City of Sweet Home
1400 24th Avenue
Sweet Home, OR 97386

Mahler Water Reclamation Facility (MWRF)

Owner-Provided Electrical Equipment Procurement Bid Documents

Document for the Provision of
Goods and Special Services

December 2022

WEST YOST
Water. Engineered.

5 Centerpointe Dr #130,
Lake Oswego, OR 97035
(530) 756-5905
FAX (530) 756-5991

MWRF Owner-Provided Electrical Equipment Procurement
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ADVERTISEMENT FOR BIDS

CITY OF SWEET HOME, OREGON
MAHLER WATER RECLAMATION FACILITY INTERIM IMPROVEMENTS
OWNER-PROVIDED ELECTRICAL EQUIPMENT PROCUREMENT

General Notice

The Automation Group (Owner) is requesting Bids for the construction of the following Project:

CITY OF SWEET HOME MAHLER WATER RECLAMATION FACILITY
OWNER-PROVIDED ELECTRICAL EQUIPMENT PROCUREMENT

Bids for the construction of the Project will be received at The Automation Group, 4678 Isabelle St. Eugene, OR 97402 until **January 10, 2023** at **2:00 pm** local time. At that time the Bids received will be publicly opened and read.

The Project includes the following Work:

Improvements and modifications to the City of Sweet Home Mahler Water Reclamation Facility (Mahler WRF) includes furnishing all labor, materials, and equipment necessary for the procurement of electrical equipment, including the MWRF main switchboard and a new standby engine generator and appurtenances.

Obtaining the Bidding Documents

The Contract Documents may be examined at The Automation Group, 4678 Isabelle St., Eugene, OR 97402. Electronic copies of the Contract Documents will be provided by the Owner. Hard copies of the Contract Documents will be provided to the successful Bidder following Bid Award.

Instructions to Bidders

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

American Iron and Steel

Section 746 of Title VII of the Consolidated Appropriations Act of 2017 (Division A - Agriculture, Rural Development, Food and Drug Administration, and Related Agencies Appropriations Act, 2017) and subsequent statutes mandating domestic preference applies an American Iron and Steel requirement to this project. All iron and steel products used in this project must be produced in the United States. The term “iron and steel products” means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and Construction Materials.

The following waivers apply to this Contract:

1. De Minimis,
2. Minor Components, and
3. Pig iron and direct reduced iron.

This Advertisement is issued by:

Owner: **The Automation Group**
By: **Gary Jenks**
Title: **Owner**
Date: **December 15, 2022**

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INSTRUCTIONS TO BIDDERS FOR PROCUREMENT CONTRACT

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ARTICLE 1—DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office*—The office from which the Bidding Documents are to be issued, and which registers plan holders.

ARTICLE 2—BIDDING DOCUMENTS

2.01 Bidder shall obtain a complete set of Bidding Requirements and proposed Contract Documents (together, the Bidding Documents). See the Agreement for a list of the Contract Documents. It is Bidder's responsibility to determine that it is using a complete set of documents in the preparation of a Bid. Bidder assumes sole responsibility for errors or misinterpretations resulting from the use of incomplete documents, by Bidder itself or by its prospective Subcontractors and Suppliers.

2.02 Bidding Documents are made available for the sole purpose of obtaining Bids for completion of the Project and permission to download or distribution of the Bidding Documents does not confer a license or grant permission or authorization for any other use. Authorization to download documents, or other distribution, includes the right for plan holders to print documents solely for their use, and the use of their prospective Subcontractors and Suppliers, provided the plan holder pays all costs associated with printing or reproduction. Printed documents may not be re-sold under any circumstances.

2.03 Owner has established a Bidding Documents Website as indicated in the Advertisement or invitation to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.04 Bidder may register as a plan holder and obtain complete sets of Bidding Documents, in the number and format stated in the Advertisement or invitation to bid, from the Issuing Office. Bidders may rely that sets of Bidding Documents obtained from the Issuing Office are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.05 Plan rooms (including construction information subscription services, and electronic and virtual plan rooms) may distribute the Bidding Documents, or make them available for examination. Those prospective Bidders that obtain an electronic (digital) copy of the Bidding Documents from a plan room are encouraged to register as plan holders from the Bidding Documents Website or Issuing Office. Owner is not responsible for omissions in Bidding Documents or other documents obtained from plan rooms, or for a Bidder's failure to obtain Addenda from a plan room.

2.06 *Electronic Documents*

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in Adobe PDF (Portable Document Format) (.pdf) that is readable by Adobe Acrobat Reader. It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the paper copies of

the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the paper copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.06.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

C. After the Contract is awarded, the Owner will provide or direct the Engineer to provide for the use of the Contractor documents that were developed by Engineer as part of the Project design process, as Electronic Documents in native file formats.

1. Electronic Documents that are available in native file format include:

a. Electronic Drawing files in Revit, AutoCAD MEP and AutoCAD Civil3D.

b. Digital Elevation Model (DEM) for the construction site

2. Release of such documents will be solely for the convenience of the Contractor. No such document is a Contract Document.

3. Unless the Contract Documents explicitly identify that such information will be available to the Successful Bidder (Contractor), nothing herein will create an obligation on the part of the Owner or Engineer to provide or create such information, and the Contractor is not entitled to rely on the availability of such information in the preparation of its Bid or pricing of the Work. In all cases, the Contractor shall take appropriate measures to verify that any electronic/digital information provided in Electronic Documents is appropriate and adequate for the Contractor's specific purposes.

4. In no case will the Contractor be entitled to additional compensation or time for completion due to any differences between the actual Contract Documents and any related document in native file format.

ARTICLE 3—RESERVED

ARTICLE 4—RESERVED

ARTICLE 5—SITE AND OTHER AREAS OWNER'S SAFETY PROGRAM

5.01 *Site and Other Areas*

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

5.02 *Owner's Safety Program*

A. Site visits and work at the Site is governed by Oregon OSHA requirements.

ARTICLE 6—BIDDER'S REPRESENTATIONS AND CERTIFICATIONS

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

A. The Bid Form that each Bidder will submit contains express representations regarding the Bidder's examination of Project documentation, and preparation of the Bid, and certifications regarding lack of collusion or fraud in connection with the Bid. Bidder should review these representations and certifications, and assure that Bidder can make the representations and certifications in good faith, before executing and submitting its Bid.

B. If Bidder is awarded the Contract, Bidder (as Contractor) will make similar express representations and certifications when it executes the Agreement.

ARTICLE 7—INTERPRETATIONS AND ADDENDA

7.01 Owner on its own initiative may issue Addenda to clarify, correct, supplement, or change the Bidding Documents.

7.02 Bidder shall submit all questions about the meaning or intent of the Bidding Documents to Owner and Engineer in writing.

7.03 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all registered plan holders. Questions received less than seven days prior to the date for opening of Bids may not be answered.

7.04 Only responses set forth in an Addendum will be binding. Oral and other interpretations or clarifications will be without legal effect. Responses to questions are not part of the Contract Documents unless set forth in an Addendum that expressly modifies or supplements the Contract Documents.

ARTICLE 8—RESERVED

ARTICLE 9—RESERVED

ARTICLE 10—SUBSTITUTE AND "OR EQUAL" ITEMS

10.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration during the bidding and Contract award process of possible substitute or "or-equal" items.

10.02 All prices that Bidder sets forth in its Bid will be based on the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda.

ARTICLE 11—RESERVED

ARTICLE 12—PREPARATION OF BID

12.01 The Bid Form is included with the Bidding Documents.

A. All blanks on the Bid Form must be completed in ink and the Bid Form signed in ink. Erasures or alterations must be initialed in ink by the person signing the Bid Form. A Bid price must be

indicated for each section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

C. Bidders shall provide pricing for all "A-listed" or first-named equipment suppliers in the Bid Form.

12.02 If Bidder has obtained the Bidding Documents as Electronic Documents, then Bidder shall prepare its Bid on a paper copy of the Bid Form printed from the Electronic Documents version of the Bidding Documents. The printed copy of the Bid Form must be clearly legible, printed on 8½ inch by 11-inch paper and as closely identical in appearance to the Electronic Document version of the Bid Form as may be practical. The Owner reserves the right to accept Bid Forms which nominally vary in appearance from the original paper version of the Bid Form, providing that all required information and submittals are included with the Bid.

12.03 A Bid by a corporation must be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation must be shown.

12.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

12.05 A Bid by a limited liability company must be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm must be shown.

12.06 A Bid by an individual must show the Bidder's name and official address.

12.07 A Bid by a joint venture must be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture must have been formally established prior to submittal of a Bid, and the official address of the joint venture must be shown.

12.08 All names must be printed in ink below the signatures.

12.09 The Bid must contain an acknowledgment of receipt of all Addenda, the numbers of which must be filled in on the Bid Form.

12.10 Postal and e-mail addresses and telephone number for communications regarding the Bid must be shown.

12.11 The Bid must contain evidence of Bidder's authority to do business in the state where the Project is located, or Bidder must certify in writing that it will obtain such authority within the time for acceptance of Bids and attach such certification to the Bid.

12.12 If Bidder is required to be licensed to submit a Bid or perform the Work in the state where the Project is located, the Bid must contain evidence of Bidder's licensure, or Bidder must certify in writing that it will obtain such licensure within the time for acceptance of Bids and attach such certification to the Bid. Bidder's state contractor license number, if any, must also be shown on the Bid Form.

ARTICLE 13—BASIS OF BID

13.01 *Lump Sum*

A. Bidders must submit a Bid on a lump sum basis for each bid item as set forth in the Bid Form.

13.02 *Additive and Deductive Unit Price Work Bid Items*

A. Bidders must submit unit prices for bid items with additional work beyond the quantities included in the Lump Sum Bid.

1. Additive and Deductive Unit Price Work Items shall include:

a. None

B. Costs for Additive and Deductive Unit Price Work Bid Items will be considered by the Owner in the evaluation of bids based on the potential impact of increased or decreased quantities for these Bid items in the course of executing the Work.

C. Bidders shall not unbalance bids for Additive and Deductive Unit Price Work Items.

13.03 *Allowances*

A. For cash allowances the Bid price must include such amounts as the Bidder deems proper for Contractor's overhead, costs, profit, and other expenses on account of cash allowances, if any, named in the Contract Documents, in accordance with Paragraph 13.02.B of the General Conditions.

