BIDDING DOCUMENTS

FOR

GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY

HUNTSVILLE, UTAH

BID SET

JULY 2024

ARDURRA

GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY

ENGINEER'S PROFESSIONAL CERTIFICATION

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INFORMATION SUMMARY

SUBJECT	INFORMATION	PRIMARY STATEMENT OF SUBJECT MATTER
PRE-BID CONFERENCE:	**7/23/2024 – 11:00 am** Green Hills Water and Sewer District 950 N. Maple St. Huntsville, UT 84317	Invitation to Bid, Page 00 00 20-1
BID DUE DATE:	**8/06/2024 – 2PM local time** Ardurra' Office 65 E. Wadsworth Parkway Suite 200 Draper, Utah 84020	Invitation to Bid, Page 00 00 20-1
BID OPENING DATE:	**8/06/2024 – 2PM local time** Ardurra' Office 65 E. Wadsworth Parkway Suite 200 Draper, Utah 84020	Invitation to Bid, Page 00 00 20-1
WORKING TIME:	**Project Start – 9/16/2024** 200 Working Days – Substantial Completion 15 Working Days – Final completion	Agreement, Page 00 52 00-2
LIQUIDATED DAMAGES:	$250/day - Substantial $500/day – Final	Agreement, Page 00 50 00-2
BID SECURITY:	5% of Bidder's Maximum Bid Price	Instructions to Bidders, Page 00 10 00-6

In case of a discrepancy, the information provided at the location of the primary statement of subject matter shall govern.

SECTION 00 00 20

INVITATION TO BID
GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY

The Green Hills Water and Sewer District will receive sealed bids that are due by 2:00 P.M. local time on August 6th, 2024 for the construction of a well pump house and water treatment facility for their Maple well. The CONTRACT DOCUMENTS, consisting of Request for Bids, Information for Bidders, Information Required of Bidder, Status Verification System Affidavit, Measurements and Payments, Certificate of Non-Collusion, Bid, Bid Bond, Agreement, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Change Order, General Conditions, Special Provisions, Specifications, Drawings, and Addenda, may be examined at the following locations:

Ardurra Group, 65 E Wadsworth Park Drive Ste 200 Draper Utah 84020

Bidding Documents are available for download and review on or before July 15, 2024. Prospective Bidders must purchase contract documents through Quest Construction Data Network. This can be done via www.QuestCDN.com. QuestCDN is a web-based platform for construction, requests and Goods and Services advertisements, bid document distribution, plan holder lists and all information pertaining to the bid. Prospective bidders should register at www.QuestCDN.com for a free membership. Enter the Quest Number "9221600" to access the bidding information on the search page. There is a $22 nonrefundable download delivery fee for the bidding documents. Bids will not be accepted from any prospective bidder who has not purchased contract documents through QuestCDN. Contact QuestCDN Client Success 952-233-1632 or Success@QuestCDN.com for assistance in membership registration and downloading digital bidding documents. Green Hills reserves the right to reject any and/or all bids and to waive any informalities if deemed in the best interest of the Owner. No bid may be considered unless accompanied by a bid guarantee of 5% of the total bid amount, which shall be forfeited if the bidder is awarded the Contract and fails to enter into a Contract with the Owner. You may contact Ryan Taylor at Ardurra with any questions.

INSTRUCTIONS TO BIDDERS

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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 and Supplementary 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 where the bidding procedures are to be administered.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the deposit sum, if any, stated in the advertisement or invitation to bid may be obtained from the Issuing Office. The deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 30 days after opening of Bids.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. Contractor shall have completed a minimum of 3 similar projects within the last 5-years. Similar experience includes structural and/or mechanical improvements to a water treatment plant or similar facility. Prior projects shall include structural additions to industrial sites and water treatment projects of similar size, magnitude, etc.

B. If requested by the Engineer or owner each bidder shall furnish the Owner satisfactory evidence of his or her competency to perform the proposed work. Such evidence of competency, shall consist of statements covering the bidder's past experience on similar work, and a list of key personnel that would be available. In addition, each bidder shall furnish the Owner satisfactory evidence of his or her financial responsibility. Such evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year.

C. A bidder may submit evidence that he or she is prequalified with the State Highway Division and is on the current "bidder's list" of the state in which the proposed work is located. Such evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified

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above.

D. Each bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the Owner after bid opening and prior to award if requested by the Owner or Engineer.

3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

A. Information and data shown or indicated in the Bidding Documents with respect to existing subsurface and physical conditions at or contiguous to the Site is based upon information and data furnished to Engineer by others of such subsurface and physical conditions, including Owner, or others.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 *Hazardous Environmental Condition*

A. None

4.04 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions, and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work, appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

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4.06 A. Reference is made to Article 7 of the Supplementary Conditions for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents (other than portions thereof related to price) for such other work.

B. Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.07 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable "technical data," and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in the Paragraph 4.06 of the Supplementary Conditions as containing reliable "technical data";

E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder’s safety precautions and programs;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

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H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.08. The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 A Pre-Bid conference will be held for this project. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are NOT required to attend and participate in the conference, but it is encouraged. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions or RFIs about the meaning, content, or intent of the Bidding Documents are to be submitted to the Engineer (Scott Bolton, PE; sbolton@ardurra.com). Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 – BID SECURITY

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8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier,

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individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each unit cost and total listed therein complete and in place. In the case of optional alternatives the words "No Bid," "No Change," or "Not Applicable" may be entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown.

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

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown.

13.08 All names shall be printed in ink below the signatures**.**

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

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

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 *Bid Schedule*

A. If Addenda have been issued that include revisions to the Bid Schedule, the Bidder is responsible for submitting his Bid on the Revised Bid Schedule.

14.02 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid Schedule. The Bidder must provide a unit price for every item of Work.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

14.03 *Allowances*

A. For cash allowances the Bid price shall 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 11.02.B of the General Conditions.

14.04 *Completion Time Comparisons*

A. Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9 above.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished 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.

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15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title, the name and address of Bidder, and shall 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 shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." A mailed Bid shall be addressed to Ardurra located at 2175 W 3000 S, Suite 200, Heber City, UT 84032.

15.03 No facsimile of FAX bids will be accepted. All bids must be submitted in original form with original signatures of bidders.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or 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.

16.02 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, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 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 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 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 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest

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in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not 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.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the lowest qualified and responsible Bidder whose Bid is in the best interests of the Project.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement along with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

END OF INSTRUCTIONS TO BIDDERS

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BID FORM

PROJECT IDENTIFICATION:

GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to: Green Hills Water and Sewer District

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

This Bid is submitted by:

BUSINESS: _____

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

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

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

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

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. 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.

D. Bidder has carefully studied all:

   i. All drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

E. Bidder has considered the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder's safety precautions and programs.

F. Based on the information and observations referred to in Paragraph 3.01.E above, Bidder does not consider that 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 required, and in accordance with the other terms and conditions of the Bidding Documents.

G. 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.

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

I. 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.

J. Bidder will submit written evidence of its authority to do business in the State or other jurisdiction where the Project is located no later than the date of its execution of the Agreement.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder further represents that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for a lump sum of the following price:

Bid No.	Item Description	Quantity	Unit	Unit Price
	Lump Sum			
1	Complete and functional Water treatment facility as shown in the plans and specification not including items noted below.	1.0	LS	
2	Tri-mite (or equal) Package System	1.0	LS	
3	Tiger Flow Booster Pumps (or equal)	1.0	LS	
	Earthwork Line Items			
4	Rock Excavation (as defined in APWA 31 23 17 - 1.3)	200	CY	

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Required Bid security in the form of a
Certified Check
Or
Bank Money Order
Or
Bid Bond

(Circle One)

B. Document 00 45 00 – List of Subcontractors

C. Evidence of authority to do business in the state or jurisdiction of the Project; or a written covenant to obtain such license within the timeframe for acceptance of Bids.

ARTICLE 8 – DEFINED TERMS

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

ARTICLE 9 – BID SUBMITTAL

9.01 This Bid is submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____ SEAL, if required by State

By: _____

(Individual's signature)

Doing business as:

_____

A Partnership

Partnership Name: _____ SEAL, if required by State

By: _____

(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name:

_____

State or Jurisdiction of Incorporation: _____

Type (General Business, Profession, Service, Limited Liability): _____

By: _____

(Signature -- attach evidence of authority to sign)

Name (typed or printed):

_____

Title: _____ CORPORATE SEAL, if required by State

Attest _____

(Signature of Corporate Secretary)

Date of Qualification to do business in _____ [State or other jurisdiction where Project is located] is ___/___/_____

A Joint Venture

Name of Joint Venture: _____

First Joint Venture Name: _____ SEAL, if required by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):
_____

Title: _____

Second Joint Venture Name: _____ SEAL, if required by State

By: _____
(Signature of joint venture partner -- attach evidence of authority to sign)

Name (typed or printed):
_____

Title: _____

(Each joint venture must sign. The manner of signing for each individual, partnership, and corporation that is party to the venture should be in the manner indicated above.)

Bidder's Business address: _____

_____

Business Phone No. (_____) _____

Business FAX No. (_____) _____

Business E-Mail Address
_____

State Contractor License No. _____. (If applicable)

Employer's Tax ID No. _____

Phone and FAX Numbers, and Address for receipt of official communications, if different from Business contact information:
_____
_____

9.02 Bid submitted on _____, 20___.

BID BOND

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
GREEN HILLS WATER AND SEWER DISTRICT
Huntsville, UT 84317

BID
Bid Due Date: **8/6/2024**

Description (*Name and Location*): **GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY – Huntsville, Utah**

BOND
Bond Number:
Date *(Not earlier than Bid due date)*:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

DOCUMENT 00 45 00

LIST OF SUBCONTRACTORS

The bidder shall list below the names and business address of each subcontractor who will perform Work under this Contract in excess of five percent (0.05) of the total bid price and shall also list the portion of the work which will be done by such subcontractor. After the opening of proposals, no changes or substitutions will be allowed without the written approval of the Owner. NOTE: Attach additional sheets if required.

WORK TO BE PERFORMED	SUBCONTRACTOR'S NAME AND ADDRESS
1.	
2.	
3.	
4.	
5.	
6.	

- END OF DOCUMENT -

Notice of Award

Date: _____

Project: WATER TREATMENT FACILITY	
Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.: _____
Contract: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY	Engineer's Project No.: 230105
Bidder: _____	
Bidder's Address: *[send Certified Mail, Return Receipt Requested]*	

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for The Water Treatment Facility.

Water Treatment Facility for Green Hills Water and Sewer District

The Contract Price of your Contract is_____. Dollars ($_____).

[Insert appropriate data if unit prices are used. Change language for cost-plus contracts.]

3 copies of the proposed Contract Documents (except Drawings) accompany this Notice of Award.

2 sets of the Drawings will be delivered separately or made available to you immediately.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Deliver to the Owner 3 fully executed counterparts of the Contract Documents.
2. Deliver with the executed Contract Documents the Contract security [Bonds] as specified in the Instructions to Bidders (Article 20), General Conditions (Paragraph 5.01), and Supplementary Conditions (Paragraph SC-5.01).
3. Provide copies of the following:
   Certificates of Insurance, Statement from Utah Employment Security Commission, Statement from Utah Division of Worker's Safety and Compensation, Copy of Utah Contractors License, and Extra Territorial Coverage for Out of State Contractors.

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

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

GREEN HILLS WATER AND SEWER DISTRICT
Owner

By:_____
Authorized Signature

_____
Title

Copy to Engineer

AGREEMENT

THIS AGREEMENT is by and between Green Hills Water and Sewer District ("Owner") and _____ ("Contractor").

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

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

The work for the Project, Green Hills Water and Sewer District Water Treatment Facility, includes several standard project tasks such as any necessary permitting, mobilization, implementation of any safety features, stormwater BMPs, etc. Work includes expansion of the existing treatment building, including mechanical, structural, electrical, HVAC, and civil site improvements, as well as implementation of process mechanical, electrical, and instrumentation and controls improvements to the treatment plant. Unless otherwise specified in the Project Manual, all of the work will be done in accordance with the Drawings and Specifications prepared by the Engineer and will meet the 2017 Utah Chapter APWA standards specifications and plans.

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: Green Hills Water and Sewer District **Water Treatment Facility.**

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Ardurra, the Consulting Engineers who shall hereinafter be referred to as "Engineer" and who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

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

4.02 *Dates to Achieve Substantial Completion and Final Completion and Payment*

The Contractor will commence the work required by the Contract Documents within fourteen (14) calendar days after the date of the Notice to Proceed; and will achieve substantial completion within one hundred and thirty-five (135) calendar days after the date of the Notice to Proceed; unless the

period for completion is extended otherwise by the Contract Documents. Final completion will be achieved within an additional 15 working days.

A. Winter Shutdown – The contractor shall be allowed a one hundred and thirty-five (135) (calendar)-day "winter shutdown" from approximately December 1st to April 15th. These days will not count towards the 135 allowable days to achieve substantial completion. The start date of the winter shutdown shall be confirmed in writing from the ENGINEER and will depend upon the season's snowfall conditions. Upon termination of the winter shutdown, the contractor shall achieve substantial completion in: one hundred and thirty-five (135) calendar days minus the calendar days spent working on the project prior to the winter shutdown.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 11 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $500.00 for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $500.00 for each day that expires after the time specified in Paragraph 4.02 or 4.03 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

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

6.02 *Progress Payments; Retainage*

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 25th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.03.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements.

1. No more than ten percent (10%) of the calculated value of any work completed shall be withheld until fifty percent (50%) of the work required by the Contract has been performed. Thereafter, the Owner may pay any of the remaining installments without retaining additional funds if, in the opinion of the Owner, satisfactory progress is being made in the work but under no condition shall more than ten percent (10%) be withheld on the remaining fifty percent (50%) of the work required. The withheld percentage of the Contract price of the work, improvement or construction shall be retained in an account in the name of the Contractor which has been assigned to the Owner until the Contract is completed satisfactorily and finally accepted by the Owner. If the Owner finds that satisfactory progress is being made in all phases of the Contract, it may, upon written request by the Contractor, authorize payment from the withheld percentage. Before payment is made, the OWNER shall determine that satisfactory and substantial reasons exist for the payment and shall require written approval from any surety furnishing bonds for the Contract.

2. If prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, in accordance with paragraph 14.02 of the General Conditions.

    a. 90% of Work completed (with the balance being retainage).

    b. 100% of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 90% of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14.02.05 of the General Conditions and less 100% of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 4 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement, Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor 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.

D. Contractor has carefully studied (or assumes responsibility for having done so) all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions.

