close all outlets and valves, including the water supply and disinfectant injection connections. Maintain the condition for 24 hours. After 24 hours, test the free chlorine residual at each outlet. The free chlorine residual shall not be less than 10 ppm. If the free chlorine residual at any outlet is less than 10 ppm, repeat the disinfection procedure until an approved result is obtained.
    - e. When the above procedure has been completed to the satisfaction of the Engineer, flush the entire system with fresh potable water until all outlets show a free chlorine residual of not more than the chlorine residual in the fresh potable water used for flushing.

### 3.04 FIELD QUALITY CONTROL

#### A. Chlorine Residual Testing

1. AWWA C651, Appendix A, DPD Drop Dilution Method, except where otherwise specified.
2. Testing shall be performed by the Contractor.

#### B. Bacteriological Analyses of Water

1. After completion of the disinfecting procedure, including final flushing as described in AWWA C651, the certified laboratory personnel will obtain water samples from the disinfected system for bacteriological analyses.
2. Two or more samples from the facility shall be collected not less than 30 minutes apart and tested for the presence of total coliform bacteria in accordance with the Standard Methods referenced in AWWA C653.
3. If the presence of total coliform bacteria is not detected in any of the samples, the facility has been adequately disinfected and may be placed into service.
4. If any of the samples show presence of total coliform bacteria, then one of the following must be conducted before placing the facility into service:
  - a. Take a repeat sample at least 24 hours apart until consecutive samples do not show the presence of total coliform bacteria.
  - b. Repeat disinfection procedures and resample.

### 3.05 DISPOSAL OF SPENT DISINFECTANT SOLUTION

- A. Dechlorinate and dispose of disinfection solution into the existing Backwash Ponds.
- B. Coordinate schedule, flow, and duration of disposal with the Owner to confirm that there is adequate capacity to handle the additional flow.
- C. Monitor the chlorine concentration in the dechlorinated solution for disposal and report to Owner to ensure that the solution has been dechlorinated to acceptable levels prior to disposal.

### 3.06 PROTECTION OF DISINFECTED FACILITIES

- A. Once disinfection has been satisfactorily completed, the Contractor shall be responsible for maintaining the disinfected status until the facility is placed into service.
- B. If work or repairs must be conducted following completion of the disinfection operations, the work shall be conducted using techniques and work methods necessary to maintain the disinfected status.
- C. If a disinfected facility is not immediately placed into service or work is conducted on the facility following successful disinfection, additional bacteriological testing may be warranted, as determined by the Engineer, to confirm disinfected status.

The cost of the additional bacteriological testing shall be borne by the Contractor at no additional cost to the Owner.

- D. If a disinfected facility becomes contaminated, the Contractor shall re-disinfect the facility at no additional cost to the Owner.

**END OF SECTION**

## SECTION 13410

### BASIC MEASUREMENT AND CONTROL INSTRUMENTATION MATERIALS AND METHODS

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes.

1. This Section contains the basic materials and methods required to install the measurement and control instrumentation system.

##### 1.02 SUBMITTALS

###### A. Contractor shall submit all the product data in Division 13 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 13410.F30) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

###### B. Product Data.

1. Pursuant to Section 01330 Submittal Procedures.
2. Provide product data on all components specified.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

###### A. **Insulated Wire Ferrules (13410.F30).**

1. Ferrules shall be plastic sleeved and insulated.
2. Ferrules shall be color coded per the DIN Standard.
3. Provide Weidmuller ferrules, or approved equal.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. CONTRACTOR shall install and connect junction boxes, termination boxes, control panels, field devices, etc. as shown on the Drawings.
- B. Conductor Terminations.
  - 1. Provide ferrules on all conductors terminating on terminal strips.
  - 2. Ferrules shall be installed with a tool supplied by the ferrule manufacturer design specifically for that purpose.
  - 3. No more than one conductor shall be terminated on each side of a terminal block unless specifically shown otherwise on the Drawings.
- C. Terminal Block Jumpers.
  - 1. When connecting adjacent terminal blocks in a terminal strip to provide for common potentials, pre-manufactured bridge type jumpers supplied by the terminal manufacturer shall be used. These jumpers screw into and connect adjacent terminal blocks at the center of the terminal blocks.
  - 2. Comb type jumper shall not be used.
  - 3. Jumpers fabricated from short lengths of wire shall not be used.
- D. Twisted Shielded Pair (TSP) Cable Preparation.
  - 1. Strip cable insulation back only to the extent necessary to separate the individual conductors for termination. The shield shall be removed up to the point where the cable insulation has been removed.
  - 2. Provide green heat shrink tubing on the full length of exposed drain wire from the point of termination back to where the cable insulation has been removed. The tubing shall be properly sized for the conductor and shall be shrunk after installation. Reference Section 16150 Wiring Connections for specification requirements for heat shrink tubing.
  - 3. The drain wire shall be grounded as indicated on the Drawings.
  - 4. Provide black heat shrink tubing at the point where the cable insulation has been removed. The tubing shall be 3 inches long and shall extend 1.5 inches up the insulation and 1.5 inches down the individual conductors. The tubing shall be properly sized for the cable and shrunk after installation. No part of the shield and no un-insulated part of the drain wire shall extend beyond this tubing. Reference Section 16150 Wiring Connections for specification requirements for heat shrink tubing.
- E. Equipment Grounding.
  - 1. Each control panel, terminal box and junction box shall have a single grounding point consisting of a grounding bus bar. All grounding conductors terminating within the enclosure shall terminate on the ground bus. The ground bus bar shall be 100 percent copper with 10 percent spare opening for future use. Reference Section 16060 Grounding And Bonding for specification requirements for grounding bus bar.

F. Conductor Splicing.

1. Conductors shall be spliced on terminal blocks installed for this purpose.
2. Conductors shall only be spliced where identified on the Drawings.
3. No other splicing methods shall be approved without prior approval by the ENGINEER.

G. Terminal Block and Terminal Strip Identification.

1. Terminal blocks shall be identified as shown on the Drawings. Identification shall be provided on both sides of the terminal block. The plastic identification inserts shall be machine printed and provided by the manufacturer of the terminal blocks.
2. Terminal strips shall be identified as shown on the drawings.

H. Identification

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.

### 3.02 FIELD QUALITY CONTROL

A. Site Tests.

1. Control and instrumentation related conductors shall be tested for resistance to ground through the use of an ohm meter and visual damage to the insulation. Grounded conductors (neutrals and negative conductors) shall be isolated from the grounding system before testing.
2. High voltage "meggers" shall not be used.
3. A conductor shall be replaced if the resistance reading is less than one meg-ohm.
4. CONTRACTOR shall record the results of these tests on the Continuity Test Certification forms and submit them to the ENGINEER as specified in Section 16080 Electrical Testing.

**END OF SECTION**

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**SECTION 13430**  
**BOXES, CONTROL PANELS AND CONTROL CENTERS**

**PART 1 GENERAL**

1.01 SUMMARY

A. Section Includes

1. This section contains the requirements pertaining to the construction and installation of the control panels.

1.02 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

B. Submittal Format:

1. The product data shall be provided as individual PDFs for each Section, unless otherwise noted for specific items. Each PDF shall be numbered to match the specification Section numbers. Submittals not itemized and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16000.A01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
4. Submittals in PDF shall include an index, table of contents, or bookmarks with hyperlinks to the associated page of all submitted items. Index shall include each product specified with their corresponding Reference Keynote Number. Electronic submittals not containing a linked index, table of contents, or bookmarks will be rejected as incomplete.

- C. Refer to Section 16000 – General Provisions for additional requirements.

D. Product Data

1. Pursuant to Section 01330 – Submittal Procedures.
2. Manufacturer’s data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

#### E. Shop Drawings

1. Dimensional drawings showing the overall length, width, and height of the assembled control panel. Included on these drawings shall be the back panel layout of installed control devices showing part numbers, dimensions, nameplate text, and other details required for a complete assembly. The CONTRACTOR shall obtain the Drawings for the control panel layout and schematic from the ENGINEER. The CONTRACTOR shall modify the Drawings as required for submittal and for as-built documentation. The CONTRACTOR shall not generate their own drawings.
2. For large control panel, physical properties, handling, mounting, shipping break point locations shall be shown in submittal drawings. This shall include total weight, lifting instructions, height, and floor space required.
3. Provide electrical schematic drawings that include: wiring details such as internal and field connection terminal block numbers; shielded wire termination requirements; grounding requirements; and wire colors. Show all required internal and external interlocking. Each drawing shall be circuit specific for the system submitted. No typical schematic drawings shall be submitted.
4. Drawings shall list the equipment number of the box, control panel, or center submitted.
5. Component designations shall match those shown on the Drawings.
6. Complete bills of materials shall be included with submittal.

### 1.03 QUALITY ASSURANCE

#### A. Qualifications

1. Equipment provided as part of this section shall be manufactured by a single licensed firm, regularly engaged in the design and manufacture of such equipment for a minimum of five years. The control panels shall have a UL508A listing. Components within control panels shall be listed in a manner consistent with UL508A requirements.

### 1.04 MAINTENANCE

#### A. Manufacturer shall provide and list in the bill of materials the following spare parts.

1. One each of all power and control fuses provided in the assembled control panel/center.

#### B. Provide Operation and Maintenance Data and Manuals Pursuant to the Contract Documents.

## **PART 2 PRODUCTS**

### **2.01 COMPONENTS**

#### **A. Terminal Strip Identification Block (13430.T15).**

1. Provide a terminal strip identification block with a machine generated label to match those shown on the Drawings.
2. Provide a Phoenix Contact marker carrier model number UBE/D, or approved equal.

#### **B. Low Current Terminal Blocks (13430.T10).**

1. Low current terminal blocks shall be provided as shown on the Drawings and in all panels requiring low current field terminations. Provide accessories as required and as shown including, but not limited to end anchors, end barriers, bridge jumpers, terminal strip pre-printed markers and snap-in pre-printed terminal block markers.
2. Low current terminal blocks shall be used for electrical circuits rated at or less than 30 amps.
3. Low current terminal blocks shall mount on DIN rail.
4. Low current terminal blocks shall be supplied with all required accessories including end covers, fixed bridge bars, partition plates and end brackets.
5. Low current terminal blocks shall be supplied with machine printed terminal block and terminal strip identification numbers that match the approved submittals.
6. Low current terminal blocks shall be grey in color.
7. Low current terminal blocks shall be UL rated for up to 30 amps at 600 VAC.
8. Low current terminal blocks shall accept wires from 24 to 10 AWG for single conductor per termination.
9. Provide Phoenix Contact model UK5N, or approved equal.

#### **C. Grounding Terminal Blocks (13430.T60).**

1. Grounding terminal blocks shall be provided as shown on the Drawings and in all panels requiring field terminations.
2. Grounding terminal blocks shall be used for electrical circuits rated at or less than 30 amps.
3. Grounding terminal blocks shall mount on DIN rail.
4. Grounding terminal blocks shall be UL rated for a maximum of 30 amps and 600 VAC and to accept wires from 26 to 10 AWG for single conductor per termination.
5. Grounding terminal blocks shall be supplied with all required accessories including end covers, fixed bridge bars, partition plates and end brackets.
6. Low current terminal blocks shall be supplied with machine printed terminal block and terminal strip identification numbers that match the approved submittals.
7. Grounding terminal blocks shall be green / yellow in color.
8. Provide Phoenix Contact model USLKG5, or approved equal.

**D. DIN Mounting Rail (13430.D10).**

1. DIN Mounting Rail shall be provided as shown on the Drawings and in all panels requiring DIN mounting rail.
2. DIN mounting rails shall be made of steel, galvanized, and yellow chromated.
3. Provide Phoenix Contact model NS 35/7.5, Allen-Bradley model 199-DR1, or approved equal.

**E. Wide Slot Wire Duct (13430.W20).**

1. Wire ducts shall be provided as shown on the Drawings.
2. Wire ducts shall be sized as shown on the Drawings, or larger.
3. Wire ducts shall be no more than 40% filled based on the total cross sectional area of the wire duct.
4. Wire ducts shall be white in color.
5. Wire ducts shall have slotted sides.
6. Wire ducts shall include removable covers
7. Wire ducts shall be attached to the backpanel with screws or plastic fasteners that are approved for the use and provided by the wire duct manufacturer.
8. Wire ducts shall not be attached to backpanel or enclosure side surfaces with glue or other such adhesives.
9. Provide Panduit Type G, or approved equal.

**F. Ground Bars (13430.G06).**

1. Ground bars shall be provided as shown on the Drawings.
2. Ground bars shall be low profile, "bus" type with set screw or pressure type connections and all copper construction.
3. Ground bars shall include sufficient termination points to accommodate all equipment grounding conductors as shown on the Drawings.
4. Ground bars shall include spare termination points to accommodate twenty (20) additional conductors sized, #14 through #8 AWG.
5. Provide Cutler-Hammer model GBK21, GE model TGK42, Square D model PK27GTA, or approved equal.

## **PART 3 EXECUTION**

### **3.01 INSTALLERS**

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
- B. CONTRACTOR shall install and connect junction boxes and control panels and to field devices as shown on the Drawings.
- C. For all conductors terminating on terminal strips, install crimp-on, insulated plastic sleeve ferrules on each wire. Install ferrules with a crimping tool provided by the ferrule manufacturer for that purpose.

- D. Individual conductors and cables shall be grouped together and routed through plastic wire ducts mounted on the backpanel surface.
- E. Bond each enclosure back-panel to the grounding electrode system with a # 8 AWG copper conductor.
- F. Where conductors and cables are routed in boxes or enclosures, they shall be neatly bundled with cable ties at intervals not to exceed 12 inches on center. The tension for the cable ties shall be set with a tool specifically made for this purpose and of the same manufacturer as the cable tie. Side cutters or other type tools shall not be used to cut the tail end of the cable tie. The CONTRACTOR shall only use the tool specifically made for this purpose and designed for use with the cable ties provided.

### 3.02 SOURCE QUALITY CONTROL

#### A. Tests and Inspections

- 1. CONTRACTOR shall notify the ENGINEER 14 days prior to commencement of shop testing. All equipment shall be tested prior to site delivery.
- 2. CONTRACTOR-developed test forms shall accompany the notification of testing.
  - a. Test forms shall list all field connections at terminal strips and all internal logic circuits, along with the method planned for simulation of field conditions to test these connections and circuits.
- 3. All analog instrument loops shall be tested using an analog signal generator by applying the appropriate control signal to the field termination terminal strip.
  - a. At a minimum, analog instrument tests shall be made at 0%, 25%, 50%, 75%, and 100% of maximum control signal.
  - b. Additional analog instrument tests shall be made as appropriate.
- 4. All digital control circuits shall be tested by: applying the appropriate control voltage to the field termination terminal strip when externally supplied; using a jumper at the field termination terminal strip when internally supplied; or, if applicable, at an internal panel connection point when field terminations are not used.

#### B. Verification of Performance

- 1. Device functions shall be observed by the ENGINEER, to determine satisfactory operation of the device and connected circuit continuity, prior to shipment.

### 3.03 FIELD QUALITY CONTROL

#### A. Site Tests, Inspection

- 1. CONTRACTOR shall install, calibrate and test, all systems prior to notifying ENGINEER of witness testing verification.