ARTICLE 14—SUBMITTAL OF BID

14.01 The Bidding Documents include one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 2 of the Bid Form.

14.02 A Bid must be received no later than the date and time prescribed and at the place indicated in the Advertisement or invitation to bid and must be enclosed in a plainly marked package with the Project title, the name and address of Bidder, the date of opening, the applicable words "SEALED BID" and must be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid must be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED" A mailed Bid must be addressed to the location designated in the Advertisement.

14.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

14.04 All responses submitted are the property of the City of Sweet Home, thus subject to disclosure pursuant to Oregon Public Records law, as qualified by ORS 279B.060(6) for similar contracts. Except for information marked "Proprietary", all documents received by City shall be available for public disclosure. The City will attempt to maintain the confidentiality of materials marked "Proprietary" to the extent permitted under the Oregon Public Records law. By responding to this solicitation, Bidders waive any challenge to the City's decisions in this regard.

14.05 **Marking all, or substantially all, or your response as "Proprietary" is not permitted and may be grounds for the City considering your bid nonresponsive, at the City's sole discretion.** If your

response contains proprietary information protected under this section, please provide an additional redacted copy.

ARTICLE 15—MODIFICATION AND WITHDRAWAL OF BID

15.01 An unopened Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

15.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 15.01 and submit a new Bid prior to the date and time for the opening of Bids.

15.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, the Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, the Bidder will be disqualified from further bidding on the Work.

ARTICLE 16—OPENING OF BIDS

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

ARTICLE 17—BIDS TO REMAIN SUBJECT TO ACCEPTANCE

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

ARTICLE 18—EVALUATION OF BIDS AND AWARD OF CONTRACT

18.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner also reserves the right to waive all minor Bid informalities not involving price, time, or changes in the Work.

18.02 Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible.

18.03 If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, whether in the Bid itself or in a separate communication to Owner or Engineer, then Owner will reject the Bid as nonresponsive.

18.04 If Owner awards the contract for the Work, such award will be to the responsible Bidder submitting the lowest responsive Bid.

18.05 *Evaluation of Bids*

A. In evaluating Bids, Owner will consider whether the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form or prior to the Notice of Award.

B. For determination of the apparent lowest responsive and responsible Bidder, Bids will be compared on the basis of the Lump Sum Price along with potential additional costs for Additive or Deductive Additional Work Bid Items determined at the Owner's discretion.

18.06 *Protests of Solicitation*

A. Bidders are directed to the protest procedures contained in ORS 279B.405 and OAR 137-047-0730. A prospective Bidder may file a protest of the solicitation if the prospective Bidder believes that the procurement process is contrary to law or that a solicitation document is unnecessarily restrictive, is legally flawed or improperly specifies a brand name. Protests shall be submitted to the City in writing no later than ten (10) days prior to the solicitation closing date.

18.07 *Protests of Contract Award*

A. Bidders are directed to the protest procedures contained in ORS 279B.410 and OAR 137-047-0740. A Bidder may protest the award of a public contract or a notice of intent to award a public contract, whichever occurs first, if:

1. The bidder is adversely affected because the bidder would be eligible to be awarded the public contract in the event that the protest were successful; and

2. The reason for the protest is that:

a. All lower bids or higher ranked proposals are nonresponsive;

b. The contracting agency has failed to conduct the evaluation of proposals in accordance with the criteria or processes described in the solicitation materials;

c. The contracting agency has abused its discretion in rejecting the protestor's bid or proposal as nonresponsive; or

d. The contracting agency's evaluation of bids or proposals or the contracting agency's subsequent determination of award is otherwise in violation of this chapter or ORS chapter 279A.

B. Protests shall be submitted to the City in writing no later than seven (7) days following the notice of intent to award.

ARTICLE 19—RESERVED

ARTICLE 20—SIGNING OF AGREEMENT

20.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder must execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within 10 days thereafter, Owner will deliver one fully executed counterpart of the Agreement to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

ARTICLE 21— RESERVED

ARTICLE 22— RESERVED

ARTICLE 23—NONDISCRIMINATION

23.01 During the performance of this contract, the Contractor shall comply with all federal and state nondiscrimination laws, including, but not limited to 42 U.S.C. 12101 et seq, the Americans with Disabilities Act (ADA).

SECTION 00 40 00 - BID FORM

(To be submitted with Bid)

MAHLER WATER RECLAMATION FACILITY
OWNER-PROVIDED ELECTRICAL EQUIPMENT PROCUREMENT
CITY OF SWEET HOME, OREGON

THIS BID IS SUBMITTED TO: The Automation Group, Inc.

Attn: Harold Barton, Project Manager
4678 Isabelle St.
Eugene, OR 97402

1.01 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with OWNER in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

2.01 Bidder accepts all of the terms and conditions of the Advertisement for Bid and Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for 45 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of OWNER.

3.01 Refer to the Instructions to Bidders for forms and documents that must be executed in full and submitted with the bid.

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

3.03 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data and documents identified in the Bidding Documents, and the following Addenda, receipt of all which is hereby acknowledged.

Addendum No.	**Addendum Date**

B. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

C. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

D. Bidder is aware of the general nature of work to be performed by OWNER and others at the Site that relates to the Work as indicated in the Bidding Documents.

E. Bidder has correlated the information known to Bidder, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

F. Bidder has given OWNER written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by OWNER is acceptable to Bidder.

G. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over OWNER.

5.01 Bidder will complete the Work in accordance with the Contract Documents for the price described in the following bid schedule within the time of completion specified in the Agreement.

BID SCHEDULE

Bidder shall submit a Bid as set forth in the Bid form. Submission of Bids on this schedule signifies Bidder's willingness to enter into a Contract for the price offered. Bidders offering a Bid on this schedule must be capable of completing the Work within the time period stated in the Agreement. OWNER may elect to any delete bid item from the work.

1.01 LUMP SUM WORK

A. Bidder proposes and agrees to accept as full payment the following bid amount for the Mahler WRF Owner-Provided Electrical Equipment proposed within the Bidding Documents, and certifies that this amount is based upon the undersigned's own estimate of quantities and costs and includes sales, consumer, use, and other taxes, except as provided below, overhead and profit.

B. Lump Sum Bid Price: $_____

Bidder Identification and Signatures

Name of Firm: _____

Federal Tax ID No: _____

State of Incorporation and Oregon CCB License No: _____

Bidder ☐ IS / ☐ IS NOT a "Resident Bidder" as defined by ORS 279.029.

Signature and Printed Name(s): *(If Bidder is a partnership or joint venture, all parties must sign below)*

_____ _____

_____ _____

Title _____

Date _____

END OF SECTION

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SECTION 00 43 33- PROPOSED PRODUCTS LIST

(To be submitted with Bid)

MAHLER WATER RECLAMATION FACILITY INTERIM IMPROVEMENTS
OWNER-PROVIDED ELECTRICAL EQUIPMENT PROCUREMENT
CITY OF SWEET HOME, OREGON

The Bidder states that the manufacturer of each listed item of equipment or material proposed by the Contractor for use on this Project will be as listed below:

Material Item	Description	Equipment or Material Manufacturer (Do not show Dealer or Supplier)
1	Switchboards (26 24 13)	
2	Packaged Diesel Generator Assemblies (26 32 00)	

The Bidder must include in the space provided, the name of the equipment or material manufacturer he has used in determining his Base Bid which will be used by the Successful Bidder in constructing the project. If the Bidder does not fill in any of the spaces, it will be considered that the Bidder has selected the first-named manufacturer as his selection for those spaces not filled in.

After the opening of Bids, no changes or substitutions from those listed manufacturers will be allowed without the express written approval of the Engineer. If such change is permitted by the Engineer, it will be evaluated in accordance with provisions of the Contract Documents pertaining to Specified Items/Proposed Equivalents.

Circumstances which will justify changes to the above listing are limited to the following:

1. Manufacturer is unable to meet specifications.
2. Manufacturer fails to honor original quotation upon which the Contractor's bid was based.
3. Manufacturer goes out of business or ceases to make the specified product.

It is the responsibility of the Contractor to furnish materials and equipment meeting the requirements of the Specifications, and acceptance of the bid does not constitute nor imply favorable review or approval of items proposed. The Owner reserves the right to deny approval or acceptance of any equipment or materials which do not comply with Specifications even though listed herein.

_____
(Signature)

_____
(Type or Print Name)

_____
(Title)

_____
(Company)

END OF SECTION

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SECTION 00 45 19 – NON-COLLUSION AFFIDAVIT

(To be submitted with Bid)

MAHLER WATER RECLAMATION FACILITY INTERIM IMPROVEMENTS
OWNER-PROVIDED ELECTRICAL EQUIPMENT PROCUREMENT
THE AUTOMATION GROUP

STATE OF OREGON
COUNTY OF LANE

I state that I am_____(title) of_____(name of firm) and that I am authorized to make this affidavit on behalf of my firm and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state that:

(1) The price(s) and amount of this bid have been arrived at independently and without consultation, communication, or agreement with any other contractor, bidder, or potential bidder, except as disclosed on the attached appendix.

(2) Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid, have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.

(3) No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, to submit a bid higher than this bid, or to submit any intentionally high or noncompetitive bid or other form of complementary bid.

(4) The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive bid.

(5) _____(name of firm), its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency for violating any non-collusion statutes and have not in the last four years been convicted of or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as described in the attached appendix.

I state that_____(name of firm) understands and acknowledges that the above representations are material and important and will be relied on by the City of Sweet Home in awarding the contract(s) for which this bid is submitted. I understand, and my firm understands that any misstatement in this affidavit is and shall be treated as fraudulent concealment from the City of Sweet Home of the true facts relating to the submission of bids for this contract.

_____
Authorized Signature

_____
Name of Company / Position

Sworn to and subscribed before me this_____day of_____, 20____.

_____ _____
Notary Public for the State of Oregon My Commission Expires

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SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. Requirements for identification of electrical, safety, measurement, data, fire alarm, security, monitoring, control and related components and equipment.

1.02 SUBMITTALS

A. Contractor shall submit all the product data in Division 26 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 - 26000.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. Product Data

1. 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.

D. Samples

1. Provide a sample of each type and size of nameplate, label, tag and means of attachment specified for approval by the OWNER.

E. 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.

F. Closeout Submittals

1. As-built electronic copy of the identification Excel data base.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Plastic Nameplates (260553.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 Chuck Eastridge Engraved Plastic Signs, or approved equal.