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor's safety precautions and programs.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and

all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 *Contents*

A. The Contract Documents consist of the following:

1. This Agreement (pages 1 to 8, inclusive).

2. Performance Bond (pages 1 to 3, inclusive).

3. Payment Bond (pages 1 to 3, inclusive).

4. General Conditions (pages 1 to 68, inclusive).

5. Supplementary Conditions (pages 1 to 13, inclusive).

6. Specifications as listed in the table of contents of the Project Manual. All work on this project shall conform to 2017 APWA Standards and Specifications or as listed in these project specifications. If there is a conflict, the more stringent standard will apply.

7. Drawings consisting of a cover sheet and sheets identified on the cover sheet in the sheet index, with each sheet bearing the following general title: Water Treatment Plant (Facility).

8. Addenda (numbers ___to___ inclusive).

9. Exhibits to this Agreement (enumerated as follows):

   a. Notice to Proceed

   b. Contractor's Bid Proposal

   c. Documentation submitted by Contractor prior to Notice of Award.

10. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

    a. Notice to Proceed.

    b. Work Change Directives.

c. Change Orders.

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in the General Conditions and/or Special Provisions.

ARTICLE 10 – MISCELLANEOUS

10.01 *Terms*

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

10.02 *Assignment of Contract*

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

10.03 *Successors and Assigns*

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

10.04 *Severability*

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 *Contractor's Certifications*

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;

2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of Owner, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and

4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____(which is the Effective Date of the Agreement).

OWNER:

Green Hills Water and Sewer District

By: _____

Title: _____

Attest: _____

Title: _____

Address for giving notices:

Green Hills Water and Sewer District

Huntsville, UT 84317

_____

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

CONTRACTOR

_____

By: _____

Title: _____

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

Attest: _____

Title: _____

Address for giving notices:

_____

_____

_____

License No.: _____

(Where applicable)

Agent for service of process:

_____

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: WATER TREATMENT FACILITY	Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.:
Contract: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY		Date of Contract:
Contractor:		Engineer's Project No.: 230514

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price: $_____	Original Contract Times: ☐ Working days ☐ Calendar days Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. $_____	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____: Substantial completion (days): _____ Ready for final payment (days): _____
Contract Price prior to this Change Order: $_____	Contract Times prior to this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order: $_____	[Increase] [Decrease] of this Change Order: Substantial completion (days or date): _____ Ready for final payment (days or date): _____
Contract Price incorporating this Change Order: $_____	Contract Times with all approved Change Orders: Substantial completion (days or date): _____ Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____

Approved by Funding Agency (if applicable):

_____ Date: _____

Change Order

Instructions

A. GENERAL INFORMATION

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Price or Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Orders to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order should be used.

B. COMPLETING THE CHANGE ORDER FORM

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Owner or Contractor for approval, depending on whether the Change Order is a true order to the Contractor or the formalization of a negotiated agreement for a previously performed change. After approval by one contracting party, all copies should be sent to the other party for approval. Engineer should make distribution of executed copies after approval by both parties.

If a change only applies to price or to times, cross out the part of the tabulation that does not apply.

Work Change Directive

No. _____

Date of Issuance: _____ Effective Date: _____

Project: WATER TREATMENT FACILITY	Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.:
Contract: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY		Date of Contract:
Contractor:		Engineer's Project No.: 230514

Contractor is directed to proceed promptly with the following change(s):

Item No.	Description

Attachments (list documents supporting change):

_____

_____

Purpose for Work Change Directive:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

☐ Nonagreement on pricing of proposed change.

☐ Necessity to expedite Work described herein prior to agreeing to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price $ _____ (increase/decrease)

Contract Time _____ days (increase/decrease)

Recommended for Approval by Engineer:	Date
Authorized for Owner by:	Date
Received for Contractor by:	Date
Received by Funding Agency (if applicable):	Date:

Notice to Proceed

Date: _____

Project: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY	
Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.: _____
Contract: WATER TREATMENT FACILITY	Engineer's Project No.: 230514
Contractor: _____	
Contractor's Address: *[send Certified Mail, Return Receipt Requested]*	

You are notified that the Contract Times under the above Contract will commence to run on _____, 2023. On or before that date, you are to start performing your obligations under the Contract Documents. In accordance with Article 4 of the Agreement, the number of days to achieve Substantial Completion is 60 days and 30 days to achieve readiness for final payment.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds and loss payees) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

Also, before you may start any Work at the Site, you must:

Submit Work Schedule to ENGINEER_____ *[add other requirements].*

GREEN HILLS WATER AND SEWER DISTRICT

Owner

Given by:

Authorized Signature

Title

Date

Copy to Engineer

PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
Green Hills Water and Sewer District
Huntsville, UT 84317

CONTRACT
Effective Date of Agreement:
Amount:
Description (*Name and Location*): **GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY HUNTSVILLE, UTAH**

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and
   2.3 Owner has agreed to pay the Balance of the Contract Price to:
      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

   3.1 Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
   3.2 Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
   3.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;
5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and
5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

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

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

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

9. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.

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

11. Definitions.

11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
11.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
11.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
11.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: Owner's Representative: ARDURRA, 2175 W. 3000 S., SUITE 200, HEBER CITY, UT (435) 315-3168

PAYMENT BOND

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

CONTRACTOR (*Name and Address*):

SURETY (*Name, and Address of Principal Place of Business*):

OWNER (*Name and Address*):
Green Hills Water and Sewer District
Huntsville, UT 84317

CONTRACT
Effective Date of Agreement:
Amount:
Description *(Name and Location)*: **GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY HUNTSVILLE, UTAH**

BOND
Bond Number:
Date (*Not earlier than Effective Date of Agreement*):
Amount:
Modifications to this Bond Form:

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ (Seal)	_____ (Seal)
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
_____	_____
Title	Title

Note: Provide execution by additional parties, such as joint venturers, if necessary.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators,

successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.

2. With respect to Owner, this obligation shall be null and void if Contractor:

   2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

   2.2 Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.

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

4. Surety shall have no obligation to Claimants under this Bond until:

   4.1 Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

   4.2 Claimants who do not have a direct contract with Contractor:
      1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
      2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
      3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.

5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety, that is sufficient compliance.

6. Reserved.

7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.

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

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

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

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

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

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

15. Definitions

15.1 Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

15.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or otherwise comply with the other terms thereof.

FOR INFORMATION ONLY – (*Name, Address, and Telephone*) Surety Agency or Broker: Owner's Representative: ARDURRA, 2175 W. 3000 S., SUITE 200, HEBER CITY, UT (435) 315-3168

Certificate of Substantial Completion

Project: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY	
Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.:
Contract: WATER TREATMENT FACILITY	Engineer's Project No.: 230514

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

_____

_____

_____

_____

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

SECURITY, OPERATION, SAFETY, MAINTNEANCE, HEAT, UTILITIES, AND INSURANCE

_____

_____

_____

Contractor's Amended Responsibilities:

WARRANTIES AND GUARANTEES

_____

_____

_____

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

Certificate of Final Acceptance

Project: GREEN HILLS WATER AND SEWER DISTRICT WATER TREATMENT FACILITY	
Owner: GREEN HILLS WATER AND SEWER DISTRICT	Owner's Contract No.:
Contract: Water Treatment Facility	Engineer's Project No.: 230514

This [tentative] [definitive] Certificate of Final Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

_____

_____

_____

_____

_____
Date of Final Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be complete.

The Date of Completion of the Work or portion thereof designated above is hereby established, subject to the provisions of the Contract pertaining to Final Acceptance.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

_____

_____

_____

Contractor's Amended Responsibilities:

_____

_____

_____

_____

The following documents are attached to and made part of this Certificate:

_____

_____

_____

_____ _____

Executed by Engineer Date

_____ _____

Accepted by Contractor Date

_____ _____

Accepted by Owner Date

Affidavit Acknowledging Payment to Materialmen, Subcontractors, and Laborers

(*Completed form is to accompany all requests to the Owner for progress payments beginning with the second request)

Contractor: _____

Owner: Green Hills Water and Sewer District

Project: Water Treatment Facility

WHEREAS, the Contractor has been retained through contract by the Owner to furnish labor or materials for construction of the above-named Project, which is owned by the Owner; and

THEREFORE, I, _____, hereby certify to the best of my knowledge, information, and belief, on a penalty of false swearing that:

• I am authorized to complete and sign this affidavit on the Contactor's behalf as the Contractor's Representative.

• Other than the reasonable disputes listed and described in this affidavit, all materialmen, subcontractors, and laborers have been paid according to their respective contracts for the work or services they performed, or materials they provided for the above-referenced contract through _____, 20___ (the date of the most recent payment received by the Contractor from the Owner).

• The funds for the disputes described in this affidavit are not included in the current pay request submitted with this affidavit, and are not included in the total amount claimed in that pay request as work completed.

Disputes: (*If none, write "None." Attach additional pages as necessary.)

Name of Entity	Amount Not Paid	Reason Funds Not Paid
_____	_____	_____
_____	_____	_____
_____	_____	_____
	_____	
	Total $	

I certify under penalty of false swearing that the foregoing Affidavit Acknowledging Payment to Materialmen, Subcontractors, and Laborers is true.

_____ _____
Signature of Contractor's RepresentativeDate

_____
Name and Title of Contractor's Representative

STATE OF _____)
) ss.
COUNTY OF _____)

The foregoing instrument was acknowledged before me by

_____ this _____ day of

_____, 20___.

Witness my hand and official seal.

_____
Notary Public

My commission expires: _____

This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly by

AMERICAN COUNCIL OF ENGINEERING COMPANIES

_____

ASSOCIATED GENERAL CONTRACTORS OF AMERICA

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A Practice Division of the
NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

Endorsed by

CONSTRUCTION SPECIFICATIONS INSTITUTE

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These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms (See SC-1.01)*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms. (See SC-1.01)

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

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

5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*—The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

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12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*—See Paragraph 11.01 for definition.

17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

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

19. *Engineer*—The individual or entity named as such in the Agreement.

20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*—Sections of Division 1 of the Specifications.

22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.

23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

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

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25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

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

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*—Polychlorinated biphenyls.

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

32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

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

36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.

37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

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38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.

43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.

46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.

47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.

48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

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49. *Unit Price Work*—Work to be paid for on the basis of unit prices.

50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight. (See SC-1.02)

D. *Defective:*

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1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

    a. does not conform to the Contract Documents; or

    b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

    c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning. (See SC-1.02)

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

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2.02 *Copies of Documents*

Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction. (See SC-2.02)

2.03 *Commencement of Contract Times; Notice to Proceed*

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

2.04 *Starting the Work*

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

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work. (See SC-2.05)

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

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B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work. (See SC-2.07)

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

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1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation , (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

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a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or

2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's

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sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and (See SC-4.02)

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and

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drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

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

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or

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

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data;

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b. locating all Underground Facilities shown or indicated in the Contract Documents;

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work. (See SC-4.04)

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel. (See SC4.05)

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4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site. (See SC4.06)

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

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

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to

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entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year

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after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond. (See SC-5.01)

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance. (See SC5.03)

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D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor. (See SC5.03)

E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional

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insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

6. include completed operations coverage:

    a. Such insurance shall remain in effect for two years after final payment.

    b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

(See SC-5.04)

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance* (See SC-5.06)

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

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1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee; (See SC-5.06)

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee. (See SC-5.06)

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary

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Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights* (See SC-5.07)

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

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C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds* (See SC-5.08)

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to

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Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

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

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

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C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and

3) it has a proven record of performance and availability of responsive service.

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b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,

b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

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3) will identify:

a) all variations of the proposed substitute item from that specified, and

b) available engineering, sales, maintenance, repair, and replacement services; and

4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

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B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary

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Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work. (See SC6.08)

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6.09 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work. (See SC6.10)

6.11 *Use of Site and Other Areas*

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

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other

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dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

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

6.12 *Record Documents*

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

6.13 *Safety and Protection* (See SC-6.13, 6.14, 6.15, & 6.16)

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

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B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative* (See SC-6.13, 6.14, 6.15, & 6.16)

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs* (See SC-6.13, 6.14, 6.15 & 6.16)

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

6.16 *Emergencies* (See SC-6.13, 6.14, 6.15 & 6.16)

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant

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changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

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d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

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

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6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses,

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and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's

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failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions: (See SC-7.02)

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.

C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

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

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

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

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8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

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8.12 *Compliance with Safety Program*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

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

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions. (See SC-9.03)

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9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

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

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between

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Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

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

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

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

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9.10 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and

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Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part;

2. approve the Claim; or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

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E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides

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that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

   a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

   b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

   c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

   d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

   e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

   f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

   g. The cost of utilities, fuel, and sanitary facilities at the Site.

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h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

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

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B. *Cash Allowances:*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item. (See SC-11.03)

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

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B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

   a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

   b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

   c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

   d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

   e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

   f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

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12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

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

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

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

13.03 *Tests and Inspections*

A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

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

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

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E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

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

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it

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from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

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E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties

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are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

~~A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed. (See SC-14.01)~~

14.02 *Progress Payments*

A. *Applications for Payments:*

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications:*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to

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recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

    a. the Work has progressed to the point indicated;

    b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and

    c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

    a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

    b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

    a. to supervise, direct, or control the Work, or

    b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

    c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

    d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

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e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

   d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor. (See SC-14.02)

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

   a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

   b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   c. there are other items entitling Owner to a set-off against the amount recommended; or

   d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any

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adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.

3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion,

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Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

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

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

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

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14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

   a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;

   b. consent of the surety, if any, to final payment;

   c. a list of all Claims against Owner that Contractor believes are unsettled; and

   d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance:*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

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C. *Payment Becomes Due:* (See SC-14.07)

~~1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.~~

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

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15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's repeated disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

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E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor

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may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or

3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

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17.02 *Computation of Times*

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

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

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

17.07 (See SC-17.07)

17.08 (See SC-17.08)

17.09 (See SC-17.09)

17.10 (See SC-17.10)

17.11 (See SC-17.11)

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DOCUMENT 00 80 00 SUPPLEMENTARY CONDITIONS

1. SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2007 ed.) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

2. DEFINED TERMS

The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract (C-700, 2007 ed.) have the meanings assigned to them in the Standard General Conditions. Additional terms used in these Supplemental Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

3. SC-1.01

Add the following paragraph immediately after Paragraph 1.01A.51. of the Standard General Conditions:

52. ABBREVIATIONS - Whenever the following abbreviations are used in these specifications or on the drawings they shall be construed to have the same as the respective expressions represented:

ABBREVIATION	EXPRESSION
CY	Cubic Yard
EA	Each
GAL	Gallon
HR	Hour
LF	Lineal Feet
LS	Lump Sum
MFBM	Thousand Feet Board Measure
SF	Square Feet
SY	Square Yard

53. UNDERGROUND FACILITIES VS. UNDERGROUND UTILITIES - The words “underground facilities” and “underground utilities” are interchangeable and shall have the same meaning as defined in these contract documents.