2. The ENGINEER shall utilize the Process Control Test Certification included in Section 16005 Starting and Adjusting to systematically verify the process control system is operating as designed. The CONTRACTOR shall perform the tasks necessary to confirm proper operation to the ENGINEER.

END OF SECTION

## SECTION 15110

### VALVES AND APPURTENANCES

#### PART 1 - GENERAL

##### 1.01 SECTION INCLUDES

- A. Furnish and install all valves and appurtenances as shown on the Drawings and described in the Specifications, as required to interconnect with equipment and piping for a complete and operable system.

##### 1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section:
  - 1. Section 01330 – Submittals

##### 1.03 SUBMITTALS

- A. Comply with Section 01330.
- B. Provide the following information, at a minimum:
  - 1. Shop Drawings: Submit product data for valves and appurtenances to demonstrate that the items conform to the Specification requirements.
  - 2. A schedule of valves indicating the label location, attachment method, and proposed label text for each valve.
  - 3. A schedule of responsible manufacturers for the project and contact information, planned site visits, and compliance tests to be performed.
  - 4. Design calculations, test and performance data, and other information required to substantiate that the valve units proposed will meet the performance requirements specified and shown.
  - 5. Protective Coatings: Manufacturer's data.

##### 1.04 DEFINITIONS

- A. Responsible Manufacturer: Manufacturer or manufacturer's representative who will ensure satisfactory performance of equipment.
- B. Valve: Device for mechanically regulating pipeline or open-channel flow.
- C. Actuator: Devices added to obtain mechanical advantage or power assist in operation.

##### 1.05 RESPONSIBLE MANUFACTURER

- A. Furnish, adjust, test, and ensure satisfactory performance of each valve.
- B. Provide any field adjustments, settings, and tests required for satisfactory performance of each valve at no additional cost to Owner.

## 1.06 QUALITY ASSURANCE

- A. Unless specified otherwise, factory test each valve body with a test pressure equal to twice the listed working pressure rating.
- B. Submit a certified copy of the pressure test reports for all valves over 12 inches in nominal size prior to shipping valves to the Site. Format these test reports per the requirements of the applicable reference standards.
- C. Storage and Preparation for Installation
  - 1. Package and store valves to prevent exposure to sunlight, chemical exposure, and atmospheric pollution.
  - 2. Inspect each valve prior to installation for damage. Repair any damage to seats, machined surfaces, or protective coatings before installation. Clean each valve to remove any dirt and debris from the interior surfaces and seat areas. Install valves in the closed position.
  - 3. Some valves must be installed with seats or seat adjustment rings on the downstream side of the valve. Determine these requirements prior to installation and install the valve in the correct orientation.

## PART 2 - PRODUCTS

### 2.01 GENERAL

- A. Provide valves, gates, actuators, stem extensions, and other accessories as indicated on the Drawings or specified. All valves shall be new and of current design. For valves of the same type, provide identical valves supplied by a single manufacturer.
- B. Provide valves and actuators with the name of the manufacturer, nominal size, flow direction arrow, design working pressure, and the reference standard cast in raised letters or indelibly marked on an appropriate part of the body.
- C. Provide valves and actuators designed for submerged service for the following locations
  - 1. Located outdoors
  - 2. Within a building below the adjacent finished grade
  - 3. In vaults
  - 4. Where otherwise indicated. All other units shall be weather-tight and suitable for outdoor service.
- D. Provide buried valves with valve boxes and covers where indicated.
- E. Unless otherwise specified, all interior bronze parts of valves shall conform to the requirements of ASTM B62.
- F. Wetted parts shall be lead-free and NSF/ANSI 61 certified for contact with potable water, or the most stringent of current regulations.

### 2.02 PROTECTIVE COATINGS

- A. Coat ferrous surfaces in water passages of all valves of size 2 inches and larger and exterior surfaces of valves and actuators, with epoxy per AWWA C550, unless otherwise specified in the valve specification.

1. Interior Surfaces:
  - a. Minimum dry film thickness: 8 mil
  - b. NSF/ANSI 61 approved.
2. Exterior Surfaces:
  - a. Above ground:
    - 1) Minimum dry film thickness: 8 mil
  - b. Buried, submerged or in blow ground vaults:
    - 1) Minimum dry film thickness: 12 mil
- B. Do not coat flange faces or bronze and stainless steel surfaces in water passages.
- C. Coat exterior bronze and stainless steel surfaces using the same system as the associated piping.
- D. Provide holiday-free protective coatings.

### 2.03 BUTTERFLY VALVES

- A. Manufacturers: One of the following or equal:
  1. DeZurik Model BAW.
  2. Pratt Model 2FII or XR70.
  3. Keystone Figure 504 or Figure 47.
- B. Materials
  1. Size 3 through 20 inches:
    - a. Shaft: Stainless steel, ASTM A276, Type 304; or carbon steel, ASTM A108, with stainless steel journals.
    - b. Disc: Ductile iron, ASTM A536; or cast iron, ASTM A48, Class 40; or cast iron, ASTM A126, Class B; or stainless steel, ASTM A276, Type 316.
    - c. Disc Edge: Stainless steel, ASTM A276, Type 316; or Ni-chrome.
    - d. Seat Sealing Surface: Neoprene or Buna N.
    - e. Body: Cast iron, ASTM A126, Class B; or cast iron, ASTM A48, Class 40
- C. Design
  1. AWWA Class: Provide valves conforming to AWWA C 504 Class 250B.
  2. Disc: Lens-shaped with a flat surface and curved surface.
  3. Shafts and Bearings:
    - a. Turned, ground and polished.
    - b. When carbon steel shafts and stainless-steel journals are used, provide static seals to isolate the interior of the disc and the shaft from the process fluid.
  4. Resilient Seats:
    - a. Valve sizes 3 inches to 24 inches: Vulcanized, bonded, mechanically secured, or clamped to the valve body. Cartridge type seats that rely on a high coefficient of friction for retention within the valve body are not acceptable.

- D. Actuator: Provide open-close power actuators for the butterfly valve.
  - 1. Open-close power actuators shall be Rotork IQT or approved equal.
  - 2. Power actuator shall be provided with four configurable indication contacts configured to indicate the following:
    - a. Remote selected (AUTO),
    - b. Internal failure (FAIL),
    - c. Fully closed (CLOSE), and
    - d. Fully opened (OPEN).
  - 3. Four additional configurable contacts shall be provided.
  - 4. Power actuator shall operate on 120VAC power and all contacts shall be rated 5A, 120VAC.

2.04 GLOBE STYLE SILENT CHECK VALVES

- A. Manufactures
  - 1. One of the following or equal:
    - a. Milliken 821A
    - b. APCO Series 600
    - c. Val-Matic Series 1800

- B. Design
  - 1. Unless otherwise specified, design valves to conform to the following minimum pressure ratings:

Size, inches	Working Pressure, psig	Hydrostatic Pressure, psig
2 through 24	250	500

- 2. Design valves to close completely at zero fluid velocity point.
  - 3. Minimum open area: 110 percent of pipe area
  - 4. Operate silently in any position
- C. Features
  - 1. The operation of the valve shall not be affected by the position in the pipeline.
  - 2. The valve disk shall be concave to the flow in the pipeline and guided by center shaft.
  - 3. Check valve shall be spring-loaded, normally-closed by means of a heavy-duty center-guided, stainless steel spring. Flow from the pumps shall cause the valve to open, and upon pump shut down, the torsion spring will shut the valve before reverse flow starts and at a point of zero velocity of non-slam closure.
- D. Materials
  - 1. Body: Ductile iron, ASTM A536 65-45-12
  - 2. Seat and Plug: Stainless steel, ASTM A276, Type 304
  - 3. Spring: Stainless steel, ASTM A276, Type 304

4. Guide Bushings and Guide Pins: Stainless steel, ASTM 276, Type 304
- E. Components
1. Flanges: ASME B16.1, 125 lb. ANSI flat faced
  2. All components shall be designed to be field replaceable.
- 2.05 PRESSURE REDUCING VALVES (PRV)
- A. Manufacturers, one of the following or equal:
1. Cla-Val Co. Clayton 90-01 Series.
  2. GA Industries, Inc.
- B. General
1. Provide flanged connections as specified.
  2. If moving parts require lubrication, then provide means for lubrication. Lubricate prior to delivery.
- C. Design
1. Maintain the set discharge pressure regardless of fluctuations in inlet pressure. Field adjustable over specified outlet pressure range.
    - a. Inlet Pressure Range: 25 to 60 psi.
    - b. Outlet Pressure Range: 2 to 30 psi. Set outline pressure at factory for 20 psi.
  2. Flow Range: 500 to 5,000 gpm.
- D. Valve
1. Pilot-controlled
  2. Diaphragm-actuated or differential piston pressure type.
- E. Source Quality Control
1. Require manufacturer to conduct hydrostatic tests at the factory for one valve of each type supplied for a particular service.
    - a. Test steel-bodied valves hydrostatically tested per ANSI B16.5.
    - b. Test aluminum-, bronze-, and brass-bodied valves hydrostatically at double the Max pressure specified.
    - c. Leakage, sweating or visible deformation at any point on the valve is cause for rejection of valves of that type and manufacturer.
  2. Submit report of testing results.

## **PART 3 - EXECUTION**

### 3.01 VALVE INSTALLATION

- A. Install valves per the manufacturer's written instructions and as indicated on the Drawings and specified.

B. Assembly of Valves and Piping

1. Install valves with piping prior to the assembled piping or attached supports being cast into concrete or attached to supports.
2. Sequence construction and operations so that the adjacent piping supports the valves, and so that the valves do not support the piping. Where permanent supports are located at valves, install the supports after the piping and valves have been installed as a completed assembly on temporary supports.
3. Install piping and valve assemblies so that the piping does not exert forces on the valves from settlement or assembly operations.
4. Correct piping alignment deviations before the valve is joined to the piping.
5. Unless shown otherwise, install butterfly, plug, and ball valves with the shafts in the horizontal position.
6. Install gates, gate valves, and other types of valves with the stems in the vertical position.
7. For manually operated valves 3 inches in nominal size and smaller, orient the valve operators and indicators to be visible to the operator.

3.02 TESTING

- A. Pressure test valves as part of the pipeline testing. Demonstrate valve operation (open/close) after the valve is installed including valve box and riser, as appropriate.

**END OF SECTION**

**SECTION 15143**  
**DUCTILE IRON PIPE**

**PART 1 - GENERAL**

1.01 SECTION INCLUDES

- A. Ductile iron pipe, joints, fittings, gaskets, and pipe lining and coating.

1.02 REFERENCED SECTIONS

- A. The following Sections are referenced in this Section:
  - 1. Section 01330 – Submittals
  - 2. Section 11500 – Disinfection
  - 3. Section 15996 – Testing Pressure Piping

1.03 SUBMITTALS

- A. Comply with Section 01330.
- B. Certifications
  - 1. Manufacturer’s certificates of compliance with the specified standards.
- C. Shop Drawings
  - 1. Detailed layout drawings showing alignment of pipes, location of valves, fittings, and appurtenances, types of joints, connections to structures and joint thrust restraint details.
- D. Product Data
  - 1. Photographs, drawings, and descriptions of fittings, gaskets, couplings, grooving of pipe and fittings, pipe linings, and coatings.
- E. Product Technical Data
  - 1. Submit schedule of piping systems that will be used and services that they will be used for.
  - 2. Submit product data on pipe, fittings, joints and joining materials, gaskets, linings, coatings, hardware, piping connections, piping accessories, thermal insulation, and other components.
  - 3. Submit manufacturer’s written directions for material handling, delivery, storage, and installation.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Block piping material for shipment, prevent damage to castings and linings.
- B. Carefully handle piping material during loading, unloading, and installation. Do not drop piping material from cars or trucks. Lower piping material by mechanical means. Do not drop or pound pipe to fit grade.

- C. Repair damaged cement mortar lining to match quality, thickness, and bonding of original lining in accordance with AWWA C104. When lining cannot be repaired or repairs are defective, replace defective piping with undamaged piping.
- D. Protect gaskets and polyethylene encasement from long term exposure to sunlight.
- E. Store fittings and other accessories such that they do not accumulate and hold rainwater, dirt, and debris.

#### 1.05 QUALITY ASSURANCE

- A. Materials and equipment furnished under this Section shall be of manufacturers who have been regularly engaged in the design and manufacture of the materials and equipment for a period of at least five (5) years. Demonstrate to the satisfaction of the Engineer that the quality is equal to the materials and equipment made by the manufacturers specifically named herein, if an alternate manufacturer is proposed.
- B. Factory Quality Control: The Contractor shall test all products as noted herein and by the reference specifications.

### **PART 2 - PRODUCTS**

#### 2.01 GENERAL

- A. Pipe sizes are nominal inside diameter unless otherwise noted. All sizes of pipe shall be as called out on the Drawings and specified herein.
- B. All pipe and fittings delivered to the job site shall be clearly marked to identify the material, class, thickness, and manufacturer.
- C. All material shall be new and free of blemishes.
- D. Where only one type of pipe is called out, no substitutions shall be allowed.
- E. Piping materials of like kind shall be the product of one manufacturer.
- F. The Contractor is responsible for furnishing and installing all items necessary to make a complete and workable piping system. This includes, but is not limited to, valve boxes, insulating couplings and gaskets, piping specialties, and all other items required by the nature of the installation. Any item not specified herein but required by the installation shall be of first quality, equal in grade to similar materials specified herein, and shall comply with all applicable reference standards listed herein.
- G. All materials (pipe, fittings, gaskets, linings, etc.) in contact with the potable water or process water to be treated to potable water shall be lead-free and NSF 61 certified.

#### 2.02 DUCTILE IRON PIPE MATERIALS

- A. Pipe
  - 1. Type: Conforming to AWWA C150 and AWWA C151 with minimum pressure class 350.
  - 2. Pipe Joints
    - a. General: To the greatest extent possible, use factory-assembled pipe spools with flanges for exposed piping. Field cutting pipe to match field conditions will be allowed in limited quantities as determined by the Construction Manager.



2. Apply mortar to clean, bare metal surfaces, extended to faces of flanges, ends of spigots, and shoulders of hubs.
3. Provide double thickness lining per AWWA C104.

## 2.03 PIPE APPURTENANCES

### A. Rubber Expansion Joints

1. Type: Built-up single arch expansion joints with full flanges and retainer rings. Provide filled arch type for services with solids.
2. Materials: EDPM cover over reinforced nylon or polyester body and EDPM tube with galvanized steel retainer ring. Cover shall have protective coating where installed outdoors.
3. Pressure and Temperature Rating
  - a. Up to 12-inch-diameter: 190 psi, 250°F
  - b. Larger than 12-inch-diameter: 80 psi, 250°F
4. Manufacturers: Proco Series 230; Garlock Style 204HP
5. Provide galvanized steel control rod-compression sleeve assemblies for all rubber expansion joints. The number and size of the control rods shall be as required for the test pressure of the pipe system or 50 psi, whichever is greater.
6. Provide full size intermediate metal pipe flanges where rubber spool connects with wafer-style valves, lug-style valve, or other items that do not have full face metal flanges.

## PART 3 - EXECUTION

### 3.01 INSTALLATION OF PIPE

#### A. General

1. Install ductile iron piping in accordance with AWWA C600.
2. Lay mechanical joint or bell and spigot pipe with 1/8 inch space between the spigot and shoulder of the pockets.