B. Epoxy Gel (260553.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.

C. Conductor and Cable Identification Sleeves (260553.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.

D. Flexible Identification Tape (260553.T56).

1. Shall be white, red, yellow, clear or as otherwise specified tape with black characters.

2. Standard tape size shall be 0.5 inch high unless specified otherwise and shall have extra strength adhesive rated for indoor and outdoor use.

3. Provide products manufactured by Brother, or approved equal.

E. Colored Tape (260553.T73).

1. Shall be two (2) inches wide nominal and available in the colors specified.

2. Shall have extra strength adhesive rated for indoor and outdoor use.

3. Color code for tape shall be as listed below.

a. IT Data/Phone – BLUE

4. Provide DUCK, 3M, or approved equal.

F. Arc Flash Labels (260553.A11).

1. Shall be self adhesive and manufactured specifically for this purpose.
2. Shall be four (4) inches high by six (6) inches wide minimum.
3. Shall be based on the latest edition requirements of the National Fire Protection Association (NFPA) 70E – Standard for Electrical Safety.
4. At a minimum the label shall contain the following information.
    a. Date calculation was performed and who did the calculation.
    b. Danger or Warning level based on the incident energy. When above 40 cal/cm sq. the label shall read “Danger”.
    c. Shall identify the hazard as being both arc flash and shock hazard.
    d. Shall clearly state the incident energy and the level of personal protective equipment (PPE) required.
    e. Provide labels manufactured by Dura Label, SKM System Analysis, Inc., or approved equal.

G. Conductor Color Coding (260553.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
	Discrete Output Switch Leg	Blue w/ Orange Stripe
24 Volt AC	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
	Discrete Output Switch Leg	Red w/ Orange Stripe
120/240 Volt Single Phase	Hot Leg # 1	Black
	Hot Leg # 2	Red
	Neutral	White
120/208 Volt Three Phase	Phase A	Black
	Phase B	Red
	Phase C	Blue
	Neutral	White
120, 208, 277 Volt	Switch Legs	Pink
480 Volt Three Phase	Phase A	Brown
Wye or Delta Corner Tap	Phase B	Purple
	Phase C	Yellow
	Neutral	Gray
120/240 Delta Three Phase	Phase A	Brown
	Phase B	Orange
	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. 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.

5. Local Area Network (LAN) cables shall be identified with the rod mount number, highband number and the network room number from which it is connected. 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.

C. Colored Tape

1. Colored tape shall be installed on conduits used for the systems listed below. The tape shall have extra strength adhesive rated for indoor and outdoor use and two (2) inches wide. CONTRACTOR shall install a single wrap around the circumference of the conduit at five (5) foot intervals. In addition the exterior of junction or pull boxes installed along these raceways shall be painted entirely with 2 coats of paint that matches the tape color.

   a. Data / IT – BLUE

D. Arc Flash Labels

1. The CONTRACTOR shall install arc flash labels on all electrical equipment as required by the NEC and National Fire Protection Association (NFPA) 70E – Standard for Electrical Safety. The minimum requirements for the labels are itemized in PART 2 Products.

2. The CONTRACTOR shall be responsible for providing the coordination study and arc flash analysis necessary to calculate the incident energy and personal protective equipment (PPE) data required on each label.

3. An as-built coordination study and arc flash analysis shall be prepared at the Contractor's expense and be performed by a Professional Engineering licensed in the State of Oregon. The calculations shall utilize SKM Power Tools software and an electronic and hard copy shall be submitted to the Owner for approval. Arc Flash Labels with all data specified by the current edition of the NFPA 70E (Standard for Electrical Safety) and Occupational Safety & Health Administration (OSHA) shall be provided by the Contractor.

4. The CONTRACTOR is responsible to make the adjustments to the protective devices and circuit breakers as specified in the coordination study.

END OF SECTION

SECTION 26 24 13

SWITCHBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes

1. This section includes requirements for Low Voltage Switchboards.

B. The Switchboards listed on this project shall be coordinated with the OWNER and the OWNER's System Integrator to install the switchboards at the locations identified on the Drawings.

C. Switchboards listed on the project include the following:

Item	Description
Switchboard SMSB-1	Service Entrance Rated Main Service Switchboard w/ Power Monitor
Switchboard MSB-1	Main Distribution Switchboard

1.02 REFERENCES

A. The following is a list of Standards that may be referenced in the Section.

1. NEMA Standard PB 2 Deadfront Distribution Switchboards.

2. Underwriters' Laboratories (UL) Standard No. UL 891 Switchboards.

3. ANSI C37.90, Standard Relays and Relay Systems Associated with Electric Power Apparatus.

4. National Electrical Code (NEC).

1.03 SUBMITTALS

A. Contractor shall submit all the product data in Division 26 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 - 260000.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. Product Data

1. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

D. Shop Drawings

1. Equipment shop drawings showing elevation and plan views, compartment arrangement, conduit entry/exit locations, dimensions, weight, shipping splits and metering layouts.

2. Single line diagrams, point to point compartment wiring diagrams for metering, relay and control circuits. Show wire and terminal numbers.

3. Product data sheets and catalog numbers for circuit breakers and fused switches. List all options, trip adjustments and accessories furnished specifically for this project.

4. Itemized bill of material for metering, protective relays, accessories and control equipment.

1.04 QUALITY ASSURANCE

A. The equipment furnished under this Section shall be the product of a manufacturer who has produced this same type of equipment for a period of at least 10 consecutive years.

B. The switchboard shall be designed, assembled and tested by the manufacturer of the circuit protective devices used in the switchboard.

1.05 DELIVERY, STORAGE, 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.

1.06 WARRANTY

A. Provide Manufacturer's extended 24-month warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Switchboard shall be manufactured by Siemens, Eaton Corporation/Cutler-Hammer, or approved equal.

B. The Main Distribution Switchboard MSB-1 shall be at maximum: 194”W x 38”D. Switchboards which exceed these dimensions shall not be acceptable.

2.02 MANUFACTURED UNITS

A. Contractor shall refer to the Drawings for all switchboard voltage, phase, and wire ratings. All switchboards shall be rated for 60 Hz.

B. The switchboard and protective devices shall be fully rated for a short circuit current of 65k rms symmetrical amperes. Systems employing series connected ratings shall not be used. Main and feeder devices shall be coordinated for selective tripping.

C. The manufacturer shall design the switchboard, including devices, for continuous operation at its rated current in a 40 degree C ambient temperature.

D. Switchboards shall be UL listed and shall be bottom fed.

E. Service entrance rated switchboards shall be provided with a utility pull section that is a minimum of 30 inches wide and 42 inches from the ground to the bottom of the secondary bus for C.T.s. The pulling/metering section shall meet the requirements of the local power company. Provide service entrance label and provide necessary applicable service entrance features per NEC and local Code requirements.

1. Switchboards identified as “service entrance rated” shall be labeled as suitable for use as service equipment.

F. Structure

1. Switchboards shall be free standing, non-compartmentalized, front accessible, and rear aligned. Units shall be completely metal enclosed. Switchboard shall consist of the required number of vertical sections bolted together to form a rigid assembly.

   a. Switchboards located indoors shall be indoor type, NEMA 1.

   b. Switchboards located outdoors shall be painted steel, NEMA 3R.

2. Switchboard shall be service entrance rated where shown on the Drawings.

3. Separate vertical compartments shall be provided for all main and branch circuit protective devices and metering equipment. Feeder devices shall be group mounted and front removable.

4. Provide an EUSERC cabinet utility pull section that shall meet the requirements of the local electric utility. The EUSERC section shall be integral to the switchboard. Reference the Drawings for more details. The service section shall include:

   a. Main lugs mounted for use with an underground pull section. Lug size shall be as shown on the Drawings.

b. A metering and current transformer compartment with busing for utility bar type current transformers and two (2) 15 inch (381.0 mm) high meter compartment doors – one with meter socket provisions and one blank

c. Provide underground pull sections with lug landing kit. Provide studs for incoming cables per utility company requirements as required by the utility company.

5. Cable compartments shall be code gauge steel, bolted to 12-gauge frame structure members. Doors shall be flush, hinged, with screw fasteners.

6. Ventilating louvers shall be provided to limit the temperature rise of current carrying parts. All openings shall be protected against entrance of falling dirt, water, or foreign matter.

7. The assembly shall be provided with adequate lifting means.

8. Compartments shown in the Contract Documents as "SPACE" shall be furnished with all hardware necessary for the future addition of a protective device as noted. The equipment shall include but not necessarily be limited to compartment door, barriers, plug in assembly, line and load bus stubs, etc.

9. All metal surfaces shall be chemically cleaned and primed. The finishing coat of paint shall be ANSI Z55.1 No. 61, light gray enamel.

G. Buses

1. All buses shall be silver plated copper. Neutral bus shall be 100% rated.

2. Main horizontal bus bars shall be mounted with all three phases arranged in the same vertical plane. Bus sizing shall be based on NEMA standard temperature rise criteria of 65 degrees C over a 40 degrees C ambient (outside the enclosure).

3. Buses shall be braced for the specified equipment short circuit current rating.

4. All joint connections shall be welded or shall be joined with bolts and Belleville washers.

5. Provide a copper ground bus extending throughout the entire length of the switchboard, equipped with lugs for external ground connections, sized for cables shown in the Contract Documents.

6. Unused spaces, or spaces indicated for future devices shall include doors, bus, device supports or mounting plates and connections.

H. Main Circuit Protective Device

1. Circuit breakers shall be molded case with inverse time and instantaneous tripping characteristics.

2. Circuit breakers shall be operated by a toggle-type handle and shall have a quick-make, quick-break over-center switching mechanism that is mechanically trip-free. Automatic tripping of the breaker shall be clearly indicated by the handle position. Contacts shall be non-welding silver allow and arc extinction shall be accomplished by means of DE-ION arc chutes. A push-to-trip button on the front of the circuit breaker shall provide a local manual means to exercise the trip mechanism.

3. Circuits shall have a minimum symmetrical interrupting capacity as indicated on the Drawings.

4. Main breaker shall be molded case with electronic trip units, ratings as shown on the Drawings.

I. Feeder Protective Devices

1. Feeder protective devices shall be molded case with electronic trip units ratings as shown on the Drawings.

J. Electronic Trip Units

1. Each molded case circuit breaker microprocessor-based tripping system shall consist of three (3) current sensors, a trip unit and a flux-transfer shunt trip. The trip unit shall use microprocessor-based technology to provide the adjustable time-current protection functions. True RMS sensing circuit protection shall be achieved by analyzing the secondary current signals received from the circuit breaker current sensors, and initiating trip signals to the circuit breaker trip actuators when predetermined trip levels and time-delay settings are reached.