4. SC-1.02

Add the following definition to Paragraph 1.02C. of the Standard General Conditions:

2. Working Day - Any day other than a legal holiday, Saturday or Sunday on

which the normal working forces of the CONTRACTOR may proceed with regular work for at least 6 hours toward completion of the contract, unless work is suspended for adverse weather or some other cause which is beyond the CONTRACTOR'S control. Any Saturday, Sunday or Holiday on which the CONTRACTOR works more than one shift a day, each 8 hour period shall be counted as one working day.

Add the following new paragraphs immediately after Paragraph 1.02F. of the Standard General Conditions:

G. Whenever in these contract documents, specifications and drawings the word "shall" is used, shall be interpreted as imperative. Whenever the words "will" or "may" are used, the sense of the words shall be interpreted to be permissive.

H. Some of the specification sections, Division 1 through 16, are written in imperative and streamlined form. This imperative language is directed to the CONTRACTOR, unless specifically noted otherwise

5. SC-2.02

Delete the word "ten" in the first sentence of Paragraph 2.02A. of the Standard General Conditions and replace with the word "five".

6. SC-2.05

Add the following sentence to the end of Paragraph 2.05A.3. of the Standard General Conditions:

A preliminary schedule of values will only be required for lump sum construction bid items greater than $10,000.00 in value.

7. SC-2.07

Add the following new paragraph immediately after Paragraph 2.07A.3 of the Standard General Conditions:

B. ENGINEER may waive scheduled conference if all necessary schedules have been received and are acceptable as submitted.

8. SC-4.02

Replace paragraph 4.02A.1 with None

9. SC-4.05

Project Control is shown on the plans and has been verified by a Professional Licensed Utah Surveyor.

10. SC-5.01

Add the following new paragraph immediately after Paragraph 5.01B. of the Standard General Conditions:

1. The Performance and Payment Bonds (Sections 00610 and 00615) must be supplied on the forms provided by the ENGINEER. The surety issuing these bonds must be licensed to do business in the State of Utah by the Utah Insurance Commissioner.

11. SC-5.03

Delete Paragraphs 503.C and 5.03.D and add the following:

C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.

D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect Contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

12. SC-5.04

Add the following new paragraph immediately after Paragraph 5.04B of the Standard General Conditions:

C. The limits of liability for the insurance required by Paragraph 5.04 of the Standard General Conditions shall provide "per project" for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers' Compensation, and related coverages under Paragraphs 5.04A.1 & 504A.2 of the Standard General Conditions:

a.	State: Utah	Statutory
b.	Employer's Liability:	
	Each Accident	$1,000,000
	Disease-Each Employee	$1,000,000
	Disease-Policy Limit:	$ 500,000

2. CONTRACTOR'S General Liability under Paragraphs 5.04A.3 through 5.04A.6 of the Standard General Conditions shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of the CONTRACTOR. Property Damage Liability insurance will provide Explosion, Collapse and Underground coverages where applicable per project:

a. General Aggregate	$2,000,000
b. Products & Completed Operations Aggregate	$4,000,000
c. Personal & Advertising Injury	$2,000,000
d. Each Occurrence	$2,000,000

3. Automobile Liability under Paragraph 5.04A.6 of the Standard General Conditions:

a. Bodily Injury:	
Each Person	$1,000,000
Each Accident	$1,000,000
b. Property Damage	
Each Accident	$1,000,000

4. The Contractual Liability coverage required by Paragraph 5.04B.3 of the

Standard General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:
   Each Accident $1,000,000
   Annual Aggregate $2,000,000

b. Property Damage:
   Each Accident $1,000,000
   Annual Aggregate $2,000,000

5. Additional Insurance - Owner's and Contractor's Protective Liability and Property Damage Insurance (OCP) – Separate Protective Liability Policy with OWNER as the named insured.

   Each Occurrence $2,000,000
   General aggregate $4,000,000

6. Include the following as additional insureds on this project for all types of insurance listed in Paragraphs 5.04A.1 through 5.04A.6., and on any other policies listed in these Supplementary Conditions:

   OWNER – GREEN HILLS WATER AND SEWER DISTRICT
   ENGINEER – Ardurra

13. SC-5.06, 5.07 and 5.08 – PROPERTY INSURANCE – CONTRACTOR PROVIDED

Sections 5.06, 5.07 and 5.08 are modified from the Standard General Conditions have been modified from the Standard EJCDC C-700 document to require the CONTRACTOR to obtain property insurance for full replacement cost of the Work, with a $1,000.00 deductible.

14. SC-5.06.A.1

Add the following new language at the end of paragraph 5.06.A.1 of the Standard General Conditions:

OWNER – GREEN HILLS WATER AND SEWER DISTRICT
ENGINEER – Ardurra Group, Inc
CONTRACTOR - As shown on Agreement
Subcontractor - As designated in Writing by Contractor

15. SC-5.06.A.2

Delete paragraph 5.06.A.2 and replace with the following:

Builder's rick insurance requirement shall be waived for this project.

16. SC-5.06.B.

Add the following new language at the end of paragraph 5.06.B. of the Standard General Conditions:

OWNER – GREEN HILLS WATER AND SEWER DISTRICT
ENGINEER – Ardurra Group, Inc
CONTRACTOR - As shown on Agreement.
Subcontractor - As designated in Writing by Contractor

17. SC – 6.08

PERMITS AND COMPLIANCE WITH LAWS

A. The CONTRACTOR shall procure and pay for all permits, licenses, and bonds necessary for the prosecution of his work, and/or required by Local, State, and Federal regulations and laws, as pertains particularly to permits and transportation of materials and equipment, or other operations which are not a specific requirement of these specification. The CONTRACTOR shall give all notices, pay all fees and taxes, and comply with all Federal, State, and Local laws, ordinances, rules, and regulations, and building and construction codes bearing on the conduct of the work.

18. SC-7.02

The OWNER intends to or has contracted with the following individuals or entities for Work at the Site:

No work is scheduled to be performed by other individuals or entities.

19. SC-9.03

Add the following new language at the end of paragraph 9.03A. of the Standard General Conditions:

B. If OWNER and ENGINEER agree, ENGINEER shall furnish a Resident Project Representative ("RPR"), assistants and other field staff to assist ENGINEER in observing progress and quality of the work of CONTRACTOR.

Through more extensive on-site observations of the work in progress and field checks of materials and equipment by the RPR and assistants, ENGINEER shall endeavor to provide further protection for OWNER against defects and deficiencies in the work of CONTRACTOR. However, ENGINEER shall not,

during such visits or as a result of such observations of CONTRACTOR'S in progress, supervise, direct or have control over CONTRACTOR'S work nor shall ENGINEER have authority over or responsibility for the means, methods, techniques, sequences or procedures selected by CONTRACTOR, for safety precautions and programs incident to the work of CONTRACTOR, for any failure of CONTRACTOR to comply with laws, rules, regulations, ordinances, codes or orders applicable to CONTRACTOR'S performing and furnishing the work, or responsibility of construction for CONTRACTOR'S failure to furnish and perform the Work in accordance with the Contract Documents.

The duties and responsibilities of the RPR are limited to those of ENGINEER in ENGINEER's Agreement with the OWNER and in the construction Contract Documents, and are further limited and described as follows:

1. General

RPR is ENGINEER's agent at the site, will act as directed by and under the supervision of ENGINEER, and will confer with ENGINEER regarding RPR's actions. RPR's dealings in matters pertaining to the on-site work shall in general be with ENGINEER and CONTRACTOR, keeping OWNER advised as necessary. RPR's dealings with subcontractors shall only be through or with the full knowledge and approval of CONTRACTOR. RPR shall generally communicate with OWNER with the knowledge of and under the direction of ENGINEER.

2. Duties and Responsibilities of RPR

a. *Schedules:* Review the progress schedule, schedule of Shop Drawing submittals and schedule of values prepared by CONTRACTOR and consult with ENGINEER concerning acceptability.

b. *Conferences and Meetings:* Attend meetings with CONTRACTOR, such as preconstruction conferences, progress meeting, job conferences and other project-related meetings and prepare and circulate copies of minutes thereof.

c. *Liaison:*
   i. Serve as ENGINEER's liaison with CONTRACTOR, working principally through CONTRACTOR'S superintendent and assist in understanding the intent of Contract Documents; and assist ENGINEER in serving as OWNER's liaison with CONTRACTOR when CONTRACTOR'S operations affect OWNER's on-site operations.
   ii. Assist in obtaining from OWNER additional details or information, when required for proper execution of the work.

d. *Shop Drawings and Samples:*

i. Record date of receipt of Shop Drawings and Samples.
ii. Receive Samples which are furnished at the site by CONTRACTOR, and notify ENGINEER of availability of Samples for examination.
iii. Advise ENGINEER and CONTRACTOR of the commencement of any Work requiring a Shop Drawing or Sample if the submittal has not been approved by ENGINEER.

e. *Review of Work, Rejection of Defective Work, Inspections and Tests:*
i. Conduct on-site observations of the Work in progress to assist ENGINEER in determining if the Work is in general proceeding in accordance with the Contract Documents.
ii. Report to ENGINEER whenever RPR believes that any work will not produce a completed Project that conforms generally to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise ENGINEER of Work that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.
iii. Verify that tests, equipment and systems start-ups and operating and maintenance training are conducted in the presence of appropriate personnel, and that CONTRACTOR maintains adequate records thereof; and observe, record and report to ENGINEER appropriate details relative to the test procedures and start-ups.
iv. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to ENGINEER.

f. *Interpretation of Contract Documents:* Report to ENGINEER when clarifications and interpretations of the Contract Documents are needed and transmit to CONTRACTOR clarifications and interpretations as issued by ENGINEER.

g. *Modifications:* Consider and evaluate CONTRACTOR'S suggestions and report with RPR's recommendations to ENGINEER. Transmit to CONTRACTOR in writing decisions as issued by ENGINEER.

h. *Records:*
i. Maintain at the job site orderly files for correspondence, reports of job conferences, Shop Drawings and Samples, reproductions of original Contract Documents including all Work Change Directives, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, ENGINEER's clarifications and interpretations of the Contract Documents, progress

reports, Shop Drawing submittals received from and delivered to CONTRACTOR and other Project related documents.

ii. Prepare a daily report or keep a diary or log book, recording CONTRACTOR'S hours on the job site, weather conditions, data relative to questions of Work Change Directives, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to ENGINEER.

iii. Record names, addresses and telephone numbers of all CONTRACTORS, subcontractors and major suppliers of materials and equipment.

i. *Reports:*

i. Furnish to ENGINEER periodic reports as required of progress of the Work and of CONTRACTOR'S compliance with the progress schedule and schedule of Shop Drawing and Sample submittals.

ii. Consult with ENGINEER in advance of scheduled major tests, inspections or start of important phases of the Work.

iii. Draft proposed Change Orders and Work Change Directives, obtaining backup material from CONTRACTOR and recommend to ENGINEER Change Orders and Work Change Directives, and Field Orders.

iv. Report immediately to ENGINEER and OWNER the occurrence of any accident.

j. *Payment Requests:* Review Applications for Payment with CONTRACTOR for compliance with the established procedure for their submission and forward with recommendations to ENGINEER, noting particularly the relationship of the payment requested to the Work completed and materials and equipment delivered at the site but not incorporated in the Work.

k. *Certificates, Maintenance and Operation Manuals*: During the course of the Work, verify that certificates, maintenance and operation manuals and other data required to be assembled and furnished by CONTRACTOR are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to the ENGINEER for review and forwarding to OWNER prior to final payment for the Work.

l. *Completion:*

i. Before ENGINEER issues a Certificate of Substantial Completion, submit to CONTRACTOR a list of observed items requiring completion or correction.

ii. Observe whether CONTRACTOR has had performed inspections required by laws, rules, regulations, ordinances, codes, or orders applicable to the work, including but not limited to those to be performed by public agencies having jurisdiction over the work.

iii. Conduct a final inspection in the company of ENGINEER,

OWNER, and CONTRACTOR and prepare a final list of items to be completed or corrected.

iv. Observe whether all items on final list have been completed or corrected and make recommendations to ENGINEER concerning acceptance and issuance of the Notice of Acceptability of the Work.

3. Limitations of Authority of RPR.

Resident Project Representative:

a. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or equal" items), unless authorized by ENGINEER.

b. Shall not exceed limitations of ENGINEER's authority as set forth in the Contract Documents.

c. Shall not undertake any of the responsibilities of CONTRACTOR, subcontractor, Suppliers, or Contractor's superintendent.

d. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures of construction unless such advise or directions are specifically required by the Contract Documents.

e. Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the Work.

f. Shall not accept Shop Drawing or Sample submittals from anyone other than CONTRACTOR.

g. Shall not authorize the OWNER to occupy the Project in whole or in part.

h. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by ENGINEER.

20. SC-6.10

Owner is exempt from Utah state sales and use taxes on materials and equipment to be incorporated in the Work. (Exemption No. 11-0-00168). Said taxes shall not be included in the Bid.

24. SC-11.03

Delete Paragraph 11.03D. of the Standard General Conditions in its entirety and insert the following in its place:

D. The unit price of an item of Unit Price Work shall be subject to re-evaluation and adjustment under the following conditions:

1. if the total final cost of a particular item of Unit Price Work amounts to 25% or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by CONTRACTOR differs by

more than 10% from the estimated quantity of such item indicated in the Agreement; and

2. if there is no corresponding adjustment with respect to any other item of Work; and

3. if CONTRACTOR believes that CONTRACTOR has incurred additional expense as a result thereof; or if OWNER believes that the quantity variation entitles OWNER to an adjustment in the unit price, either OWNER or CONTRACTOR may make a claim for an adjustment in the Contract Price in accordance with Article 11 if the parties are unable to agree as to the appropriate increase or decrease to the unit price, due to change in the quantity of Unit Price Work performed.

25. SC-14.01

Delete the first sentence of Paragraph 14.01A. of the Standard General Conditions in it's entirety.

26. SC-14.02

Delete Paragraph 14.02.C.1 of the Standard General Conditions in its entirety and replace with the following paragraph:

1. The Application for Payment with the Engineer's recommendations will be presented to the Owner for consideration. If the Owner finds the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due within ten working days after receipt by the Owner of payments from the funding agencies.