#### B. Exposed Pipe

1. Exposed pipe shall mean any pipe not buried or encased in concrete. In erecting exposed pipe a sufficient number of screw unions, flanged or grooved end type joints shall be used to allow any section or run of pipe to be disconnected without taking down adjacent runs. Flanges and grooved couplings shall be employed on pipes 2½ inches and larger. The provision of an adequate number of appropriate take-down fittings must be rigidly adhered to whether or not such fittings are indicated on the Drawings. Take-down fittings shall also be provided within two feet of threaded valves and other appurtenances. Where piping passes through concrete or masonry walls, take-down fittings shall be employed within 3 feet of the wall.
2. All exposed pipelines shall accommodate expansion and contraction forces by the use of expansion joints, anchors, and pipe guides. Where pipes cross structure expansion joints, rubber spherical molded type pipe expansion joints with restraining rods shall be installed whether specifically shown or not.

3. All unrestrained joints in pressure pipelines, including bell and spigot, flexible couplings, expansion joints and flange adapters shall have tension bars (tie rods) provided in accordance with AWWA M11 Design Manual, Figures 19.15 and 19.16, and Tables 19.7 and 19.8. Thrust protection shall be for 1½ times the specified test pressure for the pipe.
- C. Ductile Iron Pipe – Flanged
1. Flanged joints shall be made up tight with care being taken to avoid undue strain in the flanges, fittings, and other accessories.
  2. Bolt holes shall be aligned for each flanged joint. Bolts shall be full size for bolt holes; use of undersize bolts to make up for misalignment of bolt holes or for any other purpose will not be permitted.
  3. Adjoining flange faces shall not be out of parallel to such a degree that the flanged joint cannot be made watertight without overstraining the flange. Any flanged pipe or fitting whose dimensions do not allow the making of a proper flanged joint as specified herein shall be replaced by one of the proper dimensions.
  4. Clean flanges before jointing is started.

### 3.02 INSTALLATION OF PIPE CONNECTIONS

- A. Flexible Expansion Joints
1. Install in accordance with the manufacturer's instructions and recommendations.
  2. Connect expansion joints only to full-face metal flanges.
  3. Install control rod-compression sleeve assemblies with control rod nuts snug, to relieve stress on adjacent pipe, except at buried locations. Comply with manufacturer's instructions.

### 3.03 MODIFICATIONS AND CONNECTIONS TO EXISTING PIPING

- A. Coordinate with the Owner of the existing pipeline to be connected to prior to making connection.
- B. Perform demolition of existing pipelines and yard piping as shown or necessary to make connection. Preserve, in undamaged condition, piping that is to remain and where connections are to be made as part of the Work.
- C. Modify and connect to existing piping in accordance with the materials, joint requirements, welding, coatings, linings, and other provisions of this Section. Where specific details are indicated on the Drawings, provide the pipe connections, joints, fittings, and appurtenances as indicated.
- D. Coordinate with the Owner to have the pipeline de-energized. Affect lock-out/tag-out procedures as necessary to prevent the accidental use of the pipeline.
- E. Carefully cut existing pipe using saws and cutting equipment acceptable to Engineer. Do not torch cut metallic pipe for preparation of pipe at connections.
- F. Grind ends of steel pipe to remove corrosion and foreign materials where sleeve couplings are to be installed. Power tool clean and epoxy coat pipe ends prior to assembly for sleeve and grooved end-type couplings.

- G. Use pipe fittings for modifications and connections. Do not use saddle-type connections unless specifically indicated on the Drawings.
- H. Complete pressure testing and obtain Owner's approval prior to making connections to existing piping systems, unless otherwise indicated.

#### 3.04 CLEANING

- A. The interior of all pipelines shall be thoroughly cleaned of all dirt, loose scale, sand, and all foreign material prior to connection of pipe to equipment, control and regulating devices, and instrumentation and prior to testing. Pump suction lines shall be cleaned prior to operation of pumps.
- B. Cleaning shall be accomplished by flushing with water at a velocity of at least 3 feet per second or by pulling a tightly fitting cleaning ball or swab through the pipe.
- C. No test shall commence until the pipeline is completely cleaned to the satisfaction of the Engineer.

#### 3.05 FIELD TESTING

- A. All pipelines installed in this project shall be subject to field and acceptance tests as specified in Section 15996.

#### 3.06 DISINFECTION

- A. Clean and disinfect potable water systems in accordance with the procedures in Section 11500.
- B. Disinfection shall follow successful pressure testing.
- C. All new potable water pipe sections shall be disinfected prior to making final connection to existing active operating pipelines.

**END OF SECTION**

## SECTION 16000

### GENERAL PROVISIONS

#### PART 1 GENERAL

##### 1.01 PERMITS, FEES AND SERVICE CHARGES

- A. The CONTRACTOR shall obtain all electrical permits required to complete the work and pay all associated fees.
- B. The CONTRACTOR shall coordinate and provide for the installation and operation of franchise utility service (including any telephone and/or leased lines specified) as required during construction, startup, testing, and operation of the work until substantial completion.

##### 1.02 INTENT OF DRAWINGS AND SPECIFICATIONS

- A. Riser and other diagrams are schematic and are intended to show the approximate location of equipment, and the general alignment of conduits and piping, and shall not be used for obtaining quantities. Dimensions given on the plans shall take precedence over scaled dimensions and all dimensions whether in figures or scaled, shall be verified in the field.
- B. The electrical drawings do not show complete details of the site conditions. The CONTRACTOR shall check actual conditions.
- C. The exact location of apparatus, fixtures, equipment, conduit and piping shall be ascertained by the CONTRACTOR in the field, and the work shall be laid out accordingly. Should the CONTRACTOR fail to ascertain such locations or coordinate with work performed by other trades, the work shall be changed at no additional cost to the OWNER when so ordered by the ENGINEER. The ENGINEER reserves the right to make minor changes in the location of conduit, piping and equipment up to the time of installation without additional cost to OWNER.
- D. Many of the conduits are routed underground between the panels and the end of use equipment. The CONTRACTOR is responsible to coordinate the placement of those conduits with approved product submittals and coordination with the other trades. The conduits shall stub-up directly below panels and utilization equipment. Conduits which are not stubbed up directly below equipment the Work shall be changed at no additional cost to the OWNER. Failure to plan and execute this requirement shall not be acceptable.
- E. CONTRACTOR shall provide all labor, materials, equipment, machinery, and tools necessary to provide all electrical equipment specified and shown on the Drawings.

All items not specified in detail or shown on the Drawings but necessary for complete installation shall be provided by the CONTRACTOR.

### 1.03 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16000.A01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:
1. Submittals shall include information and literature as required for all equipment and materials provided under this and related sections.
  2. Shop Drawings: Shop drawings shall include the following along with any special requirements listed in the individual Specification Sections:
    - a. Installation instructions and drawings
    - b. Wiring schematics with termination point identification
    - c. Motor information
    - d. Materials of construction
    - e. Manufacturer's name and model
    - f. Manufacturer's catalog data
    - g. Supplementary structural framing for electrical equipment including design loads, member size and location. When supplementary framing is indicated, verify that dimensions are suitable for the equipment furnished. Provide additional strength when equipment furnished is heavier than that specified.
  3. Manufacturers' Literature: Literature indicating the compliance of the products with the Specifications shall be included with all submittals. This shall include catalogs and other descriptive bulletins. Relevant portions of the literature shall be clearly identified by highlighting or underlining.

4. Test Logs: The CONTRACTOR shall submit test logs as outlined below and as specified in subsequent electrical sections and drawings.
    - a. A log of the complete results of tests for shorts and grounds for each circuit. All circuits and tests shall be clearly identified.
    - b. A log of complete results of insulation resistance measurements of each circuit. All circuits and tests shall be clearly identified.
  5. Operation and maintenance information for all equipment furnished and/or installed.
  6. Programming instructions for any controllers or other programmable equipment. Copies of the any required software, including registration cards, shall be provided with the O&M manuals.
- C. The CONTRACTOR shall indicate on the submittals all variances from the Specifications.
- D. Record Drawings. After the completion of construction, the CONTRACTOR shall provide one set of “as-built” drawings to the ENGINEER as specified herein showing the location of buried conduits and all changes or deviations from the original drawings.
- E. After the completion of construction, a printout and electronic copy of any programming and/or set-points for controllers, PLCs, meters or other programmable equipment, including VFDs.
- F. Final inspection certificates shall be submitted prior to final payment.

#### 1.04 COORDINATION OF WORK

- A. The CONTRACTOR shall plan his work in coordination with the other trades and with the power and telephone utility authorities.
- B. The CONTRACTOR shall field verify all dimensions of equipment to be installed or provided by others so that correct clearances and connections may be made between the work installed by the CONTRACTOR and equipment installed or provided by others.
- C. The CONTRACTOR shall arrange all conduit runs so that they do not interfere with piping, structural members, etc.
- D. All working measurements shall be taken from the sites, checked with those shown on the drawings, and if they conflict, reported to the ENGINEER at once, and before proceeding with the work. Should the CONTRACTOR fail to comply with this procedure, he shall alter his work at his own expense as directed by the ENGINEER.
- E. No additional payments will be allowed where obstructions in the work of other trades, or work under this contract requires offsets to conduit runs.

- F. The CONTRACTOR is responsible for all alterations in the work to accommodate equipment differing in dimensions or other characteristics from that shown or specified.
- G. The CONTRACTOR shall provide all temporary power necessary for existing site equipment and for all construction needs.

1.05 CONTRACTOR'S RESPONSIBILITY FOR FIELD VERIFICATION OF EXISTING CONDITIONS

- A. The CONTRACTOR shall be responsible for performing field verification of the existing conditions prior to bidding. The nature of this work inherently requires field observation to understand the existing conditions and scope of work.
- B. Failure to observe the existing conditions or ignorance of existing conditions shall be the responsibility of the CONTRACTOR alone. Additional services shall not be authorized due to the CONTRACTOR'S lack of understanding of the existing conditions.

1.06 CONTRACTOR'S RESPONSIBILITY FOR SHUTDOWNS AND MAINTAINING EXISTING SYSTEMS

- A. Shutdowns of any Division 16 system shall be coordinated with the OWNER prior to performing the shutdown. The CONTRACTOR shall provide the OWNER with a written schedule identifying the system, duration, and impact on the OWNER'S facility.
- B. Existing Division 16 systems not impacted by the work in this project shall be protected and maintained during construction. Any system not identified on the Drawings or within these specifications shall be brought immediately to the attention of the ENGINEER and OWNER.
  - 1. The CONTRACTOR shall be responsible for bearing the cost of repairing or restoring all electrical systems that are disrupted or damaged during construction. The system shall be repaired and restored to their original condition.

1.07 SUPERVISION

- A. The CONTRACTOR shall maintain adequate supervision of the work and shall have a responsible person in charge at the site during all times that work under this contract is in progress, or when necessary for coordination with other work.

1.08 CODES

- A. Work shall conform to the National Electrical Code (NEC), and State Codes and other applicable codes, even though not specifically mentioned for each item. These shall be regarded as the minimum standard of quality for materials and workmanship.

## 1.09 PLANT AREA ELECTRICAL WORK REQUIRMENTS

- A. Provide all Electrical Work in accordance with the following table, unless otherwise specifically indicated on the Drawings.
- B. Provide NEMA 12 enclosures and supports, and RGS conduit type for all Electrical Work not included in the following table unless otherwise specifically indicated on the Drawings. Conduit type definitions are listed under Section 16131, Conduit and Fittings.

PLANT AREA	NEMA ENCLOSURE TYPE	EXPOSED CONDUIT TYPE	ENVIRONMENT W = WET D = DAMP C = CLEAN/DRY X = CORROSIVE H = HAZARDOUS	SUPPORT MATERIALS
WTP Electrical Room	NEMA 12	GRC	C	Hot Dip GALV hardware with GALV anchors
WPT Process Floor	NEMA 12	GRC	D	Hot Dip GALV hardware with GALV anchors

## 1.10 CONTRACTOR'S RECORD DRAWINGS & AS-BUILTS

- A. The CONTRACTOR shall maintain a neatly marked set of record drawings showing the locations of all buried conduits and other utilities encountered or installed during construction. The final locations of panels, field mounted instruments and panels, terminal boxes, junction boxes, receptacles, light switches and other materials included in the work shall be shown, as well as conduit routing between them to the extent it differs from the design drawings. Record drawings shall be kept current with the work as it progresses and shall be subject to inspection by the OWNER's Representative at any time. Failure to keep field record drawings current may result in the issuance of a stop work order or delay in the processing of pay requests until the record drawings are made current.
- B. The CONTRACTOR shall provide one complete set of as-built electrical schematics for all panels and equipment provided, including PLC I/O schematics as applicable, panel elementary diagrams, interconnecting wiring diagrams, wire numbers, termination strip locations and numbers. These shall be in the same format and style as those in the Contract Documents and submittal requirements.
- C. All information shown on the CONTRACTOR's field record drawings and as-built schematics shall be subject to verification by the OWNER's Representative. If significant errors or deviations are noted by the OWNER's Representative, new as-builts shall be completed at the CONTRACTOR's expense.

## **PART 2 PRODUCTS**

### **2.01 PORTABLE OR DETACHABLE PARTS**

- A. The CONTRACTOR shall retain in his possession and shall be responsible for all portable and detachable parts or portions of installations such as fuses, key locks, adapters, blocking chips and inserts until completion of his work.
- B. These parts shall be delivered to the ENGINEER and an itemized receipt obtained. This receipt, together with 2 copies of the final inspection certificate, shall be attached to the CONTRACTOR's request for final payment.
- C. All equipment shall be demonstrated to operate in accordance with the requirements of this specification and the manufacturer's recommendations.

### **2.02 NEW PRODUCTS**

- A. All products shall be new without defects and covered by Manufacturer's warranty. Products shall be re-used only where indicated on the Drawings.
- B. All products shall be listed, labeled, and certified by a testing agency approved by the state of Oregon.
- C. All equipment of the same type and capacity shall be by the same manufacturer.

## **PART 3 EXECUTION**

### **3.01 IDENTIFICATION**

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.

### **3.02 WORKMANSHIP & COORDINATION**

- A. All work shall be performed by personnel skilled in the particular trade in a workmanlike manner. Workmanship shall conform to the standards of the NEC and the National Electrical Installation Standards (NEIS).
- B. The ENGINEER shall be the sole judge as to whether or not the finished work is satisfactory; and if in his judgment any material or equipment has not been properly installed or finished, the CONTRACTOR shall replace the material or equipment whenever required, and reinstall it in a manner entirely satisfactory to the ENGINEER without any increase in cost to the OWNER.
- C. The CONTRACTOR shall coordinate and verify the installation of all equipment furnished by him to other trades, or equipment provided and installed by other trades that is connected to the electrical or control systems. Work shall include the furnishing of all labor, materials, and equipment required for the installation of a

complete and operable system as hereinafter specified and as indicated on the drawings. The Contract Documents are complementary and what is called for by any one shall be as binding as if called for by all. Unless otherwise specifically stipulated, the term "furnished and installed complete" shall be considered a part of this section.