2. An adjustable trip setting dial mounted on the front of the trip unit shall establish the continuous trip ratings of each circuit breaker. Rating plugs shall be adjustable and settings shall be adjusted by the CONTRACTOR as indicated on the Drawings. Rating plugs shall be interlocked so they are not interchangeable between frames, and interlocked such that a breaker cannot be closed and latched with the rating plug removed.

3. System coordination shall be provided by the following microprocessor-based time-current curve shaping adjustments:

a. Adjustable long-time setting (set by adjusting the trip setting dial).

b. Adjustable short-time setting and delay with selective curve shaping.

c. Adjustable instantaneous setting.

d. Adjustable ground fault setting and delay (where shown on the Drawings).

e. The microprocessor-based trip unit shall have both powered and unpowered thermal memory to provide protection against cumulative overheating should a number of overload conditions occur in quick succession.

f. When the adjustable instantaneous setting is omitted, the trip unit shall be provided with an instantaneous override.

g. Where internal ground fault protection is specified, adjustable settings shall not exceed 1200 amperes. Provide neutral ground fault sensor for four-wire loads.

h. Where continuous current rating of the protective device is rated or can be adjusted to 1200 amperes or higher, the electronic trip unit shall be provided with a arc flash energy-reducing maintenance mode capability.

i. Breakers shall have built-in test points for testing the long-time delay, instantaneous, and ground fault functions of the breaker by means of a test set.

K. Digital Metering Power Monitor (PM)

1. Provide a digital metering module (PM) for the service entrance switchboard main feeder as shown in the Contract Documents.

2. The PM shall be a microprocessor based, solid state unit suitable for door mounting on the electrical equipment enclosure and for providing monitoring for the 3 phase electrical circuits detailed in the Contract Documents. The PM shall be UL-listed and comply with applicable portions of ANSI C37.90.

3. The PM shall provide direct reading of metered or calculated values for the items listed below and shall automatically range between Units, Kilo-units, and Mega-units for all displayed values. Accuracy's indicated shall be of read or calculated values.

   a. AC amperes in each phase: 1 percent accuracy.

   b. AC voltage, phase-to-phase and phase-to-neutral: 1 percent accuracy.

   c. Kilowatts: 2 percent accuracy.

   d. Kilovars: 2 percent accuracy.

   e. Power factor: 4 percent accuracy.

   f. Frequency: 0.5 percent accuracy.

   g. Kilowatt demand (5, 10, 15, 30 minutes interval programmable): 2 percent accuracy.

   h. Kilowatt hours: 2 percent accuracy.

   i. Kilovar hours: 2 percent accuracy.

   j. KVA: 2 percent accuracy.

   k. KVAH: 2 percent accuracy.

   l. Percent TDD.

   m. Percent THD.

   n. K factor.

4. External current transformers with ratios as indicated on the drawing or as required shall be provided.

5. The PM shall not utilize voltages greater than 120 VAC on the equipment enclosure door. This may be accomplished by back pan mounting of the voltage input sensors and door mounting the display portion of the PM or with the use of separate (and fused) potential transformers. Integral potential transformers shall be fused.

6. The PM shall have a dedicated communication port configured for Ethernet / IP communication via the OWNER's SCADA system. Configure PM to transmit all variables on the SCADA system. Coordinate PM address with the OWNER's System Integrator for each PM provided.

7. The PM display face shall be membrane type and rated suitable for NEMA 12 mounting and integrated into the switchboard enclosure. The device shall have a durable, LED display screen accessible to the user without requiring opening a switchboard door.

8. The PM shall have an operating temperature range of 0 degrees C to 70 degrees C, and 0 to 95 percent relative humidity non-condensing.

9. The PM shall allow the user to disable undesired values/functions and to later reactivate them if required.

10. Control power shall be drawn from the monitored incoming AC line terminal connections. No separate AC supply input shall be required.

11. The device shall have non-volatile memory and not require battery backup; in the event of a power failure, the device shall retain all pre-set parameters, accumulated watt-hours, watt demand. Data at time of power loss shall be stored.

12. PM shall include a shorting terminal block in the CT secondary circuit.

13. The PM shall be Allen Bradley, PM-5000 or approved equal.

L. Surge Protection Device (SPD)

1. Provide a surge suppression device (SPD) as shown on the Drawings.

2. The SPDs shall incorporate thermally protected metal-oxide varistors (MOVs) as the core surge suppression component for the service entrance and all other distribution levels. The system shall not utilize silicon avalanche diodes, selenium cells, air gaps, or other components that may crowbar the system voltage leading to system upset or create any environmental hazards.

3. The Maximum Continuous Operating Voltage (MCOV) of the SPDs shall not be less than 115% of the nominal system operating voltage.

4. The SPDs shall provide line-to-line and line-to-ground protection.

5. The Nominal Discharge Current rating of the SPDs shall be 20kA.

6. The maximum Voltage Protection Rating of the SPDs shall not exceed 2,000.

7. The SPDs shall be provided with the following integral mounting options:

8. Protection Status Indicators - Each unit shall have a green / red solid-state indicator light that reports the status of the protection on each phase.

9. The indicator lights shall report the status of all protection elements and circuitry in the L-G and L-L modes.

10. The absence of a green light and the presence of a red light shall indicate that damage has occurred on the respective phase or mode. All protection status indicators shall indicate the actual status of the protection on each phase or mode. If power is removed from any one phase, the indicator lights shall continue to indicate the status of the protection on all other phases and protection modes. Diagnostics packages that simply indicate whether power is present on a particular phase shall not be accepted

11. The SPD shall include Form C dry contacts (one NO and one NC) for remote annunciation of its status. Both the NO and NC contacts shall change state under any fault condition.

12. The SPD shall contain an audible alarm that will be activated under any fault condition. There shall also be an audible alarm silence button used to silence the audible alarm after it has been activated.

13. The SPD shall be equipped with an LCD display that indicates to the user how many surges have occurred at the location. The surge counter shall trigger each time a surge event with a peak current magnitude of a minimum of 50 ± 20A occurs. A reset pushbutton shall also be standard, allowing the surge counter to be zeroed. The reset button shall contain a mechanism to prevent accidental resetting of the counter via a single, short-duration button press. In order to prevent accidental resetting, the surge counter reset button shall be depressed for a minimum of 2 seconds in order to clear the surge count total.

14. The ongoing surge count shall be stored in non-volatile memory. If power to the SPD is completely interrupted, the ongoing count indicated on the surge counter's display prior to the interruption shall be stored in non-volatile memory and displayed after power is restored. The surge counter's memory shall not require a backup battery in order to achieve this functionality.

15. The unit shall contain thermally protected MOVs. These thermally protected MOVs shall have a thermal protection element packaged together with the MOV in order to achieve overcurrent protection of the MOV. The thermal protection element shall disconnect the MOV(s) from the system in a fail-safe manner should a condition occur that would cause them to enter a thermal runaway condition.

16. All of the SPD's components and diagnostics shall be contained within one discrete assembly.

17. The minimum surge current withstand capacity of the SPD shall be as follows:

18. 250kA per phase.

19. 125kA per mode.

20. The SPDs shall be mounted within the switchboard enclosure. Externally mounted SPDs shall not be acceptable.

21. The SPDs shall be provided with a circuit breaker disconnect.

M. Wiring

1. Low voltage instrument and control wiring shall be copper, Type SIS, flameproof switchboard wire identified with shrink on marker sleeves at each end. Low voltage wiring terminal blocks shall have marking strips and shall be mounted vertically in an accessible location. All terminal lugs shall be of the full loop type.

N. Marking and Identification

1. In conformance with Section 26 05 53.

2. A manufacturer's plaque shall be fastened to the front of the switchboard. The plaque shall indicate model number, serial number, amperes, volts, short circuit rating, etc.

3. The switchboard shall be furnished with a sign marked "DANGER 480 VOLTS KEEP OUT". Letters shall be not less than 1 in high, 1/4 in stroke. Signs shall be adhesive backed mylar and OSHA approved.

4. Mimic Bus: Provide an approved mimic bus on front of each switchboard assembly. Color shall be black for the Normal Power system and red for the Essential Electrical System, either factory-painted plastic or metal strips. Plastic tape shall not be used. Use symbols similar to one line diagram shown on drawings. Plastic or metal strips shall be mounted with plated screws.

2.03 SEISMIC BRACING

A. The Manufacturer shall provide a seismic certificate.

2.04 SPARE PARTS AND ADDITIONAL MATERIALS

A. Provide the following spare parts in the quantities specified:

1. One dozen each of cover bolts, spring nuts and door fasteners.

2. One quart of touch up paint.

B. Spare parts shall be boxed or packaged for long term storage and clearly identified on the exterior of package. Identify each item with manufacturers name, description and part number.

PART 3 - EXECUTION

3.01 MANUFACTURER'S SERVICES

A. An authorized representative of the manufacturer shall provide on-site start-up and commissioning of the switchboards and power meter. Provide at minimum eight hours of on-site commissioning and four hours on site OWNER training.

B. Provide a signed certificate stating the installation meets or exceed the manufacturer's installation standards and instructions.

C. Verification that the switchboard is operating as specified.

D. Provide a printout of all as-commissioned adjustable set points for future reference.

END OF SECTION

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SECTION 26 32 00

PACKAGED DIESEL GENERATOR ASSEMBLIES

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes.
   1. Requirements for a complete factory assembled generator set with digital electronic generator controls, and digital voltage regulator.
   2. The generator and transfer switch shall be of the same manufacturer.
   3. Requirements for an outdoor weather-protective enclosure.
   4. Requirements for a sub-base fuel tank.

1.02 REFERENCES

A. The following is a list of Codes and Standards that the packaged diesel generator shall conform to. The generator set shall include necessary features to meet the requirements of these standards.
   1. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
   2. NFPA 70 – National Electrical Code
   3. NFPA 99 – Essential Electrical Systems for Health Care Facilities, if applicable to this project.
   4. NFPA 110 – Emergency and Standby Power Systems, if applicable to this project.
   5. NEMA MG1. Alternator shall comply with the requirements of the current edition of this Standard as they apply to AC alternators.
   6. UL 142 – Sub-base Tanks.
   7. UL 1236 – Battery Chargers.
   8. UL 2200 – The generator set shall be list to UL2200.