27. SC- 14.07C

Delete Paragraph 14.07C.1. of the Standard General Conditions in its entirety and replace with the following paragraph:

1. Final payment will not be made to CONTRACTOR until he has filed a sworn statement with the OWNER setting forth that all claims for material and labor performed under the Contract have been paid.

28. SC-17.07

GENERAL
All construction work shall be accomplished in compliance with the provisions of the following:

1. National Environmental Policy Act of 1969, P.L. 91-190

2. Utah Air and Water Quality Standards

3. Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations issued thereunder.

29. SC-17.08

The only items for which payment will be made under this contract are those included in the Bid Schedule. All other items included in the plans and specifications will be considered incidental (subsidiary) to and included in the prices for the items in the Bid Schedule.

30. SC-17.09

SANITATION FACILITIES FOR CONSTRUCTION PERSONNEL

The Contractor shall provide sufficient self-contained, portable toilets for use by construction personnel.

31. SC-17.10

STAGING AREA

The Owner will not supply a staging area for this project. See Special Provision 01010, Summary of Work.

32. SC-17.11

PREVIOUS PROJECT EXPERIENCE

If requested by the Engineer or owner each bidder shall furnish the Owner satisfactory evidence of his or her competency to perform the proposed work. Such evidence of competency, shall consist of statements covering the bidder's past experience on similar work, and a list of key personnel that would be available. In addition, each bidder shall furnish the Owner satisfactory evidence of his or her financial responsibility. Such evidence of financial responsibility, unless otherwise specified, shall consist of a confidential statement or report of the bidder's financial resources and liabilities as of the last calendar year or the bidder's last fiscal year.

A bidder may submit evidence that he or she is prequalified with the State Highway Division and is on the current "bidder's list" of the state in which the proposed work is located. Such evidence of State Highway Division prequalification may be submitted as evidence of financial responsibility in lieu of the certified statements or reports specified above.

Each bidder shall submit "evidence of competency" and "evidence of financial responsibility" to the Owner after bid opening and prior to award if requested by the Owner or Engineer.

Contractor shall have completed 3 similar projects within the last 5-years. Similar experience includes wastewater treatment plant or facility upgrades.

END OF SUPPLEMENTARY CONDITIONS

00-90-00 SRF Requirements

1. Investing in America Signage Required Term and Condition

2. Investing in America Brand Guide

3. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion Lower Tier Covered Transactions

4. Required Signs and Posters

5. Disadvantaged Business Enterprise Procurement Requirements Federal SRF Loan Program

6. EPA Form 5700-52A

7. Equal Opportunity Clauses

8. Certification of Non-Segregated Facilities

9. Prohibition Against Listed Violating Facilities

10. Instructions for Complying with Davis-Bacon Wage Requirements

11. Building Wage Determination – Weber County

12. Heavy Wage Determination – Weber County

13. Build America, Buy America (BABA) Act Interim Requirements

14. Build America, Buy America (BABA) Act Requirements

15. Build America, Buy America (BABA) Act Agreement Clause

Investing in America Signage Required Term and Condition

1. Signage Requirements

a. Investing in America Emblem: The recipient will ensure that a sign is placed at construction sites supported in whole or in part by this award displaying the official Investing in America emblem and must identify the project as a "project funded by President Biden's Bipartisan Infrastructure Law" or "project funded by President Biden's Inflation Reduction Act" as applicable. The sign must be placed at construction sites in an easily visible location that can be directly linked to the work taking place and must be maintained in good condition throughout the construction period.

The recipient will ensure compliance with the guidelines and design specifications provided by EPA for using the official Investing in America emblem available at: https://www.epa.gov/invest/investing-america-signage.

b. Procuring Signs: Consistent with section 6002 of RCRA, 42 U.S.C. 6962, and 2 CFR 200.323, recipients are encouraged to use recycled or recovered materials when procuring signs. Signage costs are considered an allowable cost under this assistance agreement provided that the costs associated with signage are reasonable. Additionally, to increase public awareness of projects serving communities where English is not the predominant language, recipients are encouraged to translate the language on signs (excluding the official Investing in America emblem or EPA logo or seal) into the appropriate non-English language(s). The costs of such translation are allowable, provided the costs are reasonable.

2. Public or Media Events

EPA encourages the recipient to notify the EPA Project Officer listed in this award document of public or media events publicizing the accomplishment of significant events related to construction projects as a result of this agreement and provide the opportunity for attendance and participation by federal representatives with at least ten (10) working days' notice.

INVESTING IN AMERICA

Investing In America Signage Guidelines

The Bipartisan Infrastructure Law
The CHIPS and Science Act
The Inflation Reduction Act
The American Rescue Plan

Last Updated: March 2, 2023

Office of Digital Strategy
White House Office, EOP

Meena Yi
Abbey Pitzer

Guidelines for Logo Applications

The purpose of this document is to provide general guidelines for signs displayed at project sites for projects funded under the Bipartisan Infrastructure Law (also known as the Infrastructure Investment and Jobs Act), the CHIPS and Science Act, the Inflation Reduction Act, the American Rescue Plan, and other Federally-funded projects as appropriate. The first part of this document pertains to signs for Federally-funded projects that are not installed in the highway right-of-way. For highway signage guidance that is MUTCD compliant please see pages 13 and 14. For all other signs please start here. This document provides information about the Investing In America logo mark as well as how logos, marks and seals of states, cities, and counties can be incorporated into signage. Logos of contractors are not permitted on the signage. When logos are included in signage, the placement should conform to these brand guidelines.

Variations and Usage

There is one approved mark associated with the Investing In America logo. To preserve the integrity of the Investing In America logo mark, make sure to apply them correctly. Altering, distorting, or recreating the 'marks' in any way weakens the power of the image and what it represents. Layout and design of signs and communication materials will vary, so care must be taken when applying the logo mark.

Primary Logo Mark

INVESTING IN AMERICA

Colors

The colors, graphics, and fonts used should conform to graphic standards.

COLOR	CMYK	RGB	HEX	PMS
Blue	83, 48, 0, 48	22 / 68 / 132	#164484	PMS 7687 C
Red	0, 100, 81, 0	255 / 0 / 49	#FF0031	PMS 185 C
White	2, 2, 0, 3	242 / 244 / 248	#F2F4F8	Bright White

Logos



White background: logo in red and blue

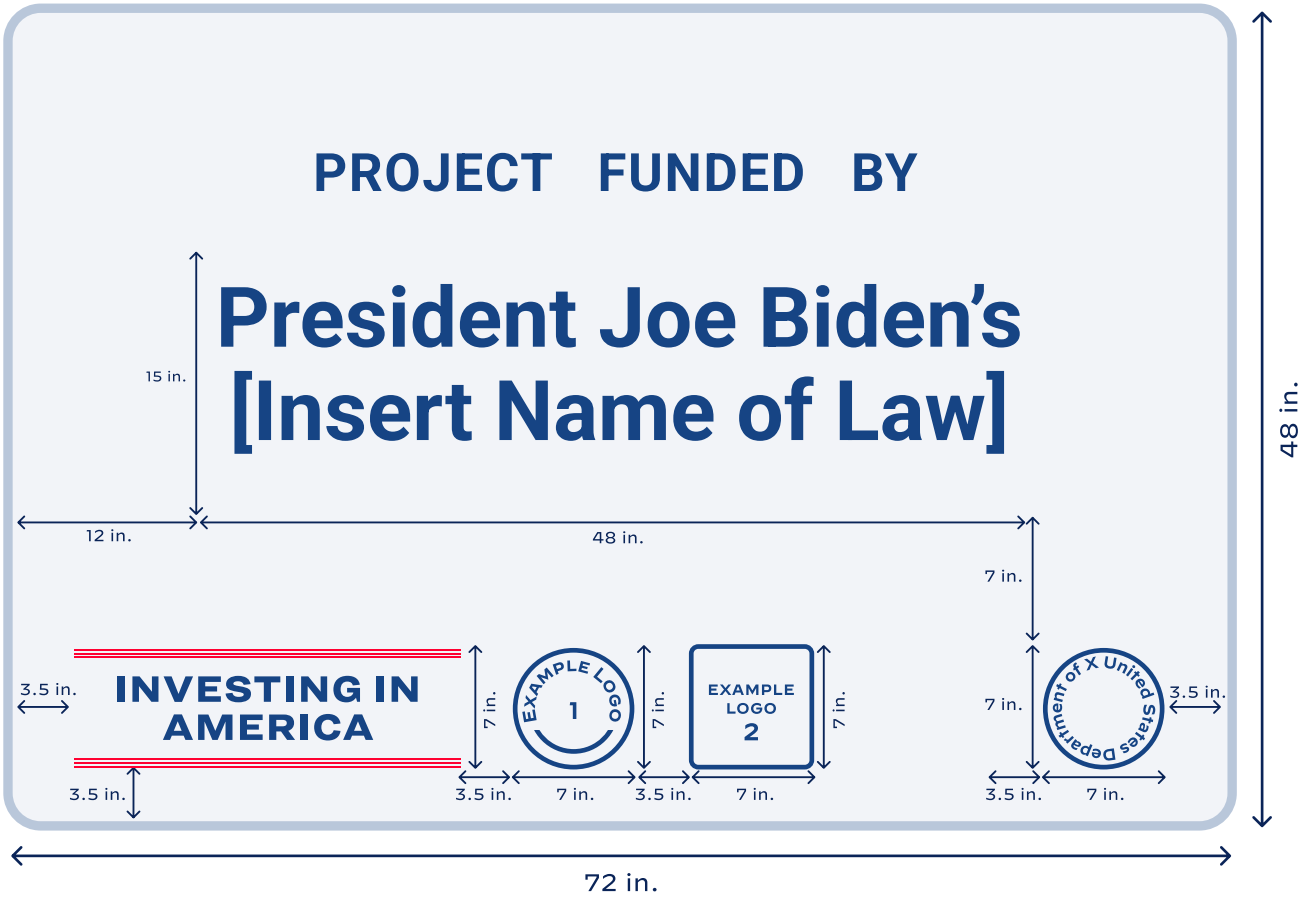


Gray background: logo in red and blue



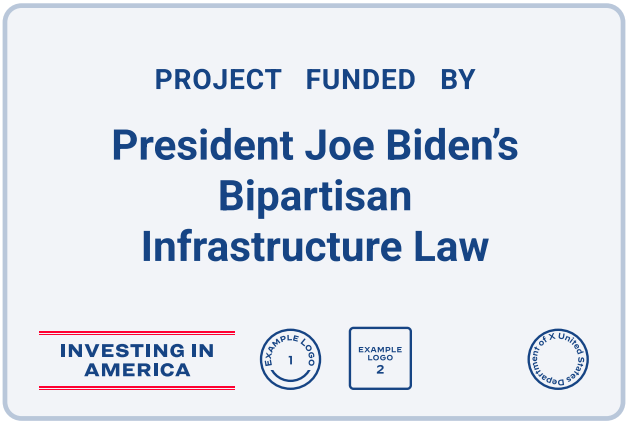
Blue background: logo in all white

Investing In America General Guidelines for Logo Applications



Sign Colors

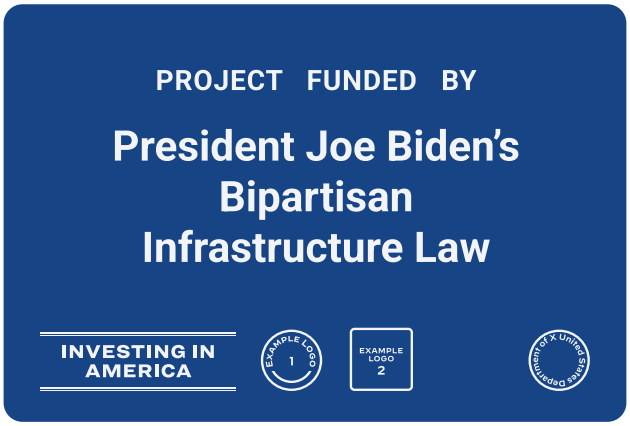
1. The Bipartisan Infrastructure Law



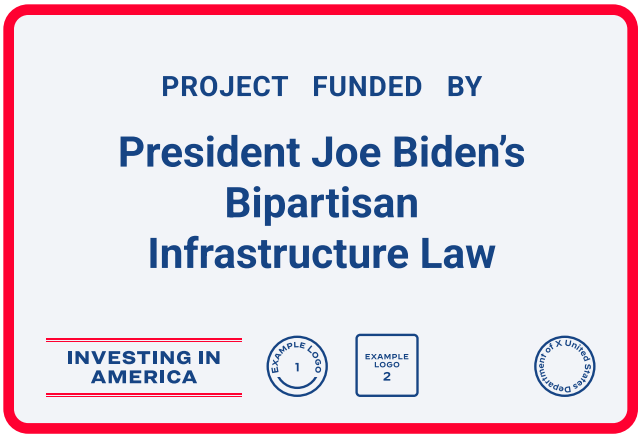
White



Gray



Blue



Red Border

Sign Colors

2. The CHIPS and Science Act



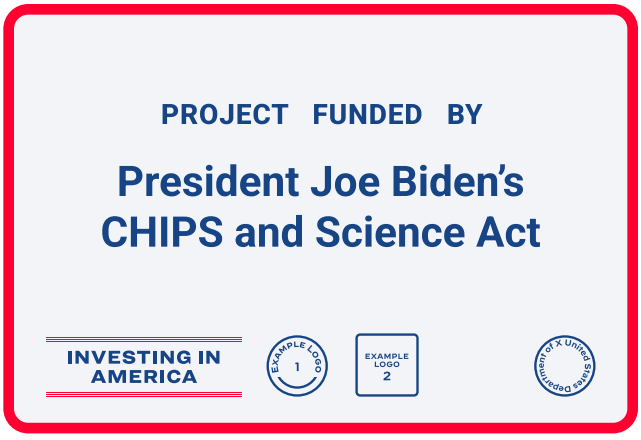
White



Gray



Blue



Red Border

Sign Colors

3. The Inflation Reduction Act



White



Gray



Blue



Red Border

Sign Colors

4. The American Rescue Plan



White



Gray



Blue



Red Border

State, City, and County Logo Variations



Square or Circular State Logo: 7x7 in.



Rectangular or Oval State Logo: **not** to exceed 17.5 x 7 in.

3 Logo Samples



Circular City Logo 7 x 7 in. State rectangular logo should **not** exceed 17.5 x7 in.



Rectangular State Logo: **not** to exceed 17.5 x 7 in.