- D. Controls and systems shall be complete with transformers, switches, relays, contactors, control valves, control devices, instrument piping, fittings, valves, control wiring, thermometers, pressure gauges, thermostats, damper operators, miscellaneous control cabinets to fill the intent of the Specifications and shall provide control for the various units and systems. All control valves and motorized dampers shall be provided with position indicators.
- E. Unless otherwise specified or shown on the drawings, switches or relays shall be installed in, or adjacent to the motor starter or other electrical device to which they are to be connected. Control and interlock wiring shall be included as necessary from breakers specified herein or shown on the drawings.
- F. Each control schematic intended to control a series of motor operated louvers, fans, and thermostats shall contain a switch for maintenance to meet the NEC requirements regarding disconnect switches for motors. This switch shall be local if any unit controlled is out of sight of the switch. This switch shall disconnect all power to all motor operated devices within the circuit.

### 3.03 TEMPORARY HEATING, LIGHTING AND POWER

- A. The CONTRACTOR shall provide all heat, lighting and power required to construct and protect the work until the work is placed in service by the OWNER for beneficial use of the OWNER. Temporary heaters shall be provided as required to keep the work area and all new electrical components dry.
- B. The source for temporary power shall be from the electric utility or OWNER approved CONTRACTOR supplied auxiliary power units. The installation for electric power shall meet the requirements of local authorities and of OSHA.
- C. The CONTRACTOR shall obtain all permits and pay all costs for connecting temporary power service at no expense to the OWNER.

### 3.04 SUPPORT BACKING

- A. Provide any necessary backing required to properly support all fixtures and equipment installed under this contract.

### 3.05 CUTTING, PATCHING AND FRAMING

- A. The CONTRACTOR shall determine in advance the locations and sizes of all sleeves, chases, and openings necessary for the proper installation of his work.

- B. Whenever practical, inserts or sleeves shall be installed prior to covering work. Cutting and patching shall be held to a minimum. All required holes in concrete construction shall be made with a core drill and patched with non-metallic non-shrink grout.
- C. Cutting, fitting repairing and finishing of carpentry work, metal work, or concrete work, and the like, which may be required for this work shall be done by craftsmen skilled in their respective trades. When cutting is required, it shall be done in such a manner as not to weaken walls, partitions, or floors; and holes required to be cut in floors must be drilled without breaking out around the holes.

### 3.06 TESTS

- A. The CONTRACTOR shall furnish all labor, material, instruments and tools to make all connections for testing of the electrical and instrumentation installation. All equipment shall be demonstrated as operating properly prior to the acceptance of the work. All protective devices shall be operative during testing of equipment. The tests shall be made under the supervision of the ENGINEER. All deficiencies or unsatisfactory conditions as determined by the ENGINEER or inspecting authorities shall be corrected by the CONTRACTOR in a satisfactory manner at his own expense.
- B. After visual inspection of joints and connections and the application of tape and other insulating materials, all sections of the entire wiring system shall be thoroughly tested for shorts and grounds. A log of results for each circuit shall be kept by the CONTRACTOR and presented to the ENGINEER.
- C. A phase rotation check shall be made to demonstrate that all power receptacles, service feeders, main power feeders and auxiliary power generators have the same A - B - C phase rotation and ground relationships.
- D. Equipment shall be tested by operating all electric motors, relays, controls, switches, heaters, etc., sufficiently to demonstrate proper installation and electrical connections. Control and emergency conditions shall be artificially simulated where necessary for complete system or subsystem.

### 3.07 CLEANING AND TOUCH-UP PAINT

- A. Upon completion of work, all electrical equipment shall be cleaned.
  - 1. Vacuum all dirt, metal shavings, and foreign materials from all enclosures. The use of compressed air shall not be acceptable.
  - 2. All stains, dirt, and fingerprints shall be removed from switchboards, motor control centers, panelboards, light fixtures, enclosures, and all other electrical equipment covers.
- B. Provide touch-up paint on equipment that has been scraped, scratched, or chipped during construction. Paint color shall match color of equipment.

3.08 COORDINATION OF STARTUP AND ADJUSTING, COMMISSIONING,  
DEMONSTRATION AND TRAINING, AND OPERATION AND MAINTENANCE  
DATA.

- A. Reference Section 16001 - Commissioning, 16005 - Starting and Adjusting, 16010 -  
Operation and Maintenance Data, and 16015 - Demonstration and Training, for  
detailed requirements.

**END OF SECTION**

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**SECTION 16001**  
**COMMISSIONING**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section Includes.
  - 1. Definitions
  - 2. Requirements for commissioning.

1.02 DEFINITIONS

- A. Commissioning Verification Period.
  - 1. The commissioning period begins after the ENGINEER has approved the Functional Test Certification demonstration with the control software, the specified demonstration and training is complete, punch list deficiencies are corrected and the final operation and maintenance manuals are submitted and approved. The duration of the commissioning verification period is 14 days without significant interruption.
- B. Significant Interruption.
  - 1. Significant interruption may include any of the following events.
    - a. Failure of the CONTRACTOR to maintain qualified onsite start-up personnel as specified.
    - b. Failure of critical equipment unit, system, or sub-system that is not satisfactorily corrected within two (2) hours after the failure.
    - c. Failure of noncritical equipment unit, system, or sub-system that is not satisfactorily corrected within twenty-four (24) hours after the failure.
    - d. As may be determined by the ENGINEER.

1.03 REQUIREMENTS FOR COMMISSIONING

- A. Commissioning of the facility shall be completed prior to substantial completion.
- B. CONTRACTOR shall provide for realistic durations in the progress schedule for the commissioning activities.
- C. Provide the labor, medium, chemicals, tools, equipment, instruments and services required for, and incidental to, completing commissioning.
- D. Demonstrate satisfactory operation within the facility of the equipment and systems in actual operation as a functional unit.

- E. Conduct commissioning for a period of fourteen (14) continuous days without significant interruption.
- F. The commissioning verification period shall restart with the correction of each significant interruption.
- G. Correct defects in material and workmanship immediately following their discovery.
- H. Provide for maintenance until substantial completion. This includes the required maintenance activities during the commissioning verification period.
- I. Perform maintenance pursuant to the operation and maintenance data requirements for the new facility during and following the commissioning verification period and prior to issuance of a certificate of substantial completion.
- J. As of the date of substantial completion, OWNER's staff shall be responsible for operation and maintenance of the new facilities. This excludes any issues identified as warranty matters.

**PART 2 PRODUCTS – NOT USED**

**PART 3 EXECUTION – NOT USED**

END OF SECTION

## SECTION 16005

### STARTING AND ADJUSTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes.

1. Definitions.
2. Sequence of start-up activities.
3. General requirements.
4. Manufacturer's representative responsibilities.
5. CONTRACTOR's independent process control test certification verification.
6. CONTRACTOR's demonstration of the process control test certification to the ENGINEER.
7. CONTRACTOR's independent functional test certification verification.
8. CONTRACTOR's demonstration of the functional test certification to the ENGINEER.
9. Record keeping.
10. Supplements.

##### 1.02 DEFINITIONS

- ###### A. Manufacturer's Representative – Authorized service division employee of the manufacturer.

##### 1.03 SEQUENCE OF START-UP ACTIVITIES

- ###### A. Develop a specific plan for testing and start-up activities required for the project and submit to the ENGINEER for approval no less than 21 days before the initial start-up of equipment begins. The plan shall, as a minimum, incorporate the activities itemized below.
1. Complete all work associated with the installations of the unit and related processes before start-up activities begin.
  2. Manufacturer's representative shall certify the installation meets manufacturer's recommendations and instructions.
  3. Manufacturer's representative shall certify equipment operates as specified and as shown in the Contract Documents.
  4. Calibrate instruments.
  5. CONTRACTOR's independent process control test certification verification.
  6. CONTRACTOR's demonstration of the process control test certification to the ENGINEER. Operation and maintenance manuals shall be available during this activity.
  7. CONTRACTOR's independent functional test certification verification.

8. CONTRACTOR's demonstration of the functional test certification to the ENGINEER.
9. Submit records kept during start-up and adjusting activities.
10. Commissioning activities described in Section 16001 – Commissioning.
11. Demonstration and training described in Section 16015 – Demonstration and Training.
12. CONTRACTOR shall provide sufficient time in the progress schedule to accommodate the start-up sequences.

#### 1.04 GENERAL REQUIREMENTS

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
- B. Demonstrate proper function of all equipment, systems and control devices.
- C. Furnish labor, process medium, chemicals, tools, equipment, instruments, and services required for, and incidental to, completing start-up and adjusting activities.
- D. Manufacturer's representative shall provide assistance for assembly and installation as well as testing guidance and troubleshooting during the start-up and adjusting activities.
- E. Complete Supplement 16005-A and submit to ENGINEER for approval. The submission and approval of this form is required prior to commencing with the CONTRACTOR's demonstration to the ENGINEER that each process itemized in the Process Control Test Certification operates as specified and designed.
- F. Complete the following mechanical adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
  1. Remove rust preventatives and oils applied to protect equipment during construction.
  2. Flush lubrication systems and dispose of flushing oils. Recharge lubrication system with lubricant recommended by manufacturer.
  3. Install and adjust packing, mechanical seals, O-rings, and other seals. Replace defective seals.
  4. Remove temporary supports, bracing and other foreign objects installed to prevent damage during shipment, storage and erection.
  5. Check rotating machinery for correct direction of rotation and for freedom of moving parts before connecting driver.
  6. Perform cold alignment and hot alignment to manufacturer's tolerances.
  7. Adjust belt tension and variable pitch sheaves.
  8. Inspect hand and motorized valves for proper adjustment. Tighten packing glands to insure no leakage, but permit valve stems to rotate without galling. Verify valve seats are positioned for proper flow direction.

9. Tighten leaking flanges or replace flange gasket. Inspect screwed joints for leakage.
  10. Install gratings, safety chains, handrails, shaft guards and sidewalks prior to operational testing.
- G. Complete the following electrical and control adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
1. Perform insulation resistance tests on all conductors operating at or above 200 volts.
  2. Perform continuity tests on all conductors.
  3. Test and set circuit breaker relays and circuit breaker trip settings for proper operation. Coordinate the trip settings for all circuit breakers.
  4. Check and record motors for actual full load amperage draw on each phase and compare to nameplate value. Submit results to ENGINEER.
- H. Complete the following instrumentation adjustments prior to, or during, the CONTRACTOR's initial start-up and adjusting activities and before demonstration to the ENGINEER.
1. Field calibrate instruments and make required adjustments and control point settings.
  2. Leak test pneumatic controls and instrument air piping.
  3. Energize transmitting and control signal systems, verify proper operations, ranges and settings.

#### 1.05 MANUFACTURER'S REPRESENTATIVE RESPONSIBILITIES

- A. Manufacturer's representative shall inspect the installation and certify with a written report that the installation meets the requirements of the Contract Documents as well as the Manufacturer's recommendations. This shall be done before the equipment is energized.
- B. At completion of a manufacturer's representatives' start-up and testing activities, they each shall furnish a written report certifying the equipment installation meets the following conditions.
1. Has been properly installed to meet the IBC seismic requirements and has been adjusted, aligned and lubricated as required.
  2. Is free of any stresses imposed by connecting piping or anchor bolts.
  3. Is suitable for satisfactory full time operation under full load conditions.
  4. Operates within the allowable limits for vibration.
  5. Controls, protective devices, instrumentation and control panels furnished as part of the equipment package are properly installed, calibrated and functioning.
  6. Control logic for start-up, shutdown, sequencing, interlocks and emergency shutdowns have been tested and are functioning properly.

1.06 CONTRACTOR'S INDEPENDENT PROCESS CONTROL TEST CERTIFICATION VERIFICATION

- A. Verify the equipment provided is installed correctly and functions properly.
- B. Complete Supplement 16005-A, "Process Control Test Certification" pursuant to the following.
  - 1. The supplement is not intended as a replacement for a systematic check of all the requirements specified.
  - 2. Complete the tests outlined in the Supplement, fill out the form and sign it certifying that the tests have been successfully performed and the results recorded.
  - 3. Where it is not possible to test a function without the software furnished, the CONTRACTOR shall verify the inputs/outputs (I/O's) are terminated correctly by simulating the process as closely and to the extent possible and checking the I/O terminations for voltage and continuity.
- C. Submission of the completed Supplement to the ENGINEER and approval of the submission are a prerequisite to the CONTRACTOR's demonstration of process control test certification to the ENGINEER.

1.07 CONTRACTOR'S DEMONSTRATION OF PROCESS CONTROL TEST CERTIFICATION TO THE ENGINEER

- A. The intent of the demonstration of the operation to the ENGINEER is to ascertain the installation, including the hardwired control, are in compliance with the Contract Documents. Successful completion of this step will facilitate efficient demonstration of the complete operations of the facilities when the configured control software is installed and tested as part of the Functional Test Certification.
- B. Demonstrate compliance with the items listed in Supplement 16005-A.
- C. ENGINEER may require the CONTRACTOR to demonstrate functions or processes in addition to those itemized in Supplement 16005-A.
- D. ENGINEER's approval of the demonstration of the process control test certification is required before the Functional Test Certification phase commences.

1.08 CONTRACTOR'S DEMONSTRATION OF THE FUNCTIONAL TEST CERTIFICATION TO THE ENGINEER

- A. The intent of the demonstration of the Functional Test Certification to the ENGINEER is to ascertain the installation, including the configured software program, is in compliance with the Contract Documents.
- B. Demonstrate items listed in Supplement 16005-B, "Functional Test Certification" to the ENGINEER.

- C. ENGINEER may require the CONTRACTOR to demonstrate functions or processes in addition to those itemized in Supplement 16005-B.
- D. ENGINEER's approval of the demonstration of the Functional Test Certification is a prerequisite to beginning the commissioning phase.

#### 1.09 RECORD KEEPING

- A. CONTRACTOR shall maintain, as a minimum, the following records generated during the start-up and adjusting activities.
  - 1. Daily logs of equipment and process testing, identifying all tests conducted and a summary of the results.
  - 2. Logs of time spent with manufacturer's representatives providing services for the project.
  - 3. Equipment lubrication records.
  - 4. Electrical phase voltage and amperage measurements for all equipment.
  - 5. Insulation resistance measurements.
  - 6. All completed test forms specified in Section 16080 Electrical Testing.

### **PART 2 PRODUCTS – NOT USED**

### **PART 3 EXECUTION**

#### 3.01 SUPPLEMENTS

- A. Supplement 16005-A, "Sweet Home WTP Process Control Test Certification".

END OF SECTION

**SUPPLEMENT 16005-A**  
Sweet Home WTP  
Process Control Test Certification

#	Description	Pass	Fail	Comments
1	Verify the Ethernet IP signal from VFD FWP401 to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			
2	Verify the Ethernet IP signal from VFD FWP402 to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			
3	Verify the Ethernet IP signal from VFD FWP403 to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			
4	Verify the Ethernet IP signal from SS Backwash Pump to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			
5	Verify the Ethernet IP signal from 50A AHF to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			
6	Verify the Ethernet IP signal from 100A AHF to New Control Panel is connected properly and able to transmit. The configuration will be done by the Owner's System Integrator (SI) before moving to the functional testing phase.			

END OF SUPPLEMENT

## SECTION 16010

### OPERATION AND MAINTENANCE DATA

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
  - 1. Definitions.
  - 2. General requirements.
  - 3. Submittal procedures.
  - 4. Content requirements for manuals.
  - 5. Supplements.