B. The generator control system shall comply with the following Codes and Standards.
   1. EN 50082-2, Electromagnetic Compatibility, Generic Immunity Requirements, Part 2.
   2. EN 55011, Limits and Methods of Measurement of Radio Interference Characteristics.
   3. FCC Part 15, Subpart B.
   4. IEC 8528 Part 4. Control Systems for Generator Sets.
   5. IEC Std. 801.2, 801.3 and 801.5 for susceptibility, conducted and radiated electromagnetic emissions.
   6. UL 508. The entire control system of the generator set shall be UL 508 listed and labeled.

C. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying assurance in design/development, production, installation and service in accordance with ISO 9001.

1.03 SUBMITTALS

A. Contractor shall submit all the product data in Division 26 at the same time. Piecemeal submittals will be rejected as incomplete.

A. 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 - 260000.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.

B. Product Data
   1. Pursuant to Section 01 33 00 – Submittal Procedures.
   2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

1. Provide a complete bill of materials. Any differences between products specified and proposed shall be clearly identified.
2. Manufacturer's product literature, model specifications and performance data sufficient to verify compliance with items specified in 1.2 References of this Section.
3. Complete model number and trip characteristics for the main circuit breaker to be provided.
4. Warranty information complying with the requirements of this Section.
5. Seismic certification for area installed provided by the manufacturer.
6. Seismic calculations for the concrete slab and anchor bolts required. Calculations shall be wet stamped by a Professional Engineer licensed in the State of Oregon.
7. Project specific power and control schematic. The schematic shall clearly identify all field wiring termination points using the same identification shown in the Contract Documents.
8. The generator, fuel tank and battery charger shall, at a minimum have the following I/O points identified on the schematic.
   a. Generator H-O-A in hand.
   b. Generator H-O-A in auto.
   c. Generator running.

d. Generator warning.
e. Generator failed.
f. Generator low fuel.
g. Battery charger failed.

9. Submittal shall include a line by line compliance statement based on this specification.
10. Manufacturer's document of EPA certification for proposed model generator.
11. Outline drawing showing overall dimensions of generator, tank, enclosure and accessories.

1.04 QUALITY ASSURANCE

A. Qualifications.
1. The manufacturer of this equipment shall have produced similar equipment for a minimum period of ten years. When requested by the ENGINEER, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.
2. The generator shall be of the same manufacturer as the transfer switch to provide a single source of warranty responsibility for all the products provided.
3. Generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation and service in accordance with ISO 9001.

B. Factory Testing.
1. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be shipped with the generator set.
2. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include; run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup and function of safety shutdowns.
3. Factory testing may be witnessed by the OWNER and/or ENGINEER. Costs for travel expenses will be the responsibility of the OWNER and/or ENGINEER. Manufacturer is responsible to provide a minimum of two weeks notice for factory testing.

1.05 WARRANTY

A. Generator set, fuels tank, enclosure and accessories specified within this Section shall be warranted for a minimum period of 5 years from the date of substantial completion against all defects in materials and workmanship. The warranty shall be comprehensive including all parts, labor and travel.

1.06 Selective Coordination

A. The manufacturer of the generator and overcurrent protection device has been designed to Selectively Coordinate to the maximum extent possible:
   1. The basis of design is the Cummins Amp Sentry Relay. Alternate overcurrent protection devices shall meet or exceed the adjustable trip characteristics of the Amp Sentry Relay.

PART 2 PRODUCTS

2.01 GENERATOR SET (263200.G01).

A. Manufacturer
   1. Basis of design shall be Cummins or approved equal.

B. Ratings.
   1. The generator set shall operate at a voltage as shown on the Drawings.
   2. The generator set shall be rated as shown on the Drawings. Standby rating, based on site conditions of an altitude of 500 feet above sea level and ambient temperatures up to 104 degrees F.

C. Performance.
   1. Voltage regulation shall be plus or minus 0.5 % for any constant load between no load and rated load. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 %.
   2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with steady state no load to steady state rated load shall not exceed plus or minus 0.5%.
   3. The diesel engine generator set shall accept a single step load of 100 % nameplate kW and power factor, less applicable de-rating factors, with the engine generator set at operating temperature.
   4. Motor starting capability shall be 4,725kVA at 125-degrees C. The alternator shall be rated for a maximum of 1,150kVA at 125-degrees C. The generator set shall be capable of recovering to a minimum of 90 % of rated no load voltage following the application of the specified kVA load at near zero power factor applied to the generator set. Maximum voltage dip on application of this load, considering both alternator performance and engine speed changes shall not exceed 25 %. The maximum frequency dip shall not exceed 8%.
   5. The alternator shall produce a clean AC voltage waveform, with no more than 5 % total harmonic distortion at full linear load when measured from line to neutral, and no more than 3 % in any single harmonic and no third order harmonics or their multiples. Telephone influence factor shall be less than 40.
   6. The generator set shall be certified by the engine manufacturer to be suitable for use at the installed location and rating and shall meet all applicable exhaust emission requirements at the time of commissioning.

D. Construction.

1. The engine generator set shall be mounted on a heavy duty steel base to maintain alignment between components. Provide vibration isolators between the engine generator assembly and the structural base. The base shall incorporate a battery tray with hold down clamps within the rails.

2.02 ENGINE AND ENGINE EQUIPMENT

A. The engine shall be diesel, 4 cycle, radiator and liquid cooled, producing 1.5 HP per kW to operate at 1800 rpm for full electrical output rating. The horsepower rating of the engine at its minimum tolerance level shall be sufficient to drive the alternator and all connected accessories.

B. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of the engine coolant temperature to provide fast stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed and accelerating to rated speed.

C. Skid mounted radiator and cooling system rated for the full load operation in 122 degrees F ambient as measured at the alternator air inlet. Radiator shall be prototype tested to verify cooling performance of the engine, radiator and fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange if generator is to be installed indoors. The equipment manufacturer shall fill the cooling system with a 50/50 ethylene glycol / water mixture prior to shipping. Rotating parts shall be guarded against accidental contact.

D. Electric starter(s) capable of three complete cranking cycles without overheating.

E. Provide with full flow lubrication oil filters with replaceable spin on canister elements.

F. An engine driven, mechanical, positive displacement fuel pump. Provide fuel filter with replaceable spin on canister element. Fuel cooler if required for operation due to the design of the engine and the installation.

G. Provide replaceable dry element air cleaner with restriction indicator.

H. Engine battery charging alternator, 40 ampere minimum and solid state voltage regulator.

I. Flexible supply and return fuel lines.

2.03 AC ALTERNATOR

A. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip proof construction, single pre-lubricated sealed bearing, air cooled by a direct drive centrifugal blower fan and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system and shall be UL 1446 listed. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees C.

B. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of providing sufficient excitation for the alternator to supply approximately 300 % of rated current for up to 10 seconds.

2.04 GENERATOR SET CONTROL

A. The generator set shall be provided with a microprocessor based control system that is designed to provide automatic starting, monitoring, protection and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set and remote monitoring and control as described in the specification.

B. The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all the components in the system under the vibration conditions encountered. All switches, lamps and meters in the control system shall be oil-tight and dust-tight. All active control components shall be installed within a UL/NEMA 3R enclosure. There shall be no exposed points in the control, with the door open, that operate in excess of 50 volts.

C. The generator control enclosure which contains all operator interface switches, lamps, emergency stop switch and accessories listed below, shall be mounted no more that seventy-five (75) inches to the top, above finished floor after the generator set has been installed on a belly tank, isolation springs or other devices specified herein and/or shown on the Drawings.

D. The generator set controller shall be capable of communicating via Ethernet/IP with the OWNER's SCADA system. The following alarms shall be monitored via Ethernet/IP by the SCADA system:
   1. Generator H-O-A in hand.
   2. Generator H-O-A in auto.
   3. Generator running.
   4. Generator warning.
   5. Generator failed.
   6. Generator low fuel.
   7. Battery charger failed.

E. Requirements for control switches are listed below.
   1. Mode select switch. The mode select switch shall initiate the following control modes. When in the run or manual position the generator set shall start and accelerate to rated speed and voltage as directed by the operator. A separate pushbutton to initiate starting is acceptable. In the off position the generator set shall immediately stop bypassing all time delays. In the auto position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.
   2. Emergency stop switch. Switch shall be red mushroom-head pushbutton. Depressing the emergency stop switch shall cause the generator set to immediately shut down and be locked out from automatic restarting.
   3. Reset switch. The reset switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.

4. Panel lamp switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed or after the switch is depressed a second time.
5. Voltage and frequency adjustment. The generator set control shall include digital raise / lower switches for adjustment of voltage and frequency.

F. Generator Set AC Output Metering.
1. The generator set shall be provided with a metering set including the following features and functions.
    a. Digital metering set, 1 % accuracy to indicate generator RMS voltage and current, frequency and total load on the generator set.
    b. Generator set alarm and status display.

G. Generator Set Alarm Status Display.
1. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. At a minimum, the control shall have separate indication lamps to indicate the following.
    a. Not in Auto.
    b. Shutdown.
    c. Warning.
    d. Remote Start.
    e. Auto mode.
    f. Manual run.
2. The generator set control shall indicate the existence of warning and shutdown conditions on the generator set control panel for all the following conditions.
    a. Low oil pressure (warning and shutdown).
    b. High coolant temperature (warning and shutdown).
    c. Over current (warning and shutdown).
    d. Oil pressure sender failure (warning).
    e. Low coolant temperature (warning).
    f. Low and high battery voltage (warning).
    g. Weak battery (warning).
    h. Low fuel level (warning).
    i. Engine temperature sender failure (warning).
    j. Low coolant level (shutdown).
    k. Fail to crank (shutdown).
    l. Fail to start/over-crank (shutdown).
    m. Over-speed (shutdown).
    n. Low and high AC voltage (shutdown).
    o. Over and under frequency (shutdown).
    p. Field overload (shutdown).
    q. Loss of sensing voltage (shutdown).
    r. Emergency stop (shutdown).
3. The control system shall incorporate data logging of alarm conditions.