2 Logo Samples

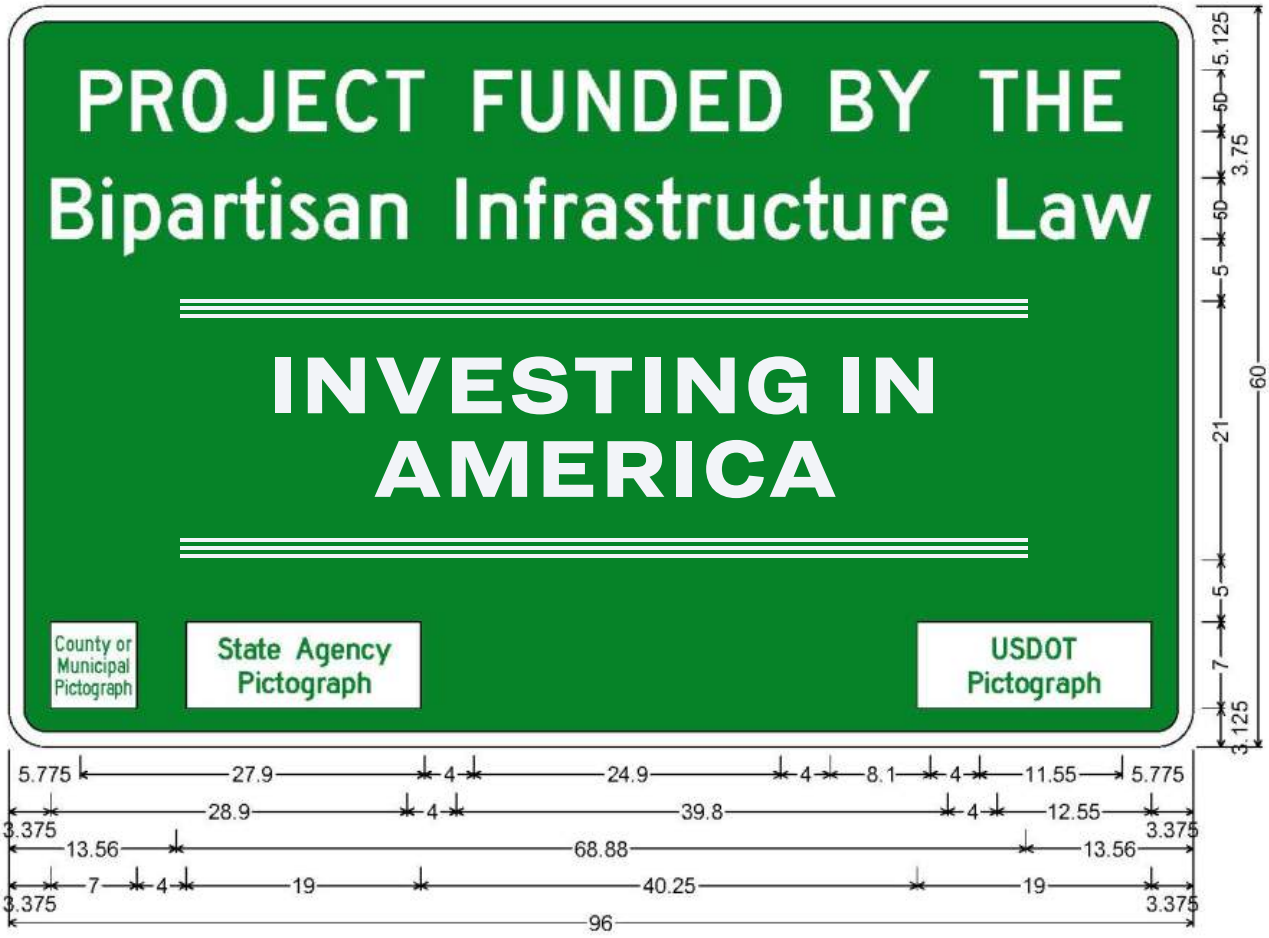


Circular State Logo: 7 x 7 in.

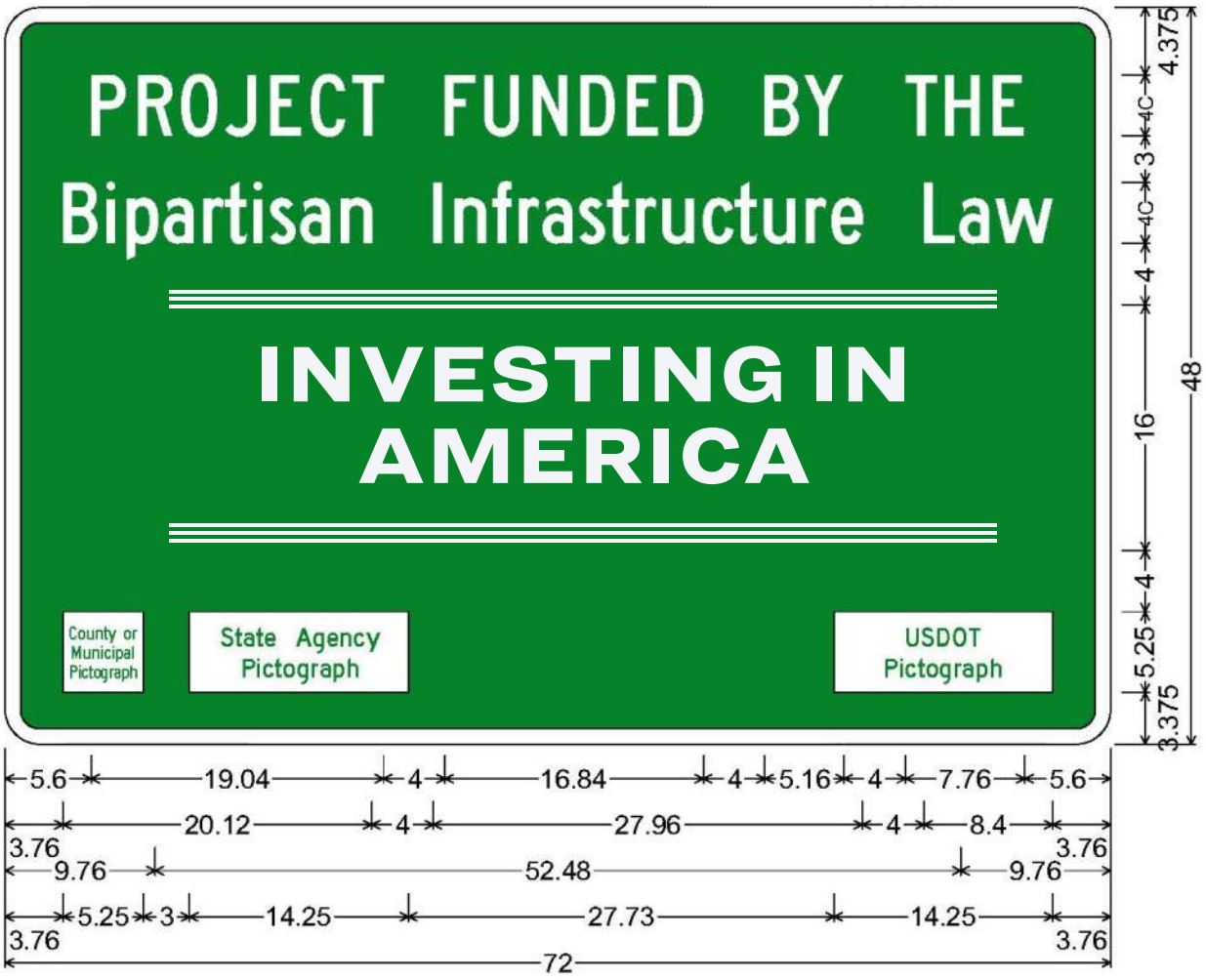


Rectangular State Logo: **not** to exceed 17.5 x 7 in.

Rules for Highway Right of Way Signage 8 Feet



Rules for Highway Right of Way Signage 6 Feet



SRF SPECIAL CONDITIONS

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION LOWER TIER COVERED TRANSACTIONS

Instructions for Certification

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.

2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.

4. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

6. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from covered transactions, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.

8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

_____

Organization Name

_____

Name and Title of Authorized Representative

_____

Signature

Date

REQUIRED SIGNS AND POSTERS

The following signs and posters required for the project include but are not limited to:

1.	Minimum Wage Poster	**https://www.dol.gov/agencies/whd/posters/flsa**
2.	Davis-Bacon Wage Poster WH-1321	**https://www.dol.gov/agencies/whd/posters/dbra**
3.	Equal Opportunity Employer Poster:	**www.dol.gov/agencies/ofccp/posters**
4.	OSHA Poster	**www.osha.gov/publications/poster**
5.	SRF Signage	See next 7 pages

DISADVANTAGED BUSINESS ENTERPRISE (DBE)
PROCUREMENT REQUIREMENTS
FEDERAL SRF LOAN PROGRAM

Revised 2/20/2020

INFORMATION TO LOAN RECIPIENT: All loan recipients of Federal State Revolving Fund (SRF) Loans shall make the six good faith efforts, listed below, to assure compliance with the State's "fair share goals" in compliance with federal DBE procurement requirements. The loan recipient/borrower shall ensure, to the fullest extent possible, that these efforts are made in all procurements for prime contractors, subcontractors, suppliers, and others, as specified below.

These requirements are extended to any and all contractors who submit bids for construction work on this loan. After the bid opening the apparent responsible, responsive, low bidder will be required to provide documentation of attempts made to get bids from suppliers, subcontractors, and others as further explained in the following text.

A. BID SOLICITATIONS: Provide the following language in the bid solicitation for every project.

This is a federally funded project. All bidders are required to make the six good faith efforts to assure compliance with the State's "fair share goals" and are required to comply with EEO regulations.

B. BID DOCUMENTS - DBE: Provide the following language and instructions in the "Special Conditions" or "Supplemental Conditions" for every project.

1. This is a federally funded project. The Bidder is required to comply with federal regulation 40 CFR 33 Participation by Disadvantaged Business Enterprises in United States Environmental Protection Agency Programs, summarized below.

2. The BIDDER/CONTRACTOR agrees to include in its bid documents the "Fair Share" objectives and require all of its sub-contractors to include in their bid documents for sub-contracts the "Fair Share" objectives. The Bidder shall be prepared to provide documentation supporting compliance with these requirements. This documentation should include a log that lists dates and times of verbal, written, and faxed correspondence, telephone logs, a list of companies contacted and contact person with that company, notes of to whom bid packages were sent, responses from firms contacted, a list of bids or quotes received and which sub-bidders will be used, etc. If a MBE/WBE, which submitted a bid/quote was not selected, state the reason for not selecting them. Upon request, after the bid opening and before the contract is awarded the Bidder will provide all relevant information to the Owner [Borrower] who will provide the same information to the Division of Drinking Water, Department of Environmental Quality, State of Utah for evaluation.

3. Every BIDDER must sign the DBE "CERTIFICATION - SIGNATURE" page and SUBMIT said page with his/her BID. If the BIDDER fails to submit the

"CERTIFICATION - SIGNATURE" page with his/her bid, the bid will be disqualified by the State of Utah. If this occurs the Borrower will be required to select the next low bidder and the State will require that bidder to provide the above-described documentation.

4. A recipient, including one exempted from applying the fair share objective requirements by §33.411, is required to make the following good faith efforts whenever procuring construction, equipment, services and supplies under an EPA financial assistance agreement, even if it has achieved its fair share objectives under subpart D of 40 CFR part 33:

    a. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

    b. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.

    c. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.

    d. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.

    e. Use the services and assistance of the SBA and the Minority Business Development Agency of the Department of Commerce.

    f. If the prime contractor awards subcontracts, require the prime contractor to take the steps in paragraphs “a” through “e” of this section.

5. The Bidder shall submit EPA Form 5700-52A, "MBE/WBE Utilization under Federal Grants, Cooperative Agreements, and Interagency Agreements" on a semi-annual basis based on the Federal Fiscal Year.

C. **BID DOCUMENTS - Federal EEO**: The BORROWER or borrower's ENGINEER shall also include in the BID DOCUMENTS Federal EEO regulations by which the Contractor must also comply.

D. TERM AND CONDITION: The BORROWER or Borrower's ENGINEER shall include in the BID DOCUMENTS the following term and condition:

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

E. CONTRACT PROVISIONS:

1. The prime contractor must pay its subcontractors for satisfactory performance no more than 30 days from the prime contractor's receipt of payment from the owner.
2. The prime contractor must notify the owner in writing prior to any termination of a DBE subcontractor for convenience.
3. If a DBE subcontractor fails to complete work under the subcontract for any reason, the prime contractor must employ the six good faith efforts if soliciting a replacement subcontractor, even if the fair share objectives have already been achieved.
4. The prime contractor must distribute State of Utah - DBE Program Subcontractor Participation Form (copy attached) to all of its DBE subcontractors. The subcontractors can submit completed forms to the DDW Coordinator.
5. The prime contractor must have its DBE subcontractors complete State of Utah-DBE Program Subcontractor Performance Form (copy attached) and include completed forms in its bid or proposal package.
6. The prime contractor must complete State of Utah-DBE Program Subcontractor Utilization Form (copy attached) and submit as part of its bid or proposal package.
7. Failure to submit the requested Forms within seven (7) calendar days of the bid opening will be viewed as non-responsive.

Additional DBE information can be found at
www.epa.gov/grants/disadvantaged-business-enterprise-program-requirements

DISADVANTAGED BUSINESS ENTERPRISE (DBE)
CERTIFICATION - SIGNATURE PAGE
FEDERAL SRF LOAN PROGRAM

The Bidder hereby certifies that the Bidder has taken the "Six Good Faith Efforts" in soliciting bids and quotes from subcontractors for supplies, construction, equipment, and professional services and is in compliance with 40 CFR part33 - *Participation by Disadvantaged Business Enterprises in United States Environmental Protection Agency programs* which are summarized in the bid documents for this proposed project.

BIDDER:

_____
(Signature)

_____
(Date)

Bidder's Name:_____

Address: _____

Phone #: _____

E-mail Address: (Optional) _____

(The above certification of the Bidder shall be filled out completely, signed, and submitted by each Bidder and shall be a part of the Contract Documents.)

MBE/WBE CONTACT LOG FOR BIDDERS *

(To be completed by General Contractor prior to bid opening, and ready for submittal to owner if determined to be apparent low bidder).