##### 1.02 DEFINITIONS

- A. Maintenance Operation.
  - 1. Routine operation required to ensure satisfactory performance and longevity of the equipment. Examples of typical maintenance operations are lubrication, belt tensioning, adjustment of pump packing glands and other routine adjustments.

##### 1.03 GENERAL REQUIREMENTS

- A. Provide operation and maintenance data for items listed in Supplement 16010 – A, “Schedule of Equipment Requiring Operation and Maintenance Data”.
- B. In addition to the composite of manuals for individual equipment items or systems, provide a consolidated summary of required routine scheduled maintenance and scheduled preventative and predictive maintenance for the project, with reference to where detailed information may be found. Include safety information and emergency plans and procedures. The summary shall be in a separate binder from the other equipment and system binders.
- C. Comply with the following format relating to the Operation and Maintenance Manual:
  - 1. All binders shall be “D” ring type with one-touch ring locking mechanism.
  - 2. Overlay material shall be crystal clear poly.
  - 3. Binders shall be black poly.
  - 4. Binders shall be nominally sized for 75 percent fill per volume with a maximum binder depth of four (4) inches and a minimum depth of one (1) inch.
  - 5. Submit example binder cover sheet for approval by ENGINEER.
  - 6. Submit example spine insert for approval by ENGINEER.
  - 7. Paper: twenty (20) pound minimum, white for typed pages, 8.5 x 11 inches.

8. Text: Manufacturer's printed data, or neatly typewritten. Facsimiles transmitted via fax machine shall be unacceptable.
9. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
10. Provide fly-leaf for each separate product, or each piece of operating equipment, with typed description of product and major component parts of equipment. Provide with heavy section dividers with numbered plastic index tabs.
11. Provide each manual with a title page, typed table of contents with consecutive page numbers. Plan contents of entire set, identified by volume number, in each binder.
12. Material shall be suitable for reproduction with quality equal to the original. Photocopying of material will be acceptable except for material containing photographs.
13. Table of contents shall be neatly typewritten, arranged in a systematic order, containing as a minimum the following data:
  - a. CONTRACTOR, name of responsible principle, address and telephone number.
  - b. List of each product required to be included and indexed to content of each volume.
  - c. List of each product, name, address and telephone number of subcontractor, supplier, installer and maintenance contractor as appropriate.
  - d. Provide local source and phone number of supply for parts and replacement.
  - e. Identify each product by product name, model number and other identifying numbers or symbols as set forth in the Contract Documents.
14. Product data:
  - a. Include only those sheets that are pertinent to the specific product provided.
  - b. Clearly annotate each sheet to identify specific product or part installed, data applicable to the installation and delete references to inapplicable information.
15. Drawings; supplement product data with drawings as necessary to clearly illustrate the following:
  - a. Relationship of component parts of equipment and systems.
  - b. Control and flow diagrams.
  - c. Coordinate drawings with project record documents to assure correct illustration of completed installations.
  - d. CONTRACTOR shall not use project record documents as maintenance manual drawings.
  - e. Provide reinforced punched binder tabs.
  - f. Reduced 11 x 17 inch drawings shall be folded to 8.5 x 11 inch format.

- g. Where reduction to 11 x 17 inch is impractical, fold and place the 8.5 x 11 inch envelopes that are bound in the binder.
- h. Identify specification Section and product on drawings and envelopes.

#### 1.04 SUBMITTAL PROCEDURE

- A. Compile the required data, arrange as specified herein and insert data in the number of volumes necessary. The volumes shall be submitted as a complete set. Partial or incomplete manuals shall be rejected by the ENGINEER.
- B. Preliminary Manuals:
  - 1. Submit three copies to ENGINEER for review and approval well before the starting and adjusting activities commence.
  - 2. If accepted:
    - a. One copy will be returned to the CONTRACTOR.
    - b. One copy will be forwarded to the OWNER.
    - c. One copy will be retained in the ENGINEER's file.
  - 3. If rejected:
    - a. Two copies will be returned to the CONTRACTOR with ENGINEER's comments for revision.
    - b. One copy will be retained in the ENGINEER's file.
    - c. CONTRACTOR shall be required to resubmit three revised preliminary manuals for ENGINEER's review.
- C. Final Manuals:
  - 1. Submit two copies to ENGINEER for review and approval before final completion.
  - 2. If accepted:
    - a. CONTRACTOR will be so notified.
    - b. CONTRACTOR shall provide a complete set of the final manual on CD-ROM. Data written specifically for the manual will be presented in MS Word format. Manufacturer data (per-printed data) will be presented in Adobe PDF format.
  - 3. If rejected:
    - a. At the ENGINEER's discretion either all but one copy of the manuals will be returned to the CONTRACTOR for revisions or all copies will be retained by the ENGINEER and the necessary revision data will be requested from the CONTRACTOR.

#### 1.05 CONTENT REQUIREMENTS FOR MANUALS

- A. The Operation and Maintenance Manuals shall normally consist of no less than four volumes outline below.
- B. Volume 1 – Facility Overview.
  - 1. All sheets in volume 1 shall have sheet protectors.

2. All materials in volume 1 shall be copied onto a CD and provided to the ENGINEER.
3. Include instructions and procedures for handling, storage, maintenance during storage, assembly, erection, installation, adjusting, testing, operating, shut down in emergency, troubleshooting, maintenance, interface with other equipment and as may otherwise be required.
4. Organize in a consistent format under separate heading for each different procedure.
5. Provide a logical sequence of instructions for each procedure.
6. Provide an information sheet for the OWNER's personnel which include the proper procedures in the event of a failure and instances that might affect the validity of warranties or bonds.
7. Content for each unit (or common units) and system:
  - a. Description of unit and component parts including controls, accessories and appurtenances. Detail their function, normal operating characteristics and limiting conditions. Provide performance curves, engineering data, nameplates data and test forms. Provide a complete commercial number and nomenclature for replaceable parts.
8. Operating Procedures:
  - a. Start-up and break-in routine and normal operating instructions.
  - b. Test procedures and results of factory tests where required.
  - c. Regulation, control, stopping and emergency instructions.
  - d. Description of operation sequence by control manufacturer.
  - e. Shutdown instructions for both short and extended durations.
  - f. Summer and winter operating instructions as applicable.
9. Maintenance and Overhaul Procedures:
  - a. Routine operations
  - b. Guide to troubleshooting.
  - c. Disassembly, removal, repair, reinstallation and reassembly.
10. Installation Instructions including alignment, adjusting, calibrating and checking.
11. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list and diagrams required for maintenance.
12. Parts list by generic title and manufacturer's part number.
13. Name, location and telephone number of nearest supplier and spare parts warehouse.
14. Where applicable identify installed spares and other provisions for future work (e.g. reserved panel space, unused components, wiring and terminals).
15. Manufacturer's printed operating and maintenance instructions.
16. Charts of valve tag numbers along with the location and function of each valve.
17. Manufacturer's certifications including calibration data sheets and specified calibration procedures or methods for installed equipment.

18. Warranty forms and information for all installed equipment provided by the CONTRACTOR.
19. Circuit directories for all panels including electrical, control and communication.
20. List of adjustable electrical relay settings, control and alarm settings.

C. Volume 2 – Equipment Manuals.

1. Table of contents shall have a sheet protector
2. Table of contents and index sheets shall be of colored card stock.
3. Manuals for individual equipment shall not be divided between separate binders.
4. List function, normal operation, characteristics and limiting conditions.
5. Complete commercial part number and nomenclature of replaceable parts.
6. Maintenance procedures including routine operations, guide to troubleshooting and adjustments.
7. Manufacturer’s printed operation and maintenance instructions.
8. List of manufacturer’s spare parts and recommended quantities to be maintained in storage.
9. Contents for Maintenance Summary Manual:
  - a. Compile individual maintenance summaries for each applicable equipment item, respective unit or system and for components or subunits.
  - b. Format shall include use of the Supplement 16010 – B “Maintenance Summary” provided. Each Maintenance Summary may take as many pages as required. Supplement shall be typewritten and shall include detailed lubrication instructions and diagrams showing points to be greased or oiled, recommended type, grade and temperature range of lubricants and frequency of lubrication.
  - c. Include a list and quantity of manufacturer’s recommended consumable and spare parts that should be stored on site.

D. Volume 3 – Drawings

1. As-built drawings associated with the project shall be provided. This includes, but is not limited to, manufacturers supplied drawings. All drawings shall be provided on 11 x 17 inch sheets folded to 8.5 x 11 inch size and bound in this volume. A complete and detailed index shall be provided that includes a list of all drawings in the volume and the drawings shall be tabbed in a fashion that provides clear and concise identification.

## **PART 2 PRODUCTS – NOT USED**

## **PART 3 EXECUTION**

### **3.01 SUPPLEMENTS**

- A. Supplement 16010 – A, “Schedule of Equipment Requiring Operation and Maintenance Data”.
- B. Supplement 16010 – B, “Maintenance Summary Form”.

**END OF SECTION**





## SECTION 16060

### GROUNDING AND BONDING

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes.

1. The section includes requirements for grounding electrodes, equipment grounding and electrical bonding.

##### 1.02 SUBMITTALS

###### A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16060.G01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

###### B. Product Data

1. Pursuant to Section 01330 Submittal Procedures.
2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

###### A. **Compression Connectors (16060.C20).**

1. Compression connections shall be provided as shown on the drawings and as required for bonding end-use equipment.

2. Compression connections shall be compress-deforming type, extruded copper material.
3. Compression connections shall be tin electroplated for corrosion resistance.
4. Compression connections shall be ring-type connectors. Forked connectors shall not be used on grounding conductors.
5. Provide Burndy products, or approved equal.

**B. Mechanical Connectors (16060.C21).**

1. Mechanical connectors shall be provided as shown on the drawings and as required for bonding to pipes.
2. Mechanical connectors shall be UL 467 Listed, copper material.
3. Mechanical connectors shall be sized to match the pipe being bonded.
4. Mechanical connector clamps shall permit parallel or 90° cable connection.
5. Mechanical connectors installed below-grade shall include silicon bronze hardware.
6. Provide Burndy GAR3902 series for above-ground installations, or approved equal.
7. Provide Burndy GAR-BU series for below-grade installations, or approved equal.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

**A. General.**

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Bond separately derived systems, including generators, to the grounding electrode system.
3. Maintain equipment ground continuity throughout the facility by means of a grounding conductor routed in all raceways.
4. Provide grounding conductors pursuant to Section 16121. Conductors shall be copper and shall be sized per the Drawings or the NEC, whichever is greater.
5. Provide ground bushings for all conduits that do not terminate in a hub type fitting and install at the source of power with a bonding conductor fastened to the ground bushing.
6. Provide ground bar kits as shown on the Drawings and where two (2) or more grounding conductors are terminated in a box or enclosure.

**B. Grounding Conductors.**

1. Brush grounding conductors clean of debris before connections are made.
2. Strip insulated conductor insulation in a neat, workman like manner where insulated conductors are used.

3. Fasten all conductors securely.

C. Connections.

1. Install connectors according to the manufacturer's directions, using the proper dies, tools, molds, shots, loads, etc. designed specifically for this purpose.
2. Provide irreversible welded type connections to ground rods, re-bar, lightning protection box, building steel etc.
3. Provide compression connector type connections to end use equipment and bolt to the equipment using washers and split lock washers for secure fastening. Bolts shall be grade 5 for grounding connections and shall be tightened to the manufacturer's recommend torque.

**END OF SECTION**

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## SECTION 16070

### HANGERS AND SUPPORTS

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. This section includes requirements pertaining to electrical equipment anchoring and electrical equipment hanging and support.

##### 1.02 SUBMITTALS

###### A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16070.H01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

###### B. Product Data.

1. Pursuant to Section 01330 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

#### PART 2 PRODUCTS

##### A. Galvanized Hardware (16070.H11).

1. Bolts shall be hot dipped galvanized steel and sized for the load served and have a hex head unless specifically specified otherwise elsewhere.
2. Nuts shall be hot dipped galvanized steel hex nut.
3. Washers shall be hot dipped galvanized steel, USS pattern flat washers.
4. Split lock washers shall be hot dipped galvanized steel.

5. Threaded rods and couplings shall be hot dipped galvanized steel.
6. Eye-bolts, u-bolts, bent-bolts and similar connecting hardware shall be hot dipped galvanized steel.

**B. Galvanized Anchors (16070.A11).**

1. Wedge or stud anchors installed in concrete or masonry shall be hot dipped galvanized steel and sized for the load served.
2. Toggle type fasteners shall only be used in hollow sheetrock wall. The wing part of the fastener may be mild steel, but the bolt shall be hot dipped galvanized steel.

**C. Galvanized Beam Clamps (16070.B11).**

1. Beam clamps shall be hot dipped galvanized steel and sized for the load served.

**D. Galvanized Strut Channel (16070.S01).**

1. Galvanized strut channel shall be hot dipped galvanized after fabrication and shall be a minimum of 12 gauge.
2. Galvanized strut channel shall have factory pre-drilled holes.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

**A. General.**

1. Hardware shall be set to a torque as recommended by the manufacturer.
2. Washers and split lock washers shall be installed on all bolts, threaded rods and anchors.
3. Lead or plastic type anchors are prohibited from use on the project.
4. When threaded rods are installed in drop-in type anchors, a washer, split lock washer and a jamb nut shall be installed at the anchor to ensure stability.
5. When channel (strut) is installed as a hanger or support from threaded rod, washers, split lock washers and jamb nuts shall be installed on both sides of the strut to lock it in place.
6. Cut ends of channel, strut, threaded rods or other cut fittings shall be filed smooth before installation.
7. Cut ends of hot dipped galvanized channel and strut shall be coated with three coats of cold galvanizing compound after the channel has been filed to prohibit rust.
8. Galvanized channel and strut shall only be installed indoors in non-corrosive areas.
9. Concrete anchors shall be installed as per the manufacturer's directions and set using the manufacturer's supplied tool.
10. Threaded rod shall not extend more than one (1) inch beyond the channel, strut or other material it is supporting.

11. Hangers and supports shall be installed level and plumb.
12. Hangers and supports shall be installed per the National Electrical Code, Building Code and Structural Code and shall be designed to safely support the load. The ENGINEER may request the CONTRACTOR provide a copy of their design calculations for the seismic requirements and the load served.

**END OF SECTION**

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## SECTION 16075

### ELECTRICAL AND CONTROL IDENTIFICATION

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes

1. Requirements for identification of electrical, safety, measurement, data, monitoring, control and related components and equipment.

##### 1.02 SUBMITTALS

###### A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16075.S21) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

###### B. Product Data

1. Pursuant to Section 01330 – Submittal Procedures.
2. The initial submittal shall contain all the products, samples and data base specified. An initial submittal that does not contain all the specified data shall be returned as incomplete.

###### C. Samples

1. Provide a sample of each type and size of nameplate, label, tag and means of attachment specified for approval by the OWNER.

###### D. Quality Assurance / Quality Control Submittals

1. The CONTRACTOR shall be responsible for submitting a data base of all identification nameplates, labels, panel schedules and tags required for the

Work. The data base shall be developed in the most current edition of Microsoft Excel for the OWNER's future use.

E. Closeout Submittals

1. Pursuant to Section 01780 – Closeout Submittals.
2. As-built electronic copy of the identification Excel data base.

## **PART 2 PRODUCTS**

### 2.01 MATERIALS

A. **Heat Sealing Lamination Products (16075.L11).**

1. Provide documents in laminate when specified. Laminate shall be clear, non- yellowing and sized for various sized documents.
2. Shall be 5 mil in thickness.