4. Provisions shall be made for indication of customer specified alarm conditions as identified in 1.3 Submittals in this specification, but in no case shall there be less than a minimum of four (4) customer specified alarm or shutdown conditions.

H. Engine Status Monitoring.
   1. The following information shall be available from the alphanumeric display panel on the generator set control.
      a. Engine oil pressure.
      b. Engine coolant temperature.
      c. Engine speed (rpm).
      d. Number of hours of operation.
      e. Number of start attempts.
      f. Battery voltage.

I. Engine Control Functions.
   1. The control system shall include a cycle cranking system which allows for user selected crank time, rest time and number of cycles. Initial settings shall be for three cranking periods of fifteen seconds each with fifteen second rest period between cranking periods.
   2. The control system shall include the engine governor control which functions to provide steady state frequency regulation as noted elsewhere in this specification.
   3. The control system shall include sender failure monitoring logic which is capable of discriminating between failed sender or wiring components and an actual failure condition.
   4. The control system shall include time delay start (adjustable from 0 to 300 seconds) and time delay stop (adjustable from 0 to 600 seconds) functions.

J. Alternator Control Functions.
   1. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from mis-operation due to load induced voltage waveform distortion and provide pulse width modulated output to the alternator exciter. The voltage regulation system shall control buildup of AC generator voltage to provide linear rise and limit overshoot. The system shall include a torque matching characteristic which shall reduce output voltage in proportion to frequency below adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll off frequency and rate and be capable of being curve matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping and frequency roll off. Adjustments shall be made via digital raise/lower switches with an alphanumeric LED readout to indicate setting level.
   2. A microprocessor based protection device shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load exceeds 110 % of the rated current of the generator set for more than sixty seconds. The device shall shutdown and lock out the generator set when output current approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance with the requirements of NFPA 70 (NEC) Article 445.
   3. The control shall provide alternator protection from the following conditions.

a. High or low voltage.
b. Over or under frequency.
c. Over current warning or shutdown.
d. Loss of voltage sensing.
e. Field overload shutdown.

4. A microprocessor based AC over / under voltage monitoring system that responds only to true RMSD voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110 % of the operator set point voltage level for more than ten seconds or with no intentional delay when voltage exceeds 130 %. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85 % for more than ten seconds.

2.05 Other Equipment to be Provided With the Generator Set.

A. The generator set shall be provided with an inherent alternator protection relay. The use of a molded case generator output circuit breaker shall not be acceptable.
1. The relay shall provide overload protection of the generator and generator feeder conductors, per the NEC.
2. The relay shall provide short circuit and ground fault protection.
3. The relay trip curve shall be adjustable to achieve selective coordination.
4. The relay shall selectively coordinate per the NEC and the Oregon Electrical Specialty Code.
5. The generator shall be provided with a disconnect capable of being locked in the open position. This disconnecting means shall not consist of a circuit breaker. The disconnecting means shall comply with the NEC and the Oregon Electrical Specialty Code.
6. The alternator protection shall be Cummins Amp Sentry.

B. Outdoor Weather Protective and Sound Attenuation Enclosure.
1. The generator set shall be provided with an outdoor enclosure (housing) with the entire package listed under UL 2200. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 100 degrees F. The housing shall have lockable hinged access doors as required to maintain easy access for all operating and service functions. Enclosure roof shall be cambered to prevent rainwater accumulation. Openings shall be screened to limit access of rodents into the enclosure.
2. The outdoor weather protective enclosure shall be made of steel.
3. The enclosure shall be insulated with non-hydroscopic materials and reduce the sound level of the generator set while operating at full rated load to a maximum of 75 dBA as measured at seven meters from the generator set in a free field environment.
4. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two step electro-coating paint process. Listed below is the minimum level of performance for the painting process.
a. Primer thickness, 0.5 – 2.0 mils. Top coat thickness, 0.8 -1.2 mils.
b. Gloss, per ASTM D523-89, 80 % plus or minus 5 %. Gloss retention after one year shall exceed 50 %.
c. Cross hatch adhesion, per ASTM D3359-93, 4B-5B.
d. Impact resistance, per ASTM D2794-93, 120-160 inch pounds.

e. Salt spray, per ASTM B1117-90, 1000+ hours.
f. Humidity, per ASTM D2247-92, 1000+ hours.
g. Water soak, per ASTM D2247-92, 1000+ hours.

5. All external enclosure hardware shall be corrosion resistant and hinges shall be stainless steel.
6. A factory mounted exhaust silencer shall be mounted inside the enclosure. The exhaust shall exit the enclosure though a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.
7. The enclosure shall include a flexible oil drain line that extends to the exterior of the enclosure. The enclosure shall include an external radiator fill provision.

C. Provide a dual wall sub-base fuel storage tank sized to allow for full load operation of the generator set for twenty-four (24) hours at full load. The tank shall be constructed of corrosion resistant steel and shall be UL listed. The equipment, as installed by the CONTRACTOR shall meet all local and regional requirements for the application. The tank shall include all the features listed below.
1. Emergency tank and basin vents, mechanical level gauge and basin drain.
2. Fuel supply and return lines connected to generator set with flexible lines as recommended by the engine manufacturer and in compliance with UL 2200 and NFPA 37 requirements.
3. Leak detection provision and high and low fuel level float switches wired to the generator set control for local and remote alarm indication.

D. Provide a fully automatic battery charger, sized as appropriate for the engine and batteries, as recommended by the engine manufacturer. The charger shall be UL labeled for use in emergency applications and shall include all features necessary to meet NFPA 110 requirements. The charger shall be provided with remote indication of battery charger fail alarm.

E. Thermostatically controlled UL 499 listed coolant heater, sized as recommended by the engine manufacturer to warm the engine to a minimum of 104 degrees F in an ambient temperature of 40 degrees F and in compliance with NFPA 110. Voltage shall be as identified in the Drawings. Coolant heater shall have provisions to isolate the heater for replacement of the heater element without draining the coolant from the generator set.

F. Provide engine starting batteries. Starting batteries shall be lead-acid, 12 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors. The batteries shall be capable of three complete fifteen second cranking cycles at 40 degrees F ambient temperature when fully charged.

G. Provide a thermostatically controlled anti-condensation winding heater on the alternator, sized as recommended by the engine manufacturer. The heater shall be provided with a cord and plug end and a minimum of six feet in length which can be plugged into a receptacle provided by the CONTRACTOR.

2.06 SEISMIC BRACING

A. The Manufacturer shall provide a seismic certificate.

PART 3 EXECUTION

3.01 INSTALLATION

A. Start-up and Testing
   1. An authorized employee of the manufacturer's service division shall perform the start-up and testing services.
   2. The CONTRACTOR shall notify the ENGINEER a minimum of two weeks in advance of the start-up and testing schedule to allow for witnessing of the tests.
   3. Provide a signed certificate stating the installation meets or exceed the manufacturer's installation standards and instructions.
   4. Start-up shall include a "cold start" test.
   5. Start-up shall verify all local and remote warnings, shutdowns and alarming events are operating as specified.
   6. Perform a power failure test on the entire installed system. The test shall be conducted by opening the power supply from the utility service and observing proper operation of the system for at least thirty minutes.
   7. Reference the Start-up and Testing specification Section in the Contract Documents for a detailed check list for all processes on the project. The Contractor shall go through the check list to verify compliance and that ask the ENGINEER to witness the tests as the CONTRACTOR goes through them a second time.
   8. Coordinate start-up and testing with the transfer switch start-up.
   9. Startup shall include operating the generator set with a load bank connected and operating at full load for a minimum of four continuous hours.
   10. The CONTRACTOR is responsible to provide diesel fuel for the start-up and testing activities. After start-up and testing is completed and accepted and before substantial completion, the CONTRACTOR shall completely fill the diesel fuel tank.
   11. Verification that the generator set and associated specified components are operating as specified.
   12. Provide a printout of all as-commissioned adjustable set points for future reference.

B. Demonstration and Training.
   1. An authorized employee of the manufacturer's service division shall perform the demonstration and training services. The demonstration and training period shall last a minimum of 4 hours and shall be provided on site.
   2. The OWNER reserves the right to video tape the demonstration and training presentation for future in-house use.
   3. Provide training handouts for 10 persons.

END OF SECTION

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SECTION 26 36 23

AUTOMATIC TRANSFER SWITCH

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes.

1. Provide a complete factory assembled automatic transfer switch with field programmable digital electronic controls designed for fully automatic operation. Controls shall include surge voltage isolation, voltage sensors on all phases of both sources, AC powered operator, positive mechanical and electrical interlocking and mechanically held contacts for both sources.

2. The transfer switch and generator set shall be of the same manufacturer to provide a single source of responsibility for all the products provided. Technicians shall be specifically trained, tested and certified to support the products. Technicians shall be employed by the generator set supplier.

1.02 REFERENCES

A. The following is a list of Codes and Standards that the transfer switch shall conform to.

1. UL1008 – Transfer switch. Transfer switches and enclosures shall be UL-1008 listed as a package and labeled to be suitable for use in either optional standby or legally required emergency applications.

2. IBC2006 – Transfer switch shall be prototype tested and third party certified to comply with the requirements of the IBC group III or IV, category D/F. The equipment shall be provided with installation instructions necessary to attain installation compliance.

3. CSA 282, Emergency Electrical Power Supply for Buildings.

4. NFPA 70, National Electrical Code.

5. NFPA 99, Essential Electrical Systems for Health Care Facilities.

6. NFPA 110, Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems.

7. IEEE 446, Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

8. NEMA ICS 10-1993, AC Automatic Transfer Switches.

B. The transfer switch shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation and service in accordance with ISO9001.

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 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.

B. Refer to Section 26 05 00 – Common Work Results for Electrical Submittals for additional requirements.

C. Product Data

1. Pursuant to Section 01300 – Submittal Procedures.

2. Manufacturer's data including materials of construction, methods of installation and related information for each item specified in PART 2 PRODUCTS.

3. Seismic calculations for the concrete slab and anchor bolts required. Calculations shall be wet stamped by a Professional Engineer licensed in the State of Oregon.

4. Manufacturer's data including materials of construction, equipment weight, and related information for each item specified.

5. Provide a complete bill of materials. Any differences between products specified and proposed shall be clearly identified.

6. Manufacturer's product literature, model specifications and performance data sufficient to verify compliance with items specified in 1.2 References of this Section.