Bidder's Company Name: _____ Bidder's Phone Number(s): _____

Bidder's Representative: _____

**	Company Contacted	Address	Phone	Person Contacted	Work Specialty	Did they Bid?	Bid Accepted?	*** Outcome?
M W								
M W								
M W								
M W								
M W								
M W								
M W								
M W								
M W								
M W								

* All entries may be reviewed by the Utah Division of Drinking Water for validation

** Please circle "M" for minority business enterprises or "W" for women business enterprises

*** Please include unit amount and total expected amount. If the bid was rejected, state why.

Updated 4/7/2005

Suggested Sources for Locating Certified MBE/WBE Contractors in Utah

Following are some possible resources for identifying and contacting DBE's (Disadvantaged Business Enterprises) for the MBE/WBE (Minority Business Enterprise/women Business Enterprise) requirements for the project.

Following are some websites:

UDOT (Utah Department of Transportation):
http://www.dot.utah.gov/cns
Click on the "Civil Rights" option, then the "DBE Directory" option

UTA (Utah Transit Authority):
http://www.rideuta.com/opportunities/dbeLanding.asp

Salt Lake City Airport Authority:
http://www.ci.slc.ut.us
click on "City Directory", then click on "Airport", then click on "About the Airport", then click on "Construction, Planning & Environment', then click on "DBE Directory".

SBA (Small Business Administration):
http://www.sba.gov
Click on "Frequently Requested Information", then scroll down to "Pro-Net" and click on "Search Data Base".
This will get you into all of the registered small business firms in the country. At that point you can decide which state you want to search by small business, small disadvantaged businesses, women owned small businesses, HubZone, Veteran Owned small businesses.

Reciprocity is granted for any out-of-state MBE/WBE certification, but all contractors and subcontractors will be required to be licensed in the State of Utah to qualify as MBE/WBE contractors on this project. To claim Utah reciprocity for out of state MBE/WBE certification, the contractor or subcontractor is to provide a letter to the Utah Division of Drinking Water, including their out-of state certification credentials, and a request to obtain Utah reciprocity. Requests for reciprocity may be reviewed for validation.

MBE/WBE "Self-Certification" is allowed. Subcontractor is to provide a letter to the Utah Division of Drinking Water stating that they fulfill requirements and are certified to work as a MBE or a WBE, and why. Self-certification applications may be reviewed for validation.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Participation Form

NAME OF SUBCONTRACTOR	**PROJECT NAME**
ADDRESS	**CONTRACT NO.**
TELEPHONE NO.	EMAIL ADDRESS
PRIME CONTRACTOR NAME	

Please use the space below to report any concerns regarding the above EPA-funded project (e.g., reason for termination by prime contractor, late payment, etc.).

_____
_____
_____
_____
_____

CONTRACT ITEM NO.	ITEM OF WORK OR DESCRIPTION OF SERVICES RECEIVED FROM THE PRIME CONTRACTOR	AMOUNT SUBCONTRACTOR WAS PAID BY PRIME CONTRACTOR

_____ _____
Subcontractor Signature Title/Date

Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Participation Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Performance Form

NAME OF SUBCONTRACTOR[1]	**PROJECT NAME**
ADDRESS	**BID/PROPOSAL NO.**
TELEPHONE NO.	**E-MAIL ADDRESS**
PRIME CONTRACTOR NAME	

CONTRACT ITEM NO.	**ITEM OF WORK OR DESCRIPTION OF SERVICES BID TO PRIME**	**PRICE OF WORK SUBMITTED TO PRIME CONTRACTOR**

Currently certified as an MBE or WBE under EPA's DBE Program?_____Yes_____No Signature of Prime Contractor Date Print Name Title _____

_____Signature of Subcontractor Date

_____Print Name Title

Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Performance Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Form

BID/PROPOSAL NO.	**PROJECT NAME**
NAME OF PRIME BIDDER/PROPOSER	**E-MAIL ADDRESS**
ADDRESS	
TELEPHONE NO.	**FAX NO.**

The following subcontractors[1] will be used on this project:

COMPANY NAME, ADDRESS, PHONE NUMBER, AND E-MAIL ADDRESS	TYPE OF WORK TO BE PERFORMED	ESTIMATED DOLLAR AMOUNT	CURRENTLY CERTIFIED AS AN MBE OR WBE?

I certify under penalty of perjury that the forgoing statements are true and correct. In the event of a replacement of a subcontractor, I will adhere to the replacement requirements set forth in 40 CFR Part 33 Section 33.302(c).

_____ _____
Signature of Prime Contractor Date

_____ _____
Print Name Title

Subcontractor is defined as a company, firm, joint venture, or individual who enters into an agreement with a contractor to provide services pursuant to an EPA award of financial assistance.

State of Utah
Department of Environmental Quality
Division of Drinking Water
Drinking Water State Revolving Fund Program
Disadvantaged Business Enterprise Program
DBE Subcontractor Utilization Form

The public reporting and recordkeeping burden for this collection of information is estimated to average fifteen (15) minutes. Burden means the total time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency. This includes the time needed to review instructions; develop, acquire, install, and utilize technology and systems for the purposes of collecting, validating, and verifying information, processing and maintaining information, and disclosing and providing information; adjust the existing ways to comply with any previously applicable instructions and requirements; train personnel to be able to respond to a collection of information; search data sources; complete and review the collection of information; and transmit or otherwise disclose the information.

ALERT

"Total Procurement" fields and "MBE/WBE Combined Procurement" fields located in section 4B of this form should include Federal funds provided under the assistance agreement, recipient matching funds, and funds from other sources that are included in the assistance agreement.

Due to process time of Paperwork Reduction Act procedures, EPA is not able to update the EPA Form 5700-52A immediately to reflect this clarification.

If EPA grant recipients have questions about EPA Form 5700-52A, please work with your respective Grants Specialist or DBE Coordinator.

OMB CONTROL NO. 2030-0020
APPROVAL EXPIRES 06/30/2024

U.S. ENVIRONMENTAL PROTECTION AGENCY MBE/WBE UTILIZATION UNDER FEDERAL GRANTS AND COOPERATIVE AGREEMENTS

This collection of information is approved by OMB under the Paperwork Reduction Act, 44 U.S.C. 3501 et seq. (OMB Control No. 2030-0020). Responses to this collection of information are required to obtain an assistance agreement (40 CFR Part 30, 40 CFR Part 31, and 40 CFR Part 33 for awards made prior to December 26, 2014, and 2 CFR 200, 2 CFR 1500, and 40 CFR Part 33 for awards made after December 26, 2014). An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The public reporting and recordkeeping burden for this collection of information is estimated to be 1 hour per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates and any suggested methods for minimizing respondent burden to the Regulatory Support Division Director, U.S. Environmental Protection Agency (2821T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

1A. REPORTING PERIOD

October 1, _ September 30,

1B. REPORT TYPE

☐ Annual ☐ Final Report (Project completed)

1C: Revision of a Prior Year Report? ◯ No ◯ Yes

If yes, what reporting period is being revised and briefly describe the changes made. **Note:** The revised report will replace the associated original report in its entirety.

2A. RECIPIENT UNIQUE ENTITY IDENTIFIER

2B. RECIPENT REPORTING CONTACT

Name:

Email:

Phone:

3. FEDERAL AWARD IDENTIFICATION NUMBER (FAIN)

(For SRF state recipients, please include all numbers for all open assistance agreements being reported on this form.

4A. If NO procurements were made this reporting period (by the recipient, sub-recipient(s), loan recipient(s), and prime contractor(s)), **CHECK and SKIP to Block No. 6**. (Procurements are all expenditures through contract, order, purchase, lease or barter of supplies, equipment, construction, or services needed to complete Federal assistance programs.)

☐

4B. Total Procurements & MBE/WBE Accomplishments This Reporting Period (in dollars)

	Construction	Non-Construction	Total
Total Procurement:	$ _____	$ _____	$ _____
MBE/WBE Combined Procurement:	$ _____	$ _____	$ _____

5A. Good Faith Efforts: If procurements were made, indicate whether your organization has followed the six Good Faith efforts found in 40 CFR Part 33, Subpart C, 40 CFR 33.501 and 2 CFR 200.321.

☐ Yes, my organization has implemented and documented each of the six Good Faith Efforts on the procurements made during this reporting period.

☐ No, my organization has not implemented and documented each of the six Good Faith Efforts on the procurements made during this reporting period.

5B. If procurements were made, but no MBE/WBE procurements are being reported, then check the applicable box(es) for the reason(s) why no MBE/WBE procurements were made.

☐ No MBE/WBE(s) applied ☐ No MBE/WBE(s) were qualified

☐ Other:

6. NAME OF RECIPIENT'S AUTHORIZED REPRESENTATIVE

TITLE

7. SIGNATURE OF RECIPIENT'S AUTHORIZED REPRESENTATIVE

DATE

EPA FORM 5700-52A available electronically at: https://www.epa.gov/grants/epa-form-5700-52a-united-states-environmental-protection-agency-minority-business

Instructions:

A. General Instructions:

MBE/WBE utilization is based on 40 CFR Part 33 and 2 CFR Parts 200 and 1500. The reporting requirement reflects the change in the reporting threshold described in Recipient/ Applicant Information Notice-2018-G04 issued by EPA's Office of Grants and Debarment on September 7, 2018 (https://www.epa.gov/grants/rain-2018-g04). EPA Form 5700-52A must be completed annually by recipients of financial assistance agreements where the combined total of funds budgeted for procuring supplies, equipment, construction and services exceeds the current Simplified Acquisition Threshold as set by the Federal Acquisition Regulation at 48 CFR Subpart 2.1. This reporting requirement applies to all new and existing awards and voids all previous reporting requirements.

In determining whether the threshold is exceeded for a particular assistance agreement, the analysis must focus on funds budgeted for procurement under the supplies, equipment, construction, services or "other" categories, and include funds budgeted for procurement under sub-awards or loans.

Reporting will also be required in cases where the details of the budgets of sub-awards/loans are not clear at the time of the grant awards and the combined total of the procurement and sub-awards and/or loans exceeds the Simplified Acquisition Threshold.

For example, if the Simplified Acquisition Threshold is $250,000, then if a recipient has $300,000 budgeted under procurement, then completion of this report is required.

When reporting is required, all procurement actions are reportable, not just the portion which exceeds the Simplified Acquisition Threshold.

If at the time of award the budgeted funds exceed the Simplified Acquisition Threshold but actual expenditures fall below, a report is still required.

If at the time of award, the combined total of funds budgeted for procurements in any category is less than or equal to the Simplified Acquisition Threshold and is maintained below the threshold, no DBE report is required to be submitted.

Recipients are required to report 30 days after the end of each federal fiscal year (i.e. October 30th), per the terms and conditions of the financial assistance agreement.

Final reports are due October 30th or 120 days after the end of the project period, whichever comes first.

MBE/WBE program requirements, including reporting, are material terms and conditions of the financial assistance agreement. Failure to comply may lead to termination of the financial assistance agreement which is then reported to the OMB-designated integrity and performance system accessible through SAM (currently FAPIIS) pursuant to 2 CFR 200.339(b).

B. Submission:

Recipients must submit completed forms to the point of contact associated with the awarding office for the applicable assistance agreement. Information on specific points of contact for EPA's Headquarters and ten Regional Offices is located at:

https://www.epa.gov/grants/frequently-asked-questions-disadvantaged-business-enterprises

Questions regarding the completion of this form should be directed to the DBE Coordinator associated with the awarding office for the applicable assistance agreement. A list of the DBE Coordinators for each awarding office can be located here:

https://www.epa.gov/grants/epa-dbe-program-coordinators

C. Instructions:

1A. Specify Federal fiscal year this report covers. The Federal fiscal year runs from October 1st through September 30th (**e.g. November 29, 2020 falls within Federal fiscal year 2021**)

1B. Specify report type. Check the annual reporting box if this is an annual report. If it is a final report, check the final report box to indicate if the project is completed.

1C. Indicate if this is a revision to a previous year and provide a brief description of the revision you are making including what reporting period is being revised. The revised report will replace the associated original report in its entirety.

2A. Provide your organization's Unique Entity Identifier. More information about Unique Entity Identifier, including its meaning, can be found in 2 CFR Part 25.

2B. Identify the name and contact information for the person located within the recipient organization that can be contacted if questions arise from this report.

3. Provide the Federal Award Identification Number (FAIN) assigned by EPA. A separate report must be submitted for each Assistance Agreement.

*For SRF recipients: In box 3 list numbers for ALL OPEN Assistance Agreements being reported on this form.

4A. Self-explanatory. **Note:** Procurement means expenditures under the supplies, equipment, construction, services or “other” categories, and include funds expended for procurement under sub-awards or loans.

4B. Provide the total dollar amount (in dollars) of **ALL** procurements awarded this reporting period by construction, non-construction, and grand total by the recipient, sub-recipients, and SRF loan recipients, **including** MBE/WBE expenditures, not just the portion which exceeds the threshold. For example: Actual dollars for procurement from the procuring office; actual contracts let from the contracts office; actual goods, services, supplies, etc., from other sources including the central purchasing/ procurement centers).

Provide the total dollar amount (in dollars) of MBE/ WBE procurements **ONLY** awarded this reporting period by construction, non-construction, and grand total by the recipient, sub-recipients, SRF loan recipients, and prime contractors not just the portion which exceeds the threshold.

***For SRF recipients only**: In 4B, please enter the total annual procurement amount under all of your SRF Assistance Agreements. The figure reported in this section is **not** directly tied to an individual Assistance Agreement identification number. **(SRF state recipients report state procurements in this section)**

5A. Self-explanatory.

5B. If procurements were made during this reporting period, but no procurements with MBE(s) or WBE(s) are being reported, then select the reason why. If "Other" is chosen, please fill in with the reason.

6. Self-explanatory.

7. Self-explanatory.

**This data is requested to comply with provisions mandated by: statute or regulations (40 CFR Part 33 and/or 2 CFR Parts 200 and 1500); OMB Circulars; or added by EPA to ensure sound and effective assistance management. Accurate, complete data are required to obtain funding, while no pledge of confidentiality is provided.

EQUAL OPPORTUNITY CLAUSES

A. The Equal Opportunity Clause published at 41 CFR 60-1.4(b) is required to be included in, and is part of, all nonexempt federally assisted construction contracts and subcontracts (including this Contract). The Equal Opportunity Clause shall be considered to be a part of every contract and subcontract required by the regulations to include such a clause, whether or not it is physically incorporated in such contracts. The notices required to be posted by paragraphs (1) and (3) of the Equal Opportunity Clause shall be the "Equal Employment Opportunity is the Law" poster approved by the Office of Federal Contract Compliance Programs and available on the internet at **http://www.dol.gov/oasam/programs/osdbu/sbrefa/poster/matrix.htm.**

EQUAL OPPORTUNITY CLAUSE (41 CFR 60-1.4(b))

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.