B. **Plastic Nameplates (16075.P05).**

1. Shall have a black background with white engraved letters. Nameplates for emergency functions shall be red background with white engraved letters. The nameplates shall have self adhesive rated for the environment which they are installed. The font type shall be consistent on all nameplates.
2. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

C. **Stainless Steel Component and Device Tags (16075.S25).**

1. Shall be stainless steel.
2. Two (2) inch round.
3. The tag shall be between .025 - .050 inches thick.
4. The text shall be center justified and shall be stamped.
5. Standard size for characters shall be 0.25 inches high.
6. The stainless steel tags shall be attached to devices with stainless steel beaded chain which shall be provided with two (2) to three (3) inches of slack when the tag is attached to the device. The hole in the tag for the beaded chain shall be at the top and centered on the tag. The hole shall be large enough that the chain will not bind in the hole.
7. Provide products supplied by E.R. Perry Signs & Engraving, or approved equal.

D. **Conduit Tags (16075.S35).**

1. Shall be 316 or 304 stainless steel.
2. Nominally 0.75 inches high by 3.0 inches long.
3. Characters shall be 0.25 inches high. And shall be machine punched or durably embossed.
4. Conduit tags shall be products readily available and manufactured for this purpose.

5. The stainless steel conduit tags shall be attached with stainless steel cable ties.
6. Provide Panduit Permanent Identification System products, or approved equal.

**E. Epoxy Gel (16075.E05).**

1. Shall be a two component, 100 % solids, moisture tolerant, high modulus, high strength, structural epoxy paste adhesive.
2. Provide Sika type Sikadur 31, Hi-Mod Gel, or approved equal.

**F. Conductor and Cable Identification Sleeves (16075.T31).**

1. The identification sleeves shall be properly sized for the cable or conductor.
2. Sleeves shall be white with black machine generated characters.
3. Provide Brady wire and cable sleeves, or approved equal.

**G. Terminal Blocks (16075.B12).**

1. Terminal blocks shall mount on DIN rail and the standard color shall be gray.
2. Grounding terminal blocks shall be green and yellow.
3. Terminal blocks shall be identified two (2) sides with machine generated plastic labels manufactured specifically for that purpose. Labels shall be white with black font.
4. Each terminal strip shall also be identified as shown on the Drawings.

**H. Conductor Color Coding (16075.C89).**

1. Conductors shall be colored as specified in the table below. The technical specification requirements for the conductors are specified elsewhere.

## Conductor Color Coding

System	Conductor	Color
All Systems	Equipment Grounding	Green
IT / Data	Data Cable Sheath (outer cover)	Blue
24 Volt DC	Positive	Blue
	Negative	White w/Blue Stripe
	Discrete Input Line (hot leg) Side	Blue
	Discrete Input Switch Leg	Blue w/White Stripe
	Discrete Output Line (hot leg) Side	Blue
24 Volt AC	Discrete Output Switch Leg	Blue w/Orange Stripe
	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/Blue Stripe
120 Volt AC Control	Hot Leg	Red
	Neutral	White
	Discrete Input Line (hot leg) Side	Red
	Discrete Input Switch Leg	Red w/White Stripe
	Discrete Output Line (hot leg) Side	Red
120/208 Volt Three Phase	Discrete Output Switch Leg	Red w/Orange Stripe
	Phase A	Black
	Phase B	Red
	Phase C	Blue
	Neutral	White
480 Volt Three Phase	Phase A	Brown
Wye or Delta Corner Tap	Phase B	Purple
	Phase C	Yellow
	Neutral	Gray

### PART 3 EXECUTION

#### 3.01 INSTALLATION

##### A. Plastic Nameplates

1. Provide plastic nameplates for panelboards, motor control centers, motor starters, disconnects, variable frequency drives, control panels and similar equipment. The verbiage on the nameplate shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.
2. In addition to the nameplate identifying the equipment, a second nameplate shall be provided that identifies the source of power for the equipment i.e. "Fed From PNL208-1".

3. Typically the nameplates shall be centered and installed near the top of the equipment.
4. Nameplates shall be black with white characters unless specified otherwise.
5. Nameplates on emergency panels shall be red with white characters.

**B. Stainless Steel Component and Device Tags**

1. Provide stainless steel component and device tags for instruments, valves, pipes and similar equipment.
2. The tag shall be attached with a stainless steel beaded chain and attached in a manner and location which enables it to be read without interfering with the operation of the component or device. Whenever possible it shall not be attached to a removable part of the equipment.
3. The verbiage on the tag shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.

**C. Conduit Tags**

1. Provide stainless steel conduit tags at each point that a conduit terminates at or within an enclosure or box. The stainless steel tag shall be attached with stainless steel cable ties.
2. Where conduits enter a vault and are installed flush with the walls, the conduit tag shall be installed directly above the conduit entry and attached to the wall of the vault with epoxy gel.
3. The verbiage on the tag shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.
4. Where conduits terminate at a box in an inaccessible location such as behind a sheetrock wall, conduit labels are not required.

**D. Conductor and Cable Identification Sleeves**

1. Provide heat shrink, machine generated, white labels with black characters for all cables and conductors. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provided on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.
2. The labels shall be installed between 6 to 8 inches from the end and shrunk. Conductors shall be labeled at all splices and points of termination.
3. Power conductors and cables, including the neutral and the ground conductors shall all be identified individually. The identification label will be developed as follows: The first set of characters will be the equipment code identifying the source of power "PNL208" followed by the circuit

number “CKT 12” and a forward slash followed by the room number where the utilization is located and then the utilization equipment. Using the first sequential unit heater in room 2334 as an example, the label would read “PNL208-CKT 12/ 2334-UH-1”.

4. Control conductors, including grounds, shields, etc. shall be identified individually. The label shall identify the point of origin and the utilization equipment it serves. The identification label will be developed as follows: An sample label for a conductor fed from terminal strip 2, terminal block 33 in control panel # 1 (CP-1) to an terminal strip 1, terminal block 4 in automatic transfer switch # 1 (ATS-1) would read CP-1 TS2-TB33 / ATS-1 TS1-TB4.

#### E. Device and Faceplate Identification Labels

1. Devices, faceplates, security devices, fire alarm & life safety devices, small electrical boxes 4 inches or less located indoors and similar equipment shall be identified utilizing flexible identification tape. Typically the CONTRACTOR shall provide machine generated, white labels with black characters except as specified otherwise. Explanation is provided below on how various systems shall be identified. In many cases the information necessary to develop the unique identification labels will be provide on the Contract Drawings. The verbiage required for the identification shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available or clear based on the information provided on the Contract Drawings.
2. Power receptacles faceplates (cover plates) shall state the panel and circuit number. A typical label might read “PNL208-1-CKT 15”.
3. Interior emergency light fixtures shall have a unique 0.5 inch adhesive dot applied to facilitate tracking routine maintenance required for emergency lighting. The dots shall be red when they have an integral battery back-up and orange when fed from an emergency panel powered by a generator.

#### F. Terminal Blocks and Terminal Strips

1. Terminal blocks shall be mounted on DIN rail and gray with the exception of the grounding terminal blocks which shall be green and yellow.
2. The terminal blocks shall be identified on both the line and load side with machine generated white labels with black font. Terminal strips shall be labeled with machine generated white labels with black font attached to label blocks manufactured for specifically for this purpose.
3. The verbiage on the tag shall be as identified on the Contract Drawings. The CONTRACTOR shall request the required verbiage from the ENGINEER should it not be available on the Contract Drawings.

END OF SECTION

## SECTION 16080

### ELECTRICAL TESTING

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes

1. Electrical and control testing forms and requirements.

##### 1.02 SEQUENCING

###### A. ENGINEER shall issue written acceptance of the following certifications submitted by the CONTRACTOR before utility power is supplied to conductors, cables, or equipment.

1. Megger Test
2. Continuity Test
3. Motor Insulation Test

###### B. CONTRACTOR shall verify to ENGINEER that every function of the electrical, measurement, and control systems are operating properly.

#### PART 2 PRODUCTS – NOT USED

#### PART 3 EXECUTION

##### 3.01 FIELD QUALITY CONTROL

###### A. Site Tests, Inspection

1. CONTRACTOR shall be responsible to become familiar with the test and certification requirements of the Contract Documents for this project. It is the intent of these requirements that the Work will be systematically checked to verify that the functions required or implied, work properly to insure safety for the personnel, environment, and equipment associated with the Work.
2. CONTRACTOR shall complete the certification forms that are supplemental to this section and submit the forms to ENGINEER for approval.
3. All site test and inspection certificates and schedules shall be contained in a 3-ring binder(s).
  - a. Size 8½ inches by 11 inches.
  - b. Paper: 20-pound minimum, white for typed pages.
  - c. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.

- d. Provide each manual with title page to include “Process Electrical Testing”, typed table of contents with consecutive page numbers. Where more than one binder is used, consecutively title each with a volume number. The first binder shall be labeled Volume 1 and consecutively numbered as required to include all test documentation.
  - e. Tab sections for each required section of testing and acceptance certification.
4. CONTRACTOR shall notify ENGINEER seven days in advance of scheduled testing and facilitate the witnessing of those tests by ENGINEER.
5. CONTRACTOR shall provide ENGINEER with current as-built documentation for electrical and measurement and control commissioning with submittal of test certification.
- a. Systems operating at or above 200-volts to ground or more shall be included in the Megger Test Certification. Minimum duration for each test shall be one minute, at 1000 VDC, and minimum acceptable results shall be 50 mega ohms.
  - b. Conductors and cables shall be included in the Continuity Test Certification. No continuity to ground is the only acceptable result of the test.
  - c. Conductors, cables, or equipment failing to meet the minimum requirements shall be replaced with new. Repair will not be acceptable.
  - d. Each individual instrument shall have an Instrument Calibration Certificate. The calibration shall operate within the tolerances specified by the manufacturer of the instrument and the Contract Documents.
  - e. Installed motors shall have a written Motor Insulation Certificate for all the motors listed in the Drawings for the Work. Motors failing test shall be tagged and locked out from operation.

### 3.02 SUPPLEMENTS

- A. Schedule 16080 - A; Megger Test Certificate.
- B. Schedule 16080 - B; Continuity Test Certificate
- C. Schedule 16080 - C; Motor Insulation Test Certificate.

END OF SECTION



SUPPLEMENT 16080 - A  
MEGGER TEST CERTIFICATE

		Project Number: <i>12345</i>							
Test Equipment Manufacturer: <i>APC</i>		Model Number: <i>GH-1</i>							
Test Equipment Last Calibration Date: <i>8/13/02</i>		Serial Number: <i>346321</i>							
Testing Personnel: <i>John Doe</i>		Accepted By: <i>S.E. Davis</i>							
Test Voltage: <i>1000 Volts</i>		Date: <i>01/01/2003</i>							
		Drawing Reference: <i>E-006</i>							
		Title: <i>Power Distribution Diagram</i>							
		Tag: <i>016</i>							
Title	Tag Identification	A-Ø/ B-Ø	A- Ø / C- Ø	A- Ø / Ground	B- Ø / Ground	C- Ø / Ground	A- Ø / Neutral	B- Ø / Neutral	C- Ø / Neutral
<i>Main Feeder</i>	<i>016-CO3</i>	∞	∞	∞	∞	∞	∞	∞	∞
<i>PNL-07</i>	<i>016-CO7</i>	∞	∞	∞	∞	∞	∞	∞	∞
<i>PNL-12</i>	<i>016-C12</i>	∞	∞	∞	∞	∞	∞	∞	∞



SUPPLEMENT 16080 - B  
CONTINUITY TEST CERTIFICATE

Test Equipment Manufacturer: <i>Fluke</i>		Model Number: <i>53G</i>	Project Number: <i>12345</i>	
Test Equipment Last Calibration Date: <i>Unknown</i>		Serial Number: <i>638842</i>	Project Name: <i>Water Division</i>	
Testing Personnel: <i>John Doe</i>		Calibration Certificate: <i>No</i>	Accepted By: <i>S.E. Davis</i> Date: <i>01/01/2003</i>	
		Test Date: <i>12/30/02</i>	Drawing Reference: <i>E-501</i> Title: <i>Conduit Schedule</i>	
Permanent Tag Number	Function	Temporary Tag Number	Device ID Number	Ohms to Ground
<i>016-34-PNL</i>	<i>Level Indicator</i>	<i>34</i>	<i>016-34</i>	$\infty$

END OF SECTION



SUPPLEMENT 16080 - C  
MOTOR INSULATION TEST

Test Equipment Manufacturer: <i>APC</i>		Model Number: <i>GH-1</i>	Project Number: <i>12345</i>		
Test Equipment Last Calibration Date: <i>11/3/02</i>		Serial Number: <i>346321</i>	Project Name: <i>Water Diversion</i>		
Testing Personnel: <i>John Doe</i>		Calibration: <i>Yes</i>	Accepted By: <i>S.E. Davis</i>		
		Test Date: <i>12/20/02</i>	Date: <i>1/1/03</i>		
		Drawing Reference: <i>E-202</i>			
Motor Serial #	Equipment ID #	T-Lead #1/Ground	T-Lead #2/Ground	T-Lead #3/Ground	
<i>GE - 346332</i>	<i>Sewage pump No. 1</i>	$\infty$	$\infty$	$\infty$	
<i>GE - 346331</i>	<i>Sewage pump No.2</i>	$\infty$	$\infty$	$\infty$	
<i>GE - 346330</i>	<i>Sewage pump No. 3</i>	$\infty$	$\infty$	$\infty$	
<i>GE - 346333</i>	<i>RAS pump No. 1</i>	$\infty$	$\infty$	$\infty$	
<i>GE - 346334</i>	<i>RAS pump No. 2</i>	$\infty$	$\infty$	$\infty$	

END OF SUPPLEMENT

**SECTION 16095**  
**MINOR ELECTRICAL DEMOLITION**

**PART 1 GENERAL**

1.01 SUMMARY

A. Section Includes.

1. Removal of existing electrical equipment, wiring and conduit in areas to be remodeled. Removal of designated construction, dismantling, cutting and alterations for completion of the Work.
2. Disposal of materials.
3. Storage of removed materials.
4. Identification of utilities.
5. Protection of items to remain as identified in the schedules at the end of this Section.
6. Removal of temporary electrical equipment prior to completion of the Work.

1.02 CLOSEOUT SUBMITTALS

- A. Refer to the Contract Documents for general closeout submittal requirements.
- B. Project Record Drawings shall be provided that record actual locations of capped conduits and equipment abandoned in place.

1.03 SEQUENCING

- A. Sequencing of the Work shall be as noted in the Contract Documents.

1.04 SCHEDULING

- A. Refer to the Contract Documents.
- B. Coordinate the schedule of noisy, malodorous and dusty work with the ENGINEER.

1.05 COORDINATION

- A. Refer to Contract Documents.
- B. Conduct demolition to minimize interference with adjacent or occupied areas.
- C. Coordinate demolition work with other trades.
- D. Coordinate and sequence demolition so as not to cause shutdown or interruption of operation of surrounding areas.

- E. Arrange timing of shutdowns with the OWNER. Do not shutdown any utility service without prior written approval. Keep shutdown periods to a minimum.