7. Warranty information complying with the requirements of this Section.

8. Project specific power and control schematic. The schematic shall clearly identify all field wiring termination points using the same identification shown in the Contract Documents.

9. The automatic transfer switch shall, at a minimum have the following I/O points identified on the schematic.

   a. Generator start output.

   b. Utility power loss (source 1).

   c. ATS on utility power (source 1).

   d. ATS on Generator power (source 2).

10. Submittal shall include a line by line compliance statement based on this specification.

1.04 QUALITY ASSURANCE

A. Qualifications

1. The manufacturer of this equipment shall have produced similar equipment for a minimum period of ten years. When requested by the ENGINEER, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

2. The automatic transfer switch shall be of the same manufacturer as the generator to provide a single source of warranty responsibility for all the products provided.

3. Transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation and service in accordance with ISO 9001.

B. Factory Testing.

1. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be shipped with the transfer switch.

1.05 WARRANTY

A. Transfer switch shall be warranted for a minimum period of 5 years from the date of substantial completion against all defects in materials and workmanship. The warranty shall be comprehensive including all parts, labor and travel.

PART 2 - PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH WITH BYPASS-ISOLATION

A. Basis of Design

1. The basis of design shall be Schneider Asco 7000 Series with Bypass Isolation Contactor.

B. Design Restrictions

1. Transfer switch dimensions shall be at maximum 32” W x 72”D x 91” H. Transfer switches which exceed these dimensions shall not be acceptable.

C. Ratings

1. Transfer switch shall be rated as shown on the Drawings.

2. Transfer switch shall have bypass-isolation capabilities.

   a. Bypass switch and transfer switch shall have identical electrical ratings.

3. Each automatic transfer switch shall consist of an inherently double throw power transfer switch with a solenoid operated mechanism and a microprocessor controller to provide automatic operation. All transfer switches and controllers shall be the products of the same manufacturer.

4. The withstand rating shall be sized based on the available in-rush current of the normal power source and the generator, whichever is greater in RMS symmetrical amperes. The transfer switch UL 1008 WCR ratings for use with protective devices at installation locations under specified fault conditions.

5. Main contacts shall be rated for 600 volts AC minimum.

6. Transfer switch shall be rated to carry 100 percent of the rated current continuously in the enclosure specified, ambient temperatures of – 40 to + 60 degrees C and relative humidity up to 95 percent and altitudes up to 10,000 feet above sea level.

7. Shall comply with Level 1 equipment per NFPA 110 and shall be UL 1008 Listed.

8. Resistance to Damage by Voltage Transients:

   a. Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

9. Relay signal:

   a. Control shall include provisions for addition of a pre-transfer relay signal, adjustable from 0 to 60 seconds, to be provided if necessary for elevator operation, based on equipment provided for the project.

10. Neutral bus shall carry 100% of load.

11. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 800 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.

12. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof, which are not intended for continuous duty, repetitive switching or transfer between two active power sources are not acceptable.

13. All main contacts shall be silver composition. Switches rated 800 amperes and above shall have segmented, blow-on construction for high withstand and close-on capability and be protected by separate arcing contacts.

14. Switched Neutral: Where neutral conductors must be switched as shown on the plans, the ATS shall be provided with fully-rated switched neutral transfer contacts. The neutrals of the normal and emergency power sources shall be

connected together only during the transfer and retransfer operation and remain connected together until power source contacts close on the source to which the transfer is being made.

D. Transition Modes

1. Open Transition: The Open Transition Power Transfer Switch shall transfer the load in a standard, 2-position, open transition configuration to reliably transfer loads between power sources using a break-before-make approach. Loads shall transfer to the alternate source in less than 100ms.The open transition power transfer switches shall utilize a reliable, single solenoid operating mechanism. The single operator design shall prevent direct connection of both sources

2. The transfer switch shall be electrically operated and mechanically held. The electrical operator shall be a momentarily energized, single-solenoid mechanism. Main operators which include overcurrent disconnect devices, linear motors or gears shall not be acceptable. The switch shall be mechanically interlocked to ensure only two possible positions, normal or emergency.

3. The switch shall be positively locked and unaffected by momentary outages, so that contact pressure is maintained at a constant value and contact temperature rise is minimized for maximum reliability and operating life.

2.02 BYPASS-ISOLATION SWITCH

A. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors. All bypass contacts shall be manually driven.

B. Power interconnections shall be silver-plated copper bus bar. The only field installed power connections shall be at the service and load terminals of the bypass-isolation switch. All control interwiring shall be provided with disconnect plugs.

C. Separate bypass and isolation handles shall be utilized to provide clear distinction between the functions. Handles shall be permanently affixed and operable without opening the enclosure door. Designs requiring insertion of loose operating handles or opening of the enclosure door to operate shall not be accepted.

D. Bypass to the load-carrying source shall be accomplished with no interruption of power to the load (make before break contacts). Devices which disconnect the load when bypassing shall not be accepted. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency." The operating speed of the bypass contacts shall be the same as the associated transfer switch and shall be independent of the speed at which the manual handle is operated. In the "Automatic" mode, the bypass contacts shall be out of the power circuit so that they will not be subjected to fault currents to which the system may be subjected.

E. The isolation handle shall provide three operating modes: "Connected," "Test," and "Isolate." The "Test" mode shall permit testing of the entire emergency power system, including the automatic transfer switches with no interruption of power to the load. The "Isolate" mode shall completely isolate the automatic transfer switch from all source and load power conductors. When in the "Isolate" mode, it shall be possible to completely

withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.

F. When the isolation switch is in the "Test" or "Isolate" mode, the bypass switch shall function as a manual transfer switch.

2.03 TRANSFER SWITCH CONTROL

A. The controller's sensing and logic shall be provided by a single built-in microprocessor for maximum reliability, minimum maintenance, and the ability to communicate serially through an optional serial communication module.

B. A single controller shall provide twelve selectable nominal voltages for maximum application flexibility and minimal spare part requirements. Voltage sensing shall be true RMS type and shall be accurate to + 1% of nominal voltage. Frequency sensing shall be accurate to + 0.2%. The panel shall be capable of operating over a temperature range of -20 to +60 degrees °C and storage from -55 to +85 degrees °C.

C. The controller shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the controller to be disconnected from the transfer switch for routine maintenance. Sensing and control logic shall be provided on multi-layer printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers. The panel shall be enclosed with a protective cover and be mounted separately from the transfer switch unit for safety and ease of maintenance. The protective cover shall include a built-in pocket for storage of the operator’s manuals.

D. All customer connections shall be wired to a common terminal block to simplify field-wiring connections.

E. The controller shall meet or exceed the following requirements for Electromagnetic Compatibility (EMC):

1. EN 55011:1991 - Emission standard - Group 1, Class A
2. EN 50082-2:1995 - Generic immunity standard, from which:
3. EN 61000-4-2:1995 - Electrostatic discharge (ESD) immunity
4. ENV 50140:1993 - Radiated Electro-Magnetic field immunity
5. EN 61000-4-4:1995 - Electrical fast transient (EFT) immunity
6. EN 61000-4-5:1995 - Surge transient immunity
7. EN 61000-4-6:1996 - Conducted Radio-Frequency field immunity

F. Controller Display and Keypad

1. A four-line, 20-character LCD display and keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters. Operational parameters shall also be available for viewing and limited control through the serial communications input port. The following parameters shall only be adjustable via DIP switches on the controller:

a. Nominal line voltage and frequency

b. Single or three phase sensing

c. Operating parameter protection

d. Transfer operating mode configuration

e. (Open transition, Closed transition, or Delayed transition)

2. All controller instructions and settings shall be easily accessible, readable and accomplished without the use of codes, calculations, or instruction manuals.

G. The following features shall be built-in to the controller, but capable of being activated through keypad programming when required by the user:

1. Provide the ability to select “commit/no commit to transfer” to determine whether the load should be transferred to the emergency generator if the normal source restores before the generator is ready to accept the load.

2. Engine Exerciser - The controller shall provide an internal engine exerciser. The engine exerciser shall allow the user to program up to seven different exercise routines. For each routine, the user shall be able to:

a. Enable or disable the routine.

b. Enable or disable transfer of the load during routine.

c. Set the start time as follows

d. time of day

e. day of week

f. week of month (1st, 2nd, 3rd, 4th, alternate or every)

g. Set the duration of the run.

h. At the end of the specified duration the switch shall transfer the load back to normal and run the generator for the specified cool down period.

H. The following features shall be built into the controller, but capable of being activated through keypad programming:

1. Terminals shall be provided for a remote contact which closes to signal the ATS to transfer to emergency. Should the emergency source fail while connected to emergency, but the normal source is acceptable the ATS shall override the transfer command and return to the normal source.

2. Terminals shall be optionally provided for an external contact so that when they are open transfer to the Normal or Emergency source is inhibited.

3. System Status - The controller LCD display shall include a “System Status” screen which shall be readily accessible from any point in the menu by depressing the “ESC” key a maximum of two times. This screen shall display a clear description of the active operating sequence and switch position. For example:

a. Normal Failed

b. Load on Normal

c. TD Normal to Emergency

d. 2 min 15s

4. Self-Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

5. Data Logging – The controller shall have the ability to log data and to maintain the last 99 events, even in the event of total power loss. The following events shall be time and date stamped and maintained in a non-volatile memory:

   a. Event Logging
   b. Data and time and reason for transfer normal to emergency.
   c. Data and time and reason for transfer emergency to normal.
   d. Data and time and reason for engine start.
   e. Data and time engine stopped.
   f. Data and time emergency source available.
   g. Data and time emergency source not available.
   h. Statistical Data
   i. Total number of transfers.
   j. Total number of transfers due to source failure.
   k. Total number of days controller is energized.
   l. Total number of hours both normal and emergency sources are available.

6. Ethernet Compatibility

   a. The controller shall be capable of Ethernet/IP communications.
   b. Provide 5170 Quad-Ethernet module with cable for controller and power metering and mounting hardware.