(3) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and

accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. The Standard Federal Equal Employment Opportunity Construction Contract Specifications published at 41 CFR 60-4.3(a) are required to be included in, and are part of, all federal and federally assisted construction contracts and subcontracts (including this Contract) in excess of $10,000 to be performed in geographical areas designated by the Director pursuant to 41 CFR 60-4.6 and in construction subcontracts in excess of $10,000 necessary in whole or in part to the performance of non-construction Federal contracts and subcontracts covered under Executive Order 11246. These Specifications shall be considered to be a part of every contract and subcontract required by the regulations to include such a clause, whether or not it is physically incorporated in such contracts.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As used in these specifications:

    a. "Covered Area" means the geographical area described in the solicitation from which this contract resulted;

    b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

    c. "Employer identification number" means the Federal Social Security number used on the employer's quarterly Federal Tax Return, U.S. Treasury Department Form 941.

    d. "Minority" includes:

        (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

        (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

        (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands);

        (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

3. If the contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area, (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each contractor or subcontractor participating in an approved Plan is individually

required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other contractors or subcontractors toward a goal in an approved Plan does not excuse any covered contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The contractor shall implement the specific affirmative action standards provided in paragraphs (7)(a) through (p) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the contractor should reasonably by able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the FEDERAL REGISTER in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

6. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

7. The contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of

and carry out the contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.

c. Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the contractor by the union or, if referred, not employed by the contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the contractor may have taken.

d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

e. Develop on-the-job training opportunities and/or participate in training programs for the areas which expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the contractor's employment needs, especially those programs funded or approved by the Department of Labor. The contractor shall provide notice of these programs to the sources compiled under (7)(b) above.

f. Disseminate the contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with on-site supervisory personnel such as superintendents, general foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained

identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the contractor's EEO policy with other contractors and subcontractors with whom the contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisor's adherence to and performance under the contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7)(a) through (p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under (7)(a) through (p) of these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the contractor. The obligation to comply, however, is the contractor's and failure of such a group to fulfill an obligation shall not be a defense for the contractor's noncompliance.

9. A single goal for minorities and a separate single goal for women have been established. The contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the contractor has achieved its goals for women generally, the contractor may be in violation of the Executive order if a specific minority group of women is under-utilized).

10. The contractor shall not use the goals and timetables of affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

11. The contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to Executive Order 11246.

12. The contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.

13. The contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in

paragraph (7) of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

14. The contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Attachment 1
SRF Required Front-End Specifications
(This form must be completed and signed by Prime Contractor and Submitted with the bid.)

U.S. Environmental Protection Agency
Certification of Non-Segregated Facilities

(Applicable to contracts, subcontracts, and agreements with applicants who are themselves performing Federally assisted construction contracts, exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant, or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national original, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause; that we will retain such certifications in his files; and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods):

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENT FOR CERTIFICATION OF NON-SEGREGATED FACILITIES

A Certification of Non-segregated Facilities, as required by the May 9, 1967, order (33 F.R. 7808, May 28, 1968) on Elimination of Segregated Facilities, by the Secretary of Labor must be submitted prior to the award of the subcontract exceeding $10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e., quarterly, semiannually, or annually).

_____

Signature Date

_____

Name and Title of Signer (Please Type)

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

PROHIBITION AGAINST
LISTED VIOLATING FACILITIES

A. REQUIREMENTS

(1) To comply with all the requirements of section 114 of the Clean Air Act, as amended (42 U.S.C. 1857, et seq., as amended by Pub. L. 92-604) and section 308 of the Clean Water Act (33 U.S.C. 1251, as amended), respectively, which relate to inspection, monitoring, entry, reports, and information, as well as other requirements specified in section 114 and section 308 of the Air Act and the Water Act, respectively, and all regulations and guidelines issued thereunder before the award of this contract.

(2) That no portion of the work required by this prime contract will be performed in a facility listed on the Environmental Protection Agency list of violating facilities on the date when this contract was awarded unless and until the EPA eliminates the name of such facility or facilities from the listing.

(3) To use his best efforts to comply with clean air and clean water standards at the facilities in which the contract is being performed.

(4) To insert the substance of the provisions of this clause, including this paragraph (4), in any nonexempt subcontract.

B. DEFINITIONS

(1) Air Act means the Clean Air Act, as amended (42 U.S.C. 1857 et seq.).

(2) Water Act means the Clean Water Act, as amended (33 U.S.C. 1251 et seq.).

(3) Clean Air Standards means any enforceable rules, regulations, guidelines, standards, limitations, orders, controls, prohibitions, or other requirements which are contained in, issued under, or otherwise adopted under the Air Act or Executive Order 11738, an applicable implementation plan as described in section 110 (d) of the Air Act (42 U.S.C. 1857c-5(d)), an approved implementation procedure or plan under section 111 (c) or section 111(d), or an approved implementation procedure under section 112(d) of the Air Act (42 U.S.C. 1857c-7(d)).

(4) Clean Water Standards means any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated under the Water Act or contained in a permit issued to a discharger by the Environmental Protection Agency or by a State under an approved program, as authorized by section 402 of the Water Act (33 U.S.C. 1342), or by a local government to ensure compliance with pretreatment regulations as required by section 307 of Water Act (33 U.S.C. 1317).

(5) Compliance means compliance with clean air or water standards. Compliance shall also mean compliance with a schedule or plan ordered or approved by a court of competent

jurisdiction, the Environmental Protection Agency in accordance with the requirements of the Air Act or Water Act and regulations.

(6) Facility means any building, plant, installation, structure, mine, vessel, or other floating craft, location, or site of operations, owned, leased, or supervised by a contractor or subcontractor, to be used in the performance of a contract or subcontract. Where a location or site of operations contains or includes more than one building, plant, installation, or structure, the entire location or site shall be deemed to be a facility except where the Director, Office of Federal Activities, Environmental Protection Agency, determines that independent facilities are located in one geographical area.

WILLIAMS-STEIGER OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970

A. AUTHORITY

(1) The contractor is subject to the provisions of the Williams-Steiger Occupational Safety and Health Act of 1970.

(2) These construction documents and the joint and several phases of construction hereby contemplated are to be governed, at all times, by applicable provisions of the Federal law(s), including but not limited to the latest amendment of the following:

a. Williams-Steiger Occupational Safety and Health Act of 1970, Public Law 94-596;

b. Part 1910 - Occupational Safety and Health Standards, Chapter XVII of Title 29, Code of Federal Regulations;

c. Part 1926 - Safety and Health Regulations for Construction, Chapter XVII of Title 29, Code of Federal Regulations.

B. SAFETY AND HEALTH PROGRAM REQUIREMENTS

(1) This project, its prime contractor and its subcontractors, shall at all times be governed by Chapter XVII of Title 29, Code of Federal Regulations, Part 1926 - Safety and Health Regulations for Construction (29 CFR 22801), as amended to date.

(2) To implement the program and to provide safe and healthful working conditions for all persons, general project safety meetings will be conducted at the site at least once each month during the course of construction, by the construction superintendent or his/her designated safety officer. Notice of such meeting shall be issued not less than three (3) days prior, stating the exact time, location, and agenda to be included. Attendance by the owner, architect, general foreman, shop steward(s), and trades, or their designated representatives, witnessed in writing as such, shall be mandatory.

(3) To further implement the program, each trade shall conduct a short gang meeting, not less than once a week, to review project safety requirements mandatory for all persons during the coming week. The gang foreman shall report the agenda and specific items covered to the project superintendent, who shall incorporate these items in his/her daily log or report.

(4) The prime contractor and all subcontractors shall immediately report all accidents, injuries, or health hazards to the owner and architect, or their designated representatives, in writing. This shall not obviate any mandatory reporting under the provisions of the Occupational Safety and Health Act of 1970.

(5) This program shall become a part of the contract documents and the contract between the owner and prime contractor, prime contractor and all subcontractors, as though fully written therein.

ANTI-KICKBACKS

Contractor shall comply with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in the Department of Labor Regulations (29 CFR, Part 3). This Act provides that Contractor is prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled.

Contractor certifies and warrants that no gratuities, kickbacks and contingency fees were paid in connection with this contract, nor were any fees, commissions, gifts, or other considerations made contingent upon the award of this contract.

Contractor certifies that, to Contractor's knowledge, no state employee has any personal or beneficial interest whatsoever in the services described in this Contract.

No staff member of Contractor, compensated either partially or wholly with funds disbursed pursuant to the Contract, shall engage in any Contract or activity which would constitute a conflict of interest as related to this Contract.

DISCOVERY OF ARCHAEOLOGICAL AND OTHER HISTORICAL ITEMS

In the event of an archaeological find during any phase of construction, the following procedure will be followed:

1. Construction shall be halted, with as little disruption to the archaeological site as possible.
2. Contractor shall notify Owner who shall contact the State Historic Preservation Officer.
3. The State Historic Preservation Officer may decide to have an archaeologist inspect the site and make recommendations about the steps needed to protect the site, before construction is resumed.
4. The entire event should be handled as expediently as possible in order to hold the loss in construction time to a minimum while still protecting archaeological finds.

A similar procedure should be followed with regard to more recent historical resources. Should any artifacts, housing sites, etc., be uncovered, the same procedure should be followed as for an archaeological find.

In the event archaeological/historical data are evaluated to meet National Register criteria, the Advisory Council on Historic Preservation may be notified and asked to comment by the Utah State Revolving Fund Program.

ACCESS

Contractor and loan recipient shall insure that authorized representatives of the Utah DEQ, State Historic Preservation Office, US EPA, Comptroller General, Inspector General, and other applicable federal and state agencies and officials will have access to the project work whenever it is in preparation or progress and shall provide proper facilities for such access and inspection. Contractor shall allow these representatives to have access to any books, documents, plans, reports, papers, and other records of Contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, copies and transcriptions thereof and to interview any officer or employee. Contractor shall insure that all subagreements will also afford access to such project work, sites, documents, records, and persons.

SITE EROSION AND SEDIMENT CONTROL MEASURES

Every effort shall be made by Contractor and subcontractors to prevent and correct problems associated with erosion and runoff processes which could occur during and after project construction. The efforts should be consistent with applicable local ordinances and the Nonpoint Source Pollution Control Guidance. Whenever appropriate, Contractor's efforts shall reflect the following engineering principles:

(a) When appropriate, land grading and excavating should be kept at a minimum to reduce the possibility of creating runoff and erosion problems which require extensive control measures.
(b) Whenever possible, topsoil should be removed and stockpiled before grading begins.
(c) Land exposure should be minimized in terms of area and time.
(d) Exposed areas subject to erosion should be covered as quickly as possible by means of mulching or vegetation.
(e) Natural vegetation should be retained whenever feasible.
(f) Early completion of stabilized drainage systems (temporary and permanent systems) will substantially reduce erosion potential.
(g) Roadways and parking lots should be paved or otherwise stabilized as soon as feasible.
(h) Clearing and grading should not be started until a firm construction schedule is known and can be effectively coordinated with grading and clearing activity.

UPDES CONSTRUCTION RELATED DISCHARGE PERMITS

Construction projects which will disturb one or more acres will require coverage under the State of Utah General Permit for Storm Water Discharges Associated with Large Construction Activities. Contractor is responsible for obtaining coverage under the appropriate permit and maintaining compliance until Owner accepts the Work as complete. For additional information see http://www.waterquality.utah.gov/UPDES/stormwatercon.htm.

Certain construction activities such as dewatering, flushing, testing, and disinfection require coverage under the State of Utah General Permit for Temporary Discharges or under a separate discharge permit. Contractor is responsible for obtaining any necessary coverage and maintaining compliance. For more information see **http://www.waterquality.utah.gov/UPDES/stormwatercon.htm**.

AIR QUALITY PROTECTION MEASURES

Contractor shall adhere to effective dust control procedures as required under the Utah Air Quality Standards and Regulations UAC R307. If asbestos is encountered during this project, Contractor shall follow standards for handling according to UAC R307-801. Contractor shall adhere to proper trade waste and materials disposal.

PRESERVATION OF OPEN COMPETITION AND GOVERNMENT NEUTRALITY TOWARDS GOVERNMENT CONTRACTORS' LABOR RELATIONS ON FEDERAL AND FEDERALLY FUNDED CONSTRUCTION PROJECTS

The assistance recipient agrees to comply with Executive Order 13202 (Feb. 22, 2001, 66 Federal Register 11225) of February 17, 2001, entitled "Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects," as amended by Executive Order 13208 (April 11, 2001, 66 Federal Register 18717) of April 6, 2001, entitled "Amendment to Executive Order 13202, Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects.

Amend 48 CFR Part 36.202 by adding paragraph (d) to read as follows:

(d) In accordance with Executive Order 13202, of February 17, 2001, Preservation of Open Competition and Government Neutrality Towards Government Contractors' Labor Relations on Federal and Federally Funded Construction Projects, as amended on April 6, 2001—

(1) The Government, or any construction manager acting on behalf of the Government, must not—

(i) Require or prohibit offerors, contractors, or subcontractors to enter into or adhere to agreements with one or more labor organizations (as defined in 42 U.S.C. 2000e(d)) on the same or other related construction projects; or

(ii) Otherwise discriminate against offerors, contractors, or subcontractors for becoming, refusing to become, or remaining signatories or otherwise adhering to agreements with one or more labor organizations, on the same or other related construction projects.

(2) Nothing in this paragraph prohibits offerors, contractors, or subcontractors from voluntarily entering into project labor agreements.

(3) The head of the agency may exempt a construction project from this policy if the agency head finds that, as of February 17, 2001—

(i) The agency or a construction manager acting on behalf of the Government had issued or was a party to bid specifications, project agreements, agreements with one or more labor organizations, or other controlling documents with respect to that particular project, which contained any of the requirements or prohibitions in paragraph (d)(1) of this section; and

(ii) One or more construction contracts subject to such requirements or prohibitions had been awarded.

(4) The head of the agency may exempt a particular project, contract, or subcontract from this policy upon a finding that special circumstances require an exemption in order to avert an imminent threat to public health or safety, or to serve the national security. A finding of "special circumstances" may not be based on the possibility or presence of a labor dispute concerning the use of contractors or subcontractors who are nonsignatories to, or otherwise do not adhere to, agreements with one or more labor organizations, or concerning employees on the project who are not members of or affiliated with a labor organization.

Instructions for Complying With Davis-Bacon Wage Requirements

a. **Wage decision:** Federal wage rates (determinations) must be obtained prior to bid solicitation. The wage determinations for the county which the project is in can be found at https://beta.sam.gov/search?index=wd. However, when the plan review is complete for the project prior to bid, the Division of Drinking Water (Division) will issue a listing of the most current prevailing wage rates. The wage determinations are required to be included in the specifications and contract documents. ***Water projects such as pipelines and storage tanks are classified as heavy construction.*** If there are other types of construction, the award recipient may submit a request to verify whether the work being performed may be classified under a different type of construction.
b. **Bid/Contract Documents**: The documents included in this packet should be included in all bid/ contract documents. These documents include: **Code of Federal Regulations - Davis-Bacon and Related Acts Provisions and Procedures, Department of Labor Certified Payroll Form, and the NOTICE TO EMPLOYEES poster.**
c. **Posting the wage decision:** The prime contractor is responsible for posting, at the jobsite: a copy of the Department of Labor poster called "Notice to Employees", and a copy of the wage decision.
d. **Payroll reports:** Certified payroll reports are required to be maintained by the recipient. The Department of Labor has a payroll report (WH-347 Form) that is included with this letter. The prime contractor should submit a weekly, certified payroll report beginning with the first week that the company works on the project and for every week afterward until the firm has completed the work. It's recommended to number the payroll reports beginning with #1 and to clearly mark the last payroll for the project "Final." The contractor should submit a consecutively-numbered, certified payroll each week; even if no work is performed on the project for one or more weeks. The weekly payrolls are called certified because each payroll is signed and contains language certifying that the information is true and correct. Thoroughly checking the weekly payroll reports also gives the award recipient the advantage to see if any discrepancies in reported hours are occurring.
    i. **Payroll retention:** The award recipient must keep a complete set of payrolls and other basic records such as time cards. For Davis-Bacon projects, records should be kept for at least 3 years after completion.
    ii. **"No Work" Payroll Reports:** If a contractor does not work on the job site for more than a week "no work" payrolls must be submitted.
    iii. **Payroll inspection**: In addition to submitting payrolls to the recipient, every contractor (and subcontractor) must make their own copy of the payrolls available for review or copying to any authorized representative from DOL.
e. **Payroll reviews and corrections:** The award recipient or another designated inspector must visit the project site and interview some of the workers concerning their employment on the project. In addition, the Division of Drinking Water (Division) may periodically review payrolls and related submissions, comparing the interview information to the payrolls, to ensure that the labor standards requirements have been met. The Division will notify the award recipient if these reviews find any discrepancies or errors. The award recipient will then be given instructions about what steps must be taken to correct any problems.

DAVIS BACON PREVAILING WAGE REQUIREMENTS

"Notwithstanding any other provision of law and in a manner consistent with other provisions in this Act, all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to this Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code. With respect to the labor standards specified in this section, the Secretary of Labor shall have the authority and functions set forth in Reorganization Plan Numbered 14 of 1950 (64 Stat. 1267; 5 U.S.C. App.) and section 3145 of title 40, United States Code."

Federal Labor Standards Provisions (from 29 CFR 5.5)

(a) (1) *Minimum wages.*

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

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii) (A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

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

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

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

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

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

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

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

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

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

(3) *Payrolls and basic records.*

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

(ii) (A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the project owner. Project owner will provide copies to the Utah SRF Program upon request. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.* , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the US Department of Labor/Wage and Hour Division Web site at ***http://www.dol.gov/whd/programs/dbra/wh347.htm***. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the project owner. Project owner shall provide such information, upon request, to the Utah SRF Program or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the project owner or other government agencies.

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

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

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

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

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for

submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

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

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

(4) *Apprentices and trainees*

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

apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

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

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

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

(6) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the project owner

and/or the Utah SRF Program may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

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

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

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

(10)*Certification of eligibility.*

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

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

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

(b) *Contract Work Hours and Safety Standards Act.* As used in this paragraph, the terms *laborers* and *mechanics* include watchmen and guards.

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

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

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

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

Other related requirements and information

1. Based on 29 CFR 5.6(a)(3): Owner shall make such investigations as may be necessary to assure compliance with the labor standards provisions and related statutes and regulations. Investigations shall be made with such frequency as may be necessary to assure compliance. Such investigations shall include interviews with employees, which shall be taken in confidence, and examinations of payroll data and evidence of registration and certification with respect to apprenticeship and training plans. In making such examinations, particular care shall be taken to determine the correctness of classifications and to determine whether there is a disproportionate employment of laborers and of apprentices or trainees registered in approved programs. Such investigations shall also include evidence of fringe benefit plans and payments thereunder. Complaints of alleged violations shall be given priority.

2. A brief summary of required Davis Bacon compliance checking activities by Owner:

   - Make sure the Davis-Bacon poster and the wage determination are posted at the job site in a prominent and accessible place where both can be easily seen by the workers.

- Review the weekly payrolls for compliance with the requirements.
- Interview employees to cross check the payrolls and to help ensure compliance with the requirements.

3. The regulations do not require a specific interval and number of employee interviews; however, Owner shall make the interval and number of interviews commensurate with the size and complexity of the project so as to provide a reasonable check on Contractor's compliance.

4. The regulations do not require a specific interview format. Owner can use or adapt other agencies' Davis-Bacon interview forms, such as the one provided by the US Department of Housing and Urban Development, form HUD-11, which can be found at **http://www.hud.gov/offices/olr/olrform.cfm** or Standard Form -1445 which can be found at **http://www.gsa.gov/portal/forms/download/12BF5D0E2DC4484685256CBC0062F375**.

5. Owner shall maintain the payrolls, interview records, and other compliance related records for a minimum of three years after completion of the contract and shall provide them upon request to the Utah SRF Program or to applicable federal agencies.

6. Additional compliance information and assistance is available at **http://www.dol.gov/compliance/guide/dbra.htm** and other related websites.

7. Following are the **identifier codes** used to reference the various craft unions. Examples of classifications for which their local unions commonly negotiate wage and fringe benefit rates are shown in parentheses.

   ASBE = International Association of Heat and Frost Insulators and Asbestos Workers

   BOIL = International Brotherhood of Boiler Makers, Iron Shipbuilders, Blacksmiths, Forgers and Helpers

   BRXX = International Union of Bricklayers, and Allied Craftsmen (bricklayers, cement masons, stone masons, tile, marble and terrazzo workers)

   CARP = United Brotherhood of Carpenters and Joiners of America (carpenter, millwright, piledrivermen, soft floor layers, divers)

   ELEC = International Brotherhood of Electrical Workers (electricians, communication systems installers, and other low voltage specialty workers)

   ELEV = International Union of Elevator Constructors

   ENGI = International Union of Operating Engineers (operators of various types of power equipment)

   IRON = International Association of Bridge, Structural and Ornamental Iron Workers

LABO = Laborers' International Union of North America

PAIN = International Brotherhood of Painters and Allied Trades (painters, drywall finishers, glaziers, soft floor layers)

PLAS = Operative Plasterers' and Cement Masons' International Association of the United States and Canada (cement masons, plasterers)

PLUM = United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada (plumbers, pipefitters, steamfitters, sprinkler fitters)

ROOF = United Union of Roofers, Waterproofers and Allied Workers

SHEE = Sheet Metal Workers International Association

SU.... = The "SU..." identifier is for rates derived from **su**rvey data where the union rate(s) were not determined to be prevailing for the classification(s) listed. (The data reported for such a classification and used in computing the prevailing rate may have included both union and non-union wage data.) Note that **various classifications,** for which non-union rates have been determined to be prevailing, may be listed in alphabetical order under this identifier, which the computer places into the wage determination in alphabetical order, as listed here.

TEAM = International Brotherhood of Teamsters

U.S. Department of Labor
Wage and Hour Division

PAYROLL

(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

U.S. Wage and Hour Division

Rev. Dec. 2008

OMB No.:1235-0008
Expires: 04/30/2021

NAME OF CONTRACTOR ☐ OR SUBCONTRACTOR ☐	ADDRESS	
PAYROLL NO.	FOR WEEK ENDING	PROJECT AND LOCATION / PROJECT OR CONTRACT NO.

(1) NAME AND INDIVIDUAL IDENTIFYING NUMBER (e.g., LAST FOUR DIGITS OF SOCIAL SECURITY NUMBER) OF WORKER	(2) NO. OF WITHHOLDING EXEMPTIONS	(3) WORK CLASSIFICATION	OT. OR ST.	(4) DAY AND DATE — HOURS WORKED EACH DAY	(5) TOTAL HOURS	(6) RATE OF PAY	(7) GROSS AMOUNT EARNED	(8) DEDUCTIONS: FICA	WITH-HOLDING TAX			OTHER	TOTAL DEDUCTIONS	(9) NET WAGES PAID FOR WEEK
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While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that is will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W. Washington, D.C. 20210

(over)

Date _____

I, _____ _____
(Name of Signatory Party) (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the
(Contractor or Subcontractor)

_____; that during the payroll period commencing on the
(Building or Work)

_____ day of _____, _____, and ending the _____ day of _____, _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full
(Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

_____

_____

_____

_____

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ – in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ – Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE

THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

Insert (in place of this page) the applicable Davis-Bacon Wage Determinations.
Current wage decisions for Utah can be found at: ***https://beta.sam.gov/search?index=wd.***

*Use the wage decision that applies to the type of construction. Most water projects are classified as "**heavy**." The definition of "building" is 'a sheltered enclosure with walk-in access for the purpose of housing persons, machinery, equipment or supplies.' **Treatment plants** may be "**heavy**" or "**building**" or both, depending on circumstances. Water mains constructed in conjunction with a UDOT project may be "highway." Discuss with the SRF program if necessary, especially if multiple types seem to apply. We may need to consult EPA or the US Department of Labor in some cases.*

Check the wage decision(s) before going to bid and again at least 10 days prior to contract award to make sure you are using the most current decision(s) as they get updated regularly.

"General Decision Number: UT20240089 04/19/2024

Superseded General Decision Number: UT20230089

State: Utah

Construction Type: Building

Counties: Morgan and Weber Counties in Utah.

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

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

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be

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

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://url.us.m.mimecastprotect.com/s/_o1DCG6Ej4uWOrGwcKg-Fg?domain=dol.gov.

Modification Number	Publication Date
0	01/05/2024
1	01/19/2024
2	03/15/2024
3	04/19/2024

CARP0801-002 12/01/2022

	Rates	Fringes
CARPENTER (Drywall Hanging and Metal Stud Installation Only)	$ 31.66	13.97

ELEC0354-001 06/11/2023

	Rates	Fringes
ELECTRICIAN (Low Voltage Wiring Only)	$ 27.65	1.5%+14.73
ELECTRICIAN	$ 39.00	1.3%+16.55

PAIN0077-003 07/01/2022

	Rates	Fringes
DRYWALL FINISHER/TAPER	$ 31.00	8.44

PLUM0140-001 08/01/2023

	Rates	Fringes
PLUMBER/PIPEFITTER	$ 42.00	15.02

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* SFUT0669-003 01/01/2024

	Rates	Fringes
SPRINKLER FITTER (Fire		

Sprinklers).....$ 39.43 26.04

SHEE0312-002 07/01/2022

	Rates	Fringes
SHEET METAL WORKER (Including HVAC Duct Installation).....	$ 39.26	11.67

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* SUUT2012-021 07/29/2014

	Rates	Fringes
BRICKLAYER.....	$ 22.13	1.67
CARPENTER (Acoustical Ceiling Installation Only).....	$ 21.00	3.20
CARPENTER, Excludes Acoustical Ceiling Installation, Drywall Hanging, and Metal Stud Installation.....	$ 20.68	5.49
CEMENT MASON/CONCRETE FINISHER...	$ 16.00 **	0.00
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation).....	$ 17.76	1.83
IRONWORKER, STRUCTURAL.....	$ 20.21	3.22
LABORER: Common or General.....	$ 12.78 **	0.00
LABORER: Irrigation.....	$ 9.50 **	0.00
LABORER: Mason Tender - Brick...	$ 16.38 **	1.00
LABORER: Mason Tender - Cement/Concrete.....	$ 13.87 **	0.14
LABORER: Pipelayer.....	$ 13.57 **	0.00
OPERATOR: Backhoe/Excavator/Trackhoe.....	$ 16.92 **	0.00
OPERATOR: Loader.....	$ 19.34	0.00
PAINTER (Brush, Roller and Spray, Excluding		

Drywalling/Taping).....$ 15.33 ** 0.00

ROOFER.....$ 15.62 ** 0.00

TILE FINISHER.....$ 13.54 ** 0.00

TILE SETTER.....$ 23.00 0.00

TRUCK DRIVER: Dump Truck.....$ 17.74 2.66

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

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

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://url.us.m.mimecastprotect.com/s/IF3xCJ6Rm5upAk5xsGKzxN?domain=dol.gov.

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

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

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

Survey wage rates are not updated and remain in effect until a

new survey is conducted.

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION"

"General Decision Number: UT20240095 01/05/2024

Superseded General Decision Number: UT20230095

State: Utah

Construction Type: Heavy
HEAVY CONSTRUCTION PROJECTS

County: Weber County in Utah.

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

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	. Executive Order 13658 generally applies to the contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for

performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at https://url.us.m.mimecastprotect.com/s/_o1DCG6Ej4uWOrGwcKg-Fg?domain=dol.gov.

Modification Number	Publication Date
0	01/05/2024

ELEC0354-005 06/01/2023

	Rates	Fringes
ELECTRICIAN	$ 39.00	1.3%+16.55

ENGI0003-034 07/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR (Mechanic)	$ 33.04	16.09

LABO0295-002 07/01/2019

	Rates	Fringes
TRAFFIC CONTROL (Flagger)	$ 23.71	9.78

TEAM0222-004 07/01/2023

	Rates	Fringes
TRUCK DRIVER (Dump Truck)	$ 28.17	13.99

SUUT2018-006 05/07/2020

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	$ 19.69	1.17
LABORER: Common or General	$ 20.39	3.29
LABORER: Pipelayer	$ 16.00 **	3.98
OPERATOR: Backhoe/Excavator/Trackhoe	$ 24.00	4.22

OPERATOR: Bobcat/Skid
Steer/Skid Loader.....$ 25.29 0.00

OPERATOR: Loader.....$ 24.00 4.22

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

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

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave
for Federal Contractors applies to all contracts subject to the
Davis-Bacon Act for which the contract is awarded (and any
solicitation was issued) on or after January 1, 2017. If this
contract is covered by the EO, the contractor must provide
employees with 1 hour of paid sick leave for every 30 hours
they work, up to 56 hours of paid sick leave each year.
Employees