## **PART 2 PRODUCTS – NOT USED**

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify wiring and equipment scheduled for demolition serve only abandoned process and facilities.
- B. Verify termination points for demolished services.

#### **3.02 DEMOLITION**

- A. Items scheduled for demolition shall be legally disposed of by the CONTRACTOR.
- B. Remove exposed abandoned conduit.
- C. Disconnect electrical systems in walls, floors and ceilings scheduled for removal.
- D. Reconnect equipment being disturbed by renovation work and required for continued service.
- E. Disconnect or shut off service to areas where electrical work is to be removed. Remove electrical fixtures, equipment, switches, receptacles, conduit, and conductors which are not part of the completed project.
- F. Install temporary wiring and connections necessary to maintain existing systems in service during construction.
- G. Remove, relocate, and extend existing installations to accommodate new construction.
- H. Repair adjacent construction and finishes to original condition that are damaged during demolition and extension work.
- I. Remove abandoned grounding and bonding components, fasteners, supports and electrical identification components. Cut embedded support elements flush with wall, floors, and ceilings.
- J. Clean and repair existing equipment scheduled to be reinstalled.
- K. Protect and retain power to existing active equipment remaining.
- L. Cap abandoned empty conduit at both ends.

- M. Provide water-tight, knockout seals in panels, enclosures, gutters, or junction boxes where conduit has been removed.
- N. Seal concrete penetrations, originally occupied by removed conduit, with suitable grouting material.

### 3.03 REUSEABLE ELECTRICAL EQUIPMENT

- A. Unless specifically identified for reuse, no used electrical equipment, conduit, conductors, components of any sort scheduled for demolition, disposal or salvage shall be installed for reuse on the project.
- B. Electrical equipment identified specifically as being reused on the project shall be cleaned and protected until such time as it is reinstalled.

**END OF SECTION**

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## SECTION 16121

### 600 VOLT CONDUCTORS AND CABLES

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes.

1. The section includes the requirements for conductors and cables used to conduct potentials of 600 volts and less.
2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

##### 1.02 REFERENCES

###### A. The following is a list of Standards which may be referenced in the Section.

1. American Society for Testing and Materials (ASTM).
  - a. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard or Soft.
2. National Electrical Contractors Association, Inc. (NECA): National Electrical Installation Standards (NEIS).
3. National Electrical Manufacturers Association (NEMA).
  - a. WC 3, Rubber-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
  - b. WC 5, Thermoplastic Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
  - c. WC 7, Cross Linked-Thermosetting Polyethylene Wire and Cable for the Transmission and Distribution of Electrical Energy.
  - d. WC 55, Instrumentation Cables and Thermocouple Wire.
4. National Fire Protection Association (NFPA). 70, National Electrical Code (NEC).
5. Underwriters Laboratories, Inc. (UL).
  - a. 13, Standard for Power-Limited Circuit Cables.
  - b. 44, Standard for Safety Rubber-Insulated Wires and Cables.
  - c. 62, Standard for Safety Flexible Cord and Fixture Wire.
  - d. 510, Standard for Safety Insulating Tape.
  - e. 854, Standard for Safety Service-Entrance Cables.
  - f. 910, Standard for Safety Test Method for Fire and Smoke Characteristics of Electrical and Optical Fiber Cables Used in Air Handling Spaces.
  - g. 1277, Standard for Safety Electrical Power and Control Tray Cables.
  - h. 1581, Standard for Safety References for Electrical Wires, Cables and Flexible Cords.

## 1.03 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16121.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product Data.
1. Pursuant to Section 01330 Submittal Procedures.
  2. Manufacturer's data including materials of construction, weight, and related information for each item specified in PART 2 PRODUCTS.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. **Single Conductors (16121.C01).**
1. Conductors shall be rated for 600 volts and conform to applicable requirements of NEMA.
  2. Conductors shall be stranded copper.
  3. Insulation type shall be THWN-2. XHHW-2 in #10 AWG or smaller.
  4. Conductors shall be sized per the Drawings and the NEC, whichever is greater.
  5. Rome Cable Corporation, Southwire Company, Okonite Company, or approved equal.
- B. **Twisted Shielded Pair (TSP) Cables (16121.C25).**
1. TSP cable shall be rated for 600 volts and conform to applicable requirements of NEMA.
  2. Conductors shall be stranded copper. The gauge shall be 16 AWG unless specifically stated otherwise in the Drawings for a particular instance.
  3. Overall jacket type shall be PVC.

4. Conductors shall be twisted and bonded along their length to maintain uniform twists. The number of pairs shall be as identified in the Drawings with a drain wire and overall aluminum foil shield.
5. Belden, General Cable, AFC Cable Systems, or approved equal.

**C. Category 6 Ethernet Cable (16121.C30)**

1. Shall be 600V rated for ethernet/IP applications.
2. Shall be shielded.
3. PVC jacket, oil and UV resistant, CMX outdoor rated.
4. Shall be provided with shielded RJ45 terminals on both ends.
5. Provide Belden part number 7953A or approved equal.

**2.02 ACCESSORIES**

**A. Colored Tape (16121.T01).**

1. Colored tape shall be used to identify individual conductors larger than # 6 AWG.
2. 3M colored tape, or approved equal.

**B. Cable Ties (16121.T05).**

1. Cable ties shall be nylon, adjustable, self-locking, and properly sized for the bundle and force implied.
2. Thomas and Betts, Panduit, or approved equal.

**C. Pulling Compound (16121.P01).**

1. Pulling compound shall be non-corrosive, noncombustible, nonflammable waxed based lubricant listed for this use.
2. Ideal Company, Polywater, Inc., or approved equal.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

**A. General.**

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Conductor and cable installations shall meet or exceed the NECA National Electrical Installation Standards.
3. Twisted Shielded Pair (TSP) cable installation and termination methods are specified in Section 13410 Basic Measurement and Control Instrumentation Materials and Methods and Section 13430 Boxes, Control Panels and Control Centers.
4. CONTRACTOR shall not exceed the manufacturer's recommendations for maximum pulling tensions or minimum bending radii for respective conductors or cables.

5. Pulling compound is recommended for all conductor or cable installations and shall be used on all installations requiring a mechanical pulling device.
6. CONTRACTOR shall furnish and use a dynamometer on all conductor or cable installations requiring the use of a mechanical pulling device. The dynamometer shall be used to verify the maximum pulling tensions are not exceeded. Should the pulling tensions be exceeded, the conductor or cable shall be removed from the raceway and discarded. It shall not be reused under any circumstance on the project. The CONTRACTOR shall be responsible to make the alterations necessary before attempting to re-pull new conductors or cables.
7. Immediately after pulling in conductors or cables, the pulling compound shall be completely removed from the conductors or cables, from boxes, enclosures, floors, walls, etc.
8. Conductor and cable installations shall be continuous without splices or intermediate terminations unless specifically identified on the Drawings or prior written approval from the ENGINEER.
9. Where conductors or cables are routed in boxes enclosures or cable tray they shall be neatly bundled with cable ties at intervals not to exceed 12 inches on center. The tension for the cable ties shall be set with a tool specifically manufactured for that purpose and of the same manufacturer as the cable tie. Side cutters, linemen pliers and similar tools shall not be used to cut the tail end of the cable tie. The CONTRACTOR shall only use the tool specifically manufactured for this purpose and of the same manufacturer as the cable tie.
10. Conductors and cables shall not be installed until the raceway, boxes, enclosures, conduit bushings, etc. have all been installed. Where conductors or cables have been installed prior to meeting this requirement, the ENGINEER shall at their discretion elect to have the conductors or cables removed, disposed of and replaced with new product.
11. Should the outer jacket of any conductor or cable be damaged in any way, they shall be removed, disposed of and replaced with new product.
12. An equipment grounding conductor shall be installed in all raceways. Size shall be as identified on the Drawings or the NEC, whichever is greater, but in no case shall it be less than # 16 AWG for under 50 volts and no less than # 14 for 50 volts or above.

END OF SECTION

## SECTION 16131

### CONDUIT AND FITTINGS

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes

1. The Section includes the requirements pertaining to conduits and fittings used to contain electrical conductors and cables.
2. All conductors and cables shall be installed in conduit or approved raceways regardless of which Division the conductors or cables are specified.

##### 1.02 REFERENCES

###### A. The following is a list of standards which may be referenced in this Section.

1. American National Standards Institute (ANSI).
  - a. C80.1, Rigid Steel Conduit-Zinc Coated.
2. American Society for Testing Materials (ASTM).
  - a. A123 E1, Standard Specification for Zinc-Coated (Galvanized) Coatings on Iron and Steel Products.
3. National Electrical Contractors Association (NECA).
  - a. National Electrical Installation Standards (NEIS).
4. National Electrical Manufacturers Association (NEMA).
  - a. RN 1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Coated and Intermediate Metal Conduit.
  - b. TC 3, PVC Fittings for use with Rigid PVC Conduit and Tubing.
  - c. TC 6, PVC and ABS plastic Utilities Duct for Underground Installation.
5. Nation Fire Protection Association (NFPA).
  - a. 70, National Electrical Code (NEC).
6. Underwriters Laboratories, Inc. (UL).
  - a. 6, Standard for Safety Rigid Metal Conduit.
  - b. 514B, Standards for Safety Fittings for Conduit and Outlet Boxes.
  - c. 651, Standard for Safety Schedule 40 and 80 PVC Conduit.
  - d. 651A, Standard for Safety Type EB and Rigid PVC Conduit and HDPE Conduit.
  - e. 1660, Standard for Safety Liquid-Tight Flexible Nonmetallic Conduit.
  - f. 360, Standard for Safety Liquid-Tight Flexible Metallic Conduit.
  - g. 797, Standard for Safety Electrical Metallic Conduit.

## 1.03 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
  2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16131.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
  3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.
- B. Product data
1. Pursuant to Section 01330 - Submittal Procedures.
  2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. **Galvanized Rigid Steel Conduit (GRC) (16131.C01).**
1. Shall be mild steel, hot dipped galvanized inside and out.
  2. Shall be manufactured in accordance with ANSI C80.1 – Rigid Steel Conduit, Zinc Coated, and UL-6.
  3. Conduit fittings shall be hot dipped galvanized malleable iron.
  4. Condulets shall form 7 type.
  5. The use of three-piece couplings shall be incorporated only when unavoidable and not simply due to poor planning and layout.
  6. The use of compression, setscrew and split conduit fittings is unacceptable.
  7. Gaskets shall be installed on all conduit covers regardless of the environment they are installed in.
  8. Conduit straps shall be hot dipped galvanized malleable iron and incorporate matching conduit spacers when attached directly to walls, ceilings and floors.
  9. LTV steel, Triangle PWC, or approved equal.

**B. Liquid-Tight Flexible Aluminum Conduit (LFAC) (16131.C20).**

1. Shall be constructed of a flexible aluminum core with a sunlight resistant thermoplastic outer jacket.
2. Conduit fittings shall be manufactured to the PVC-GRC fitting specifications. Galvanized or non-metallic conduit fittings are unacceptable unless written approval is obtained from the ENGINEER for specific locations before installation.
3. No couplings shall be installed.
4. Sealing rings shall be installed where conduit terminates at an enclosure.
5. Conduit shall be Anaconda, Electriflex, T & B, or approved equal.
6. Sealing ring shall be OZ Gedney 4Q-G, or approved equal.

2.02 ACCESSORIES

**A. Conduit Thread Lubricant (16131.L01).**

1. Shall be an electrically conductive with copper particles suspended in the product.
2. Provide Kopr-Shield Catalog number CP8-TB, or approved equal.

**B. Cord Grip (CGB) (16131.C89).**

1. Provide stainless steel bodied cord grips.
2. Provide cord grips with stainless steel mesh with hanging loops when suspended by cord.
3. Provide Hubbell, Kellems, or approved equal.

**PART 3 EXECUTION**

3.01 INSTALLATION

**A. General Requirements**

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification
2. Install conduit runs in accordance with the schematic representation shown on the Drawings.
3. Provide conduit drains installed as shown on the Drawing details and in conduit systems as identified on the Drawings. Discuss the installation details with the ENGINEER before underground conduits are covered. Changes that may become necessary in the conduit system resulting from a lack of coordination with the ENGINEER prior to covering underground conduits shall be completed by the CONTRACTOR at no additional expense to the OWNER.
4. Minimum conduit size shall be .75 inch unless specifically called out otherwise on the drawings.
5. Where raceways are indicated, but the routing is not identified, the routing shall be the CONTRACTOR'S choice and in accordance with the rest of the Contract Documents and the National Electrical Code (NEC).

6. Raceways shall be electrically and mechanically complete before the conductors are installed.
7. Routing of conduits may be adjusted to avoid obstructions. Coordinate with other trades prior to installation of raceways. Lack of such coordination shall not be justification for extra compensation and removal and reinstallation to resolve conflicts shall be at the CONTRACTOR's expense.
8. Conduit joints shall be wrench tight, thoroughly grounded, secure and free of obstructions.
9. Conduits shall be reamed.
10. Metallic threads shall all be coated with conduit thread lubricant before assembly. Failure to install the lubricant will result in removal of all conduit and reassembly with the conduit lubricant.
11. Exposed conduits shall be installed parallel or perpendicular to the structural members and surfaces and shall be level and or plumb.
12. When two or more conduits are routed in the same general direction their routing shall be parallel with symmetrical bends.
13. Conduits shall be bent with equipment specifically designed for this purpose and for the specific size and type of conduit.
14. Conduits that are creased or crushed shall be replaced.
15. Install conduits such that they do not interfere with the proper and safe operation of equipment and do not block or otherwise interfere with the ingress and egress and installation of removable hatches and covers.
16. Install expansion joints as needed across expansion joints in the structure and at other locations where necessary to compensate for thermal or mechanical expansion or contraction.
17. Conduits shall be routed at least six (6) inches from high temperature piping, ducts and flues.
18. Conduits installed in exposed areas indoors shall be GRC type unless the area contains potentially corrosive elements.
19. Final connections to dry type transformers, motors, instruments and other equipment requiring a flexible connection shall be made with LFAC conduit. Lengths shall not exceed three (3) feet.
20. All conduits shall be capped throughout construction to prevent entrance of dirt, trash, water, etc.
21. All conduits that are trade size 2.5" and larger which are routed through floors, ceilings or walls below grade shall include a large enough opening to accommodate the installation of Link-Seal. After installation and inspection of the Link-Seal, the CONTRACTOR shall install non-shrink type grout that matches the color of the surrounding material. The grout shall be installed on both sides of the Link-Seal installation.
22. All power conduits routed to or from an adjustable frequency drive or a variable frequency drive shall be metallic conduit. Conduits installed underground shall meet the requirements listed below under part B; underground and concrete encased conduit installation.

23. Spare conduits shall be provided with a coupling and threaded male plug that matches the makeup of the conduit for the area they are installed in. The conduit shall terminate at an enclosure when one is called out and exists as part of the Work. Where the spare conduit is stubbed up in a concrete slab for future equipment, it shall be installed flush with the finished floor. Where spare conduits are routed to other areas such as outside a building envelope, in an attic, to a vault, etc., the conduit shall have a female conduit cap installed.
24. All conduits shall be individually identified at every point they terminate. The conduit identification shall be the same as that which is used on the conduit /conductor schedule in the Drawings. Should conduits be installed that are not listed on the conduit schedules, the CONTRACTOR shall add conduit callouts to the as-built conduit schedules and label the conduits accordingly.

B. Miscellaneous

1. Provide cord grip for any unsupported cord.

**END OF SECTION**

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## SECTION 16135

### BOXES AND ENCLOSURES

#### PART 1 GENERAL

##### 1.01 SUMMARY

A. Section Includes.

1. This Section includes requirements for electrical device boxes, enclosures, in-ground boxes and vaults.

##### 1.02 REFERENCES

A. The following is a list of Standards that may be referenced in the Section.

1. American Society for Testing and Materials (ASTM).
  - a. A123 E1 Standard Specifications for Zinc-Coated Coatings on Iron and Steel Products.
2. National Electrical Contractors Association, Inc. (NECA).
  - a. 5055 National Electrical Installation Standard.
3. National Fire Protection Association (NFPA).
  - a. 70 National Electrical Code (NEC)
4. Underwriters Laboratory, Inc. (UL).
  - a. 514C Standard for Safety Non-Metallic Outlet Boxes, Flush Device Boxes and Covers.
  - b. 50 Enclosures for Electrical Equipment.

##### 1.03 SUBMITTALS

A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16135.B01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data.

1. Pursuant to Section 01330 Submittal Procedures.
2. Manufacturer's data including materials of construction, equipment weight and related information for each item specified in PART 2 PRODUCTS.

## **PART 2 PRODUCTS**

### **2.01 DEVICE BOXES**

A. General Enclosures (16135.E01).

1. Shall be NEMA 12 galvanized steel.
2. Shall be 12" wide x 12" high x 6" deep.
3. Shall have an aluminum interior mounting panel (backpanel).
4. Shall be constructed of stainless steel with hinged and gasketed door.
5. Provide with necessary accessories and those shown on the Drawings.
6. Provide a grounding kit.
7. Hoffman model 32FK47 or approved.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

A. General.

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Install boxes and enclosures in accordance with the schematic representation as indicated on the Drawings.
3. Boxes and enclosures shall be mounted level and plumb.
4. Boxes and enclosures shall not be altered, holes drilled, etc. in any way that may compromise the NEMA rating of the enclosure or box.
5. Boxes and enclosures shall be mounted with stainless steel hardware.
6. Boxes and enclosures shall be bonded to the equipment grounding conductor.
7. Surface mounted enclosures and boxes shall be spaced off the surface at least ¼ inch in damp or wet locations.
8. Boxes and enclosures with threaded hubs or punched holes shall have the opening match the conduit size. The use of reducing bushings or reducing washers is unacceptable.
9. Galvanized cast iron boxes are permitted only where GRC conduit is permitted.
10. Enclosures shall be provided whenever a junction or pull box larger than 4 inches square is required.
11. Provide a divider whenever a box contains conductors of different potentials that the code requires separation.

END OF SECTION

## SECTION 16150

### WIRING CONNECTIONS

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes.

1. This Section includes requirements for conductor termination methods.
2. Additional conductor termination means and methods are specified in Sections 13410 Basic Measurement and Control Instrumentation Materials and Methods and Section 13430 Boxes, Control Panels and Control Centers.

##### 1.02 SUBMITTALS

###### A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.

1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16150.C01) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.
3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

###### B. Product Data.

1. Pursuant to Section 01330 - Submittal Procedures.
2. Manufacturer's data including materials of construction, applications and related information for each item specified in PART 2 PRODUCTS.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

#### **A. Small Compression Connectors (16150.C01).**

1. Insulated fork, ring or splicing (butt) connectors shall be provided for # 10 AWG or smaller conductors that splice together or terminate with a screw other than in a terminal block.
2. Connectors shall be properly sized for the conductor and for the stud used.
3. Burndy, Panduit, Thomas and Betts, or approved equal.

#### **B. Insulated Wire Ferrules (16150.F10).**

1. For all conductors terminating on terminal blocks, install crimp-on, insulated plastic sleeve ferrules on each conductor. Install ferrules with a crimping tool provided by the ferrule manufacturer for that purpose.
2. Wire ferrules shall be color coded to match the DIN color code.
3. Weidmuller, Panduit, American Electric, Inc., or approved equal.

#### **C. Medium and Large Compression Connectors (16150.C10).**

1. Non-insulated copper compression connectors shall be provided for # 8 AWG and larger conductors.
2. The connector shall have a voltage and current rating equal to or exceeding the conductor.
3. The barrel shall be long enough to accommodate a minimum of two (2) circumferential crimps.
4. The connectors shall be properly sized for the conductor.
5. Burndy, Panduit, Thomas and Betts, or approved equal.

#### **D. Electrical Spring Connectors (Wire Nuts) (16150.W01).**

1. Provide properly sized spring connectors for the size and number of conductors spliced.
2. Ideal, 3M, Thomas and Betts, or approved equal.

### **2.02 ACCESSORIES**

#### **A. Varnished Cambric Tape (16150.T30).**

1. Varnished cambric insulating tape shall be bias cotton cambric fabric tape, oil primed and coated with high-grade yellow electrical insulating varnish.
2. The tape shall not contain any adhesives.
3. 3M – Scotch # 2510, or approved equal.

#### **B. Electrical Tape (16150.T40).**

1. General electrical tape shall be premium grade, all weather vinyl electrical insulating tape.
2. 3M – Scotch 33+, or approved equal.

**C. Thin Wall Heat Shrink Tubing (16150.T01).**

1. Thin walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
3. Burndy, Panduit, or approved equal.

**D. Heavy Wall Heat Shrink Tubing (16150.T10).**

1. Thin walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The inside diameter shall be coated with an adhesive sealant to protect against moisture and corrosion.
3. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
4. Burndy, Panduit, or approved equal.

**E. Heavy Wall Heat Shrinkable End Caps (16150.T20).**

1. Heavy walled heat shrink tubing shall be flame retardant and made of cross-linked polyolefin.
2. The inside diameter shall be coated with an adhesive sealant to protect against moisture and corrosion.
3. The tubing shall have a minimum operating temperature of – 55 to + 135 degrees Celsius.
4. Burndy, Panduit, or approved equal.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

**A. General**

1. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
2. Care shall be taken when terminating conductors to avoid kinking, cutting or puncturing the jacket or allowing contamination by grease, oil or water.
3. Care shall be taken when terminating conductors to properly support the conductors and to avoid undue pressure on the connector or utilization equipment.
4. Conductors shall be terminated by use of lugs, pressure type connectors wire nuts or terminal blocks. Wrapping conductors around a screw type terminal is not acceptable.
5. Compression connectors shall be installed using the tool and die provided by the same manufacturer as the connectors and as per their directions.
6. Compressions on connectors used for # 8 AWG conductors and larger shall have a minimum of two (2) circumferential crimps.
7. Indenter type crimps on compression connectors shall not be used on conductors larger than # 10 AWG.

8. Additional conductor termination means and methods including terminal blocks and control conductors are specified in Sections 13410 Basic Measurement and Control Instrumentation Materials and Methods and Section 13430 Boxes, Control Panels and Control Centers.
9. Connectors shall be installed as per the manufacturer's directions.
10. Insulated wire ferrules shall be provided for conductors terminated on terminal blocks utilizing a crimping tool provided by the ferrule manufacture specifically for this purpose.
11. Where wire ducts in enclosures exist, conductors shall be grouped together and routed in the wire ducts and shall be fanned out to the terminals.
12. Wire nuts shall be used on conductors # 10 AWG or less and only for splicing conductors at light fixtures, at receptacles and motors. No other splicing of conductors with wire nuts are permitted unless specifically identified on the Drawings.
13. All spare conductors shall be identified individually, neatly coiled and fastened with cable ties. The coil shall be labeled to describe its origin. Spare conductors shall be left long enough to be neatly routed and terminate anywhere within the enclosure.
14. Conductors installed outdoors which are not terminated the same day, shall have heavy wall heat shrinkable end caps installed the same day they are pulled in. The end caps shall remain in place until the day they are terminated.
15. Heavy wall heat shrink tubing shall be installed over splices or over the barrel of connectors installed outdoors.
16. Thin wall heat shrink tubing shall be installed over splices or over the barrel of connectors installed indoors.
17. Thin wall heat shrink tubing shall be installed over twisted shielded pair cable where the cable is stripped back. Reference Section 13410 Basic Measurement and Control Instrumentation Materials and Methods for specifics on this installation.
18. As connections are set with a torque wrench, a black felt marker shall be used to mark across the bolt, nut or screw indicating the torque has been set.
19. Insulated Mechanical Multi-Tap Connectors shall be utilized for splices located at in-ground lighting and power boxes. It may also be used for motor terminations.

B. Terminations For Motors.

1. Conductors sized # 10 AWG or less for phase conductors shall be connected with wire nuts set tight. The wire nuts shall be wrapped with premium grade electrical tape with a 50 percent overlap, installed in a clockwise rotation to hold the connector in place and to keep debris out of the connector.
2. The equipment grounding conductor shall be terminated on a lug identified for this use. If the motor is not supplied with a lug, a ring or compression type lug shall be used.

3. Conductors sized larger than # 10 AWG shall be terminated with compression connectors properly sized. The connectors shall be bolted together in a pigtail type fashion using stainless steel bolts, flat washers, lock washers and nuts. They shall have a torque as recommended by the bolt manufacturer for the bolt size used.
4. The bolt shall not be longer than the minimum necessary for the connection. The connectors shall be wrapped with varnished cambric tape with a 50 percent overlap covering the end of the connectors and extending one inch beyond the connector barrel. The varnished cambric tape shall be held in place by two layers of premium quality electrical tape, each layer with a 50 percent overlap.
5. Conductors shall be left as long as practical for termination in the motor terminal box.

**END OF SECTION**

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## SECTION 16447

### LOW VOLTAGE MOTOR CONTROL CENTERS (MCC)

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes
  - 1. This section includes requirements for Low voltage (600 VAC or less) Motor Control Centers (MCC).
- B. Variable frequency drives shall be factory installed by the motor control center manufacturer as shown in the Contract Documents.

##### 1.02 REFERENCES

- A. The following is a list of Standards that may be referenced in the Section.
  - 1. NEMA Standard ICS-2 Industrial Control and System Controllers, Contactors, and Overload Relays Rated 600 Volts.
  - 2. Underwriters Laboratories (UL) Standard No. UL-508C Power Conversion Equipment.
  - 3. Underwriters Laboratories (UL) Standard No. UL-845 Motor Control Centers.
  - 4. American National Standards Institute ANSI C19.3 Compressors for Process Industries.
  - 5. National Electric Code (NEC).
- B. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

##### 1.03 SUBMITTALS

- A. Contractor shall submit all the product data in Division 16 at the same time. Piecemeal submittals will be rejected as incomplete.
  - 1. The product data shall be bound in a three ring binder with tabs for each Section. The tabs shall be numbered to match the specification Section numbers. Submittals not bound and labeled as specified will be rejected as incomplete.
  - 2. A submittal is required for each product specified. Each individual product submittal shall have the corresponding Reference Keynote Number (example - 16447.S21) typewritten in the upper right hand corner of the submittal. The submittals within each Section tab shall be in the same sequential order as they are listed in the specification Section. Submittals not containing the Reference Keynote Number will be rejected as incomplete.

3. No typical submittals will be accepted. Each submittal shall be project specific and clearly identify specifically which components or parts are being submitted for approval. Any product submittals, such as a catalog sheet, which do not clearly identify which components or parts are being submitted for approval, will be rejected as incomplete.

B. Product Data

1. Provide product data on all components specified.
2. Manufacturer's data including material of construction, equipment weight, and related information for each item specified in PART 2 PRODUCTS.
3. Certified copies of manufacturer's test reports shall be submitted.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Equipment Handling

1. Equipment shall be handled and stored in accordance with manufacturer's instructions. One (1) copy of these instructions shall be included with the equipment at time of shipment.

1.05 COMMISSIONING

1. Provide commissioning in accordance with Section 16001.

1.06 SCOPE

A. CONTRACTOR shall provide the following:

1. Install OWNER furnished MCC section.
2. Install CONTRACTOR furnished CONTRACTOR installed feeder breaker.

## PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide new feeder circuit breaker in existing motor control center as shown on the drawings. The existing motor control center is a GE Evolution Series E9000. New circuit breaker shall be listed for use within the existing MCC.

2.02 MANUFACTURED UNITS

A. Low Voltage Motor Control Centers.

1. Overcurrent Devices
  - a. The operator handle of all buckets shall be interlocked with the MCC frame, so that a unit insert cannot be withdrawn or inserted when the operator is in the ON position.
  - b. The operating handle of all buckets shall be capable of being pad locked in the open (off) position.

- c. Feeder Circuit Breakers
  - 1) VFDs and feeder circuit breakers shall be protected by molded case thermal magnetic units and have a short circuit rating as indicated on the Drawings.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. All identification labeling shall be in compliance with Section 16075 Electrical and Control Identification.
- B. Field installed interior wiring shall be neatly grouped by circuit and bound by plastic tie wraps. Circuit groups shall be supported so that circuit terminations are not stressed.
- C. In general, all conduits entering or leaving a motor control center or switchboard shall be stubbed into the bottom or top horizontal wireway directly below or above the vertical section in which the conductors are to be terminated.
- D. Remove temporary lifting angles, lugs and shipping braces. Touch-up damaged paint finishes.
- E. Make wiring interconnections between shipping splits.
- F. Install bus splice plates and torque connections.
- G. Seal all seams, cracks, or openings.

### **3.02 SEISMIC BRACING**

- A. The Manufacturer shall provide a seismic certificate.
- B. CONTRACTOR shall provide seismic anchor bolts.
- C. The seismic anchor bolts shall be designed by the Contractor's Structural Engineer. The Engineer shall be licensed in the State of Oregon and shall provide wet stamped and signed seismic calculations and drawings.
- D. The Contractor shall provide approved shop drawings to the Engineer. The shop drawings shall indicate the weight and dimensions of the motor control center. The Contractor shall provide any additional information required by the Engineer to perform the seismic calculations.

### **3.03 MANUFACTURER'S SERVICES**

- A. Shall be provided by the OWNER.

### 3.04 CONTRACTOR'S SUPPORT OF START-UP AND COMMISSIONING

- A. The CONTRACTOR shall support all start-up and commissioning activities, including but not limited to:
  - 1. Disconnect, lock-out, and re-energize electrical loads.
  - 2. Assist with identifying and troubleshooting line voltage control wiring.

### 3.05 FIELD QUALITY CONTROL

- A. The CONTRACTOR shall have complete responsibility for field quality control. This includes the following responsibilities:
  - 1. Coordinate MCC installation and testing with other equipment installation and testing per Section 16080.
  - 2. Ensure protection of the equipment from damage during construction. This includes the provision of adequate on site storage facilities prior to installation.
  - 3. Ensure that the area of installation is fully prepared according to the Contract Documents prior to the commencement of the MCC installation.
- 4. Provide complete and accurate as-built schematic drawings.
- B. Site Tests, Inspection
  - 1. In accordance with Section 16080.

### 3.06 CLEANING

- A. After testing is complete, the CONTRACTOR shall inspect and clean the MCC equipment and remove any material introduced during the testing and/ or left from the initial installation. Remove all rubbish and debris from inside and around the control center. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

END OF SECTION