2.04 VOLTAGE, FREQUENCY AND PHASE ROTATION SETTINGS

A. Voltage and frequency on both the normal and emergency sources (as noted below) shall be continuously monitored.

B. Minimum Standard Protection Level Metering Capabilities

Parameter	Sources	Dropout/Trip	Pickup/Reset
Undervoltage	N&E,3ϕ	70 to 98%	85 to 100%
Overvoltage	N&E,3ϕ	102 to 115%	2% below trip
Under Frequency	N&E	85 to 98%	90 to 100%
Over Frequency	N&E	102 to 110%	2% below trip
Voltage Unbalance	N&E	5 to 20%	1% below dropout

C. Repetitive accuracy of all settings shall be within ± 0.5% over an operating temperature range of -20 °C to 60 °C.

D. Voltage and frequency settings shall be field adjustable in 1% increments either locally with the display and keypad or remotely via serial communications port access.

E. The controller shall be capable (when activated by the keypad or through the serial port) of sensing the phase rotation of both the normal and emergency sources. The source shall not be accepted if the phase rotation is not the preferred rotation selected (ABC or CBA).

F. Source status screens shall be provided for both normal & emergency sources to display digital readout of voltage on all 3 phases, frequency, and phase rotation.

G. The controller shall include a user selectable algorithm to prevent repeated transfer cycling to a source on an installation which experiences primary side, single phase failures on a Grounded Wye – Grounded Wye transformer which regenerates voltage when unloaded. The algorithm shall also inhibit retransfer to the normal (utility) source upon detection of a single phasing condition until a dedicated timer expires, the alternate source fails, or the normal source fails completely and is restored during this time delay period. The time delays associated with this feature shall be adjustable by the user through the controller keypad and LCD.

2.05 TIME DELAYS

A. An adjustable time delay of 0 to 6 seconds shall be provided to override momentary normal source outages and delay all transfer and engine starting signals. Capability shall be provided to extend this time delay to 60 minutes by providing an external 24 VDC power supply.

B. A time delay shall be provided on transfer to emergency, adjustable from 0 to 60 minutes, for controlled timing of transfer of loads to emergency.

C. An adjustable time delay of 0 to 6 seconds to override momentary emergency source outage to delay all retransfer signals during initial loading of engine generator set.

D. Two-time delay modes (which are independently adjustable) shall be provided on re-transfer to normal. One-time delay shall be for actual normal source power failures and the other for the test mode function. The time delays shall be adjustable from 0 to 60 minutes. Time delay shall be automatically bypassed if the emergency source fails and the normal source is acceptable.

E. A time delay shall be provided on shut down of engine generator for cool down, adjustable from 0 to 60 minutes.

F. A time delay activated output signal shall also be provided to drive (an) external relay(s) for selective load disconnect control. The controller shall have the ability to activate an adjustable 0 to 5 minute time delay in any of the following modes:

1. Prior to transfer only.
2. Prior to and after transfer.
3. Normal to emergency only.
4. Emergency to normal only.
5. Normal to emergency and emergency to normal.
6. All transfer conditions or only when both sources are available.

G. All time delays shall be adjustable in 1 second increments, except the extended parallel time, which shall be adjustable in .01 second increments.

H. All time delays shall be adjustable by using the LCD display and keypad. The time delay value displayed on the LCD or remote device shall be the remaining time until the next event occurs.

2.06 ENCLOSURE

A. NEMA 1.

B. The enclosure shall provide wire bending space in compliance with the latest edition of the NEC. The cabinet door shall include a permanently mounted key type latch(es). Bolted covers or doors are not acceptable.

C. Manual operating handles shall be accessible to authorized personnel only by opening the key locking cabinet door. Transfer switches with manual operating handles and /or non-key operated switches located on the outside of the cabinet do meet this specification requirement and are not acceptable.

2.07 ACCESSORIES

A. A three position momentary-type test switch shall be provided for the test / automatic / reset modes. The test position will simulate a normal source failure. The reset position shall bypass the time delays on either transfer to emergency or retransfer to normal. Switches which require utilizing the keypad and display function or have no manual time delay bypass means are not acceptable.

B. Auxiliary contacts, rated 10 amps, 250 VAC shall be provided consisting of one contact, closed when the ATS is connected to the normal source and one contact closed, when the ATS is connected to the emergency source.

C. LED indicating lights (16 mm industrial grade, type 12) shall be provided; one to indicate when the ATS is connected to the normal source (green) and one to indicate when the ATS is connected to the emergency source (red).

D. LED indicating lights (16 mm industrial grade, type 12) shall be provided and energized by controller outputs. The lights shall provide true source availability of the normal and emergency sources, as determined by the voltage sensing trip and reset settings for each source.

2.08 SEISMIC CERTIFICATION

A. Provide manufacturer's seismic certification.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General.

1. All identification labeling shall be in compliance with Owner's requirements.

2. The transfer switch shall be installed per the manufacturer's instructions.

3. The transfer switch shall be installed as per the Drawings.

4. The transfer switch shall be installed per the NEC.

5. The mounting of the transfer switch shall meet or exceed the seismic requirements for the jurisdiction installed.

B. Field Quality Control

1. The local authority having jurisdiction shall approve the installation of the transfer switch and generator set before they are energized.

C. Open Transition Sequence of Operation

1. Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to loads when the normal source fails. The normal position of the transfer switch is source 1 (connected to utility) and no start signal is supplied to the generator.

2. Generator set exercise test with load mode. The control system shall be configurable to test the generator set under load. In this mode the transfer switch shall control the generator set in the following sequence.

   a. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program or when manually initiated by the operator.

   b. When the control system senses the generator set at rated voltage and frequency it shall operate to connect the loads to the generator set by opening the normal source contacts and closing the emergency source contacts at a predetermined time later. The timing sequence for the contact operation shall be programmable in the controller.

   c. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period the transfer switch shall automatically reconnect to the normal service.

   d. On completion of the exercise period the transfer switch shall operate to connect the loads to the normal source by opening the emergency source contacts and closing the normal source contacts a predetermined time later. The timing sequence for the contact operation shall be programmable in the controller.

   e. The transfer switch shall operate the generator set unloaded for a cool down period and then remove the start signal from the generator set. If the normal power fails at any time when the generator is running, the transfer switch shall immediately connect the system loads to the emergency source.

3. Generator set exercise test without load mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode the transfer switch shall control the generator set in the following sequence.

   a. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program or when manually initiated by the operator.

   b. The control system shall operate the generator set unloaded for the duration of the exercise period.

   c. At the completion of the exercise period the transfer switch shall remove the start signal from the generator set. If the normal power fails at any time when the generator is running, the transfer switch shall immediately connect the system loads to the emergency source.

D. Start-up and Testing

1. An authorized employee of the manufacturer's service division shall perform the start-up and testing services.
2. Provide a minimum of eight (8) hours of on site start-up and testing, excluding travel time.
3. Provide a signed certificate stating the installation meets or exceed the manufacturer's installation standards and instructions.
4. Verification that the transfer switch is operating as specified.
5. Provide a printout of all as-commissioned adjustable set points for future reference.

E. Demonstration and Training.

1. An authorized employee of the manufacturer's service division shall perform the demonstration and training services. The demonstration and training period shall last a minimum of 4 hours and shall be provided on site.
2. The OWNER reserves the right to video tape the demonstration and training presentation for future in-house use.
3. Provide training handouts for 10 persons.

END OF SECTION

Exhibit A

Drawings

SHEET KEY NOTES

1. EQUIPMENT IS OWNER FURNISHED, CONTRACTOR INSTALLED.
2. PROVIDE AMP SENTRY RELAY.
3. PER SPECIFCATIONS, ALLEN BRADLEY PM-5000.

EXISTING
PACIFIC POWER
UTILITY VAULT

P001

XFMR-1
NEW UTILITY
TRANSFORMER

P002

SERVICE ENTRANCE SWITCHBOARD, SMSB-1 (1)
480/277V, 3Ø, 4-WIRE, 2500-AMP, 65-KAIC, NEMA 3R

UTILITY METER
AVAILABLE
FAULT CURRENT
33,500 AMPS

M

2500AF
2500AT
LSIG/ARMS

(3)
POWER
MONITOR

CT
SECTION

MAIN
SECTION

G001

C001

P003

P004

DIESEL GENSET, GEN-1 (1)
480V, 3Ø, 4-WIRE
900kW, 1125kVA

(2)
1600A

G002

C004

C002

MAIN ELECTRICAL & BLOWER BUILDING

(1) ATS-1
2500A
480/277V, 3Ø
4-POLE
NEMA 1
WITH BYPASS
CONTACTOR
100KAIC

N
E

PB
GEN-1
E-STOP

P007

MAIN SWITCHBOARD, MSB-1 (1)
480/277V, 3Ø, 4-WIRE, 2500-AMP, 65-KAIC

600AF
400AT
LSIG

600AF
400AT
LSIG

1200AF
800AT
LSIG

1200AF
800AT
LSIG

1200AF
1200AT
LSIG

600AF
400AT
LSIG

30AT
SPD

K
2500AF
2500AT
3P
LSIG/ARMS
NC

K
2500AF
2500AT
3P
LSIG/ARMS
NO

30AT
SPD

1200AF
800AT
LSIG

1200AF
800AT
LSIG

1200AF
1200AT
LSIG

600AF
400AT
LSIG

600AF
400AT
LSIG

A-SIDE | MAIN | INCOMING | MAIN | B-SIDE

C006 P005

P100

P200

P300

P400

P500

P201

P301

P401

P501

C007 P006

ACTIVE
HARMONIC
FILTER
AHF-1 (1)

MCC-100
CONNECTION
SHEET: E-012

MCC-200
CONNECTION A
SHEET: E-013

MCC-300
CONNECTION A
SHEET: E-014

MCC-400
CONNECTION A
SHEET: E-015

MCC-500
CONNECTION A
SHEET: E-016

MCC-200
CONNECTION B
SHEET: E-013

MCC-300
CONNECTION B
SHEET: E-014

MCC-400
CONNECTION B
SHEET: E-015

MCC-500
CONNECTION B
SHEET: E-016

ACTIVE
HARMONIC
FILTER
AHF-2 (1)

NO.	DATE	BY	REVISION

NOTICE
0 ½ 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE

MB DESIGNED
JL DRAWN
BP CHECKED

REGISTERED PROFESSIONAL ENGINEER
86683
Digitally Signed
OREGON
MAY 08, 2012
BENJAMIN E. PERRY
EXPIRES: 12-31-2024

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IMPROVEMENTS PROJECT
PHASE 1

SERVICE ENTRANCE ONE-LINE DIAGRAM

PROJECT NO.: 936-50-21-09 | SCALE: AS NOTED | DATE: SEPTEMBER 2022

SHEET
E-011
76 of 135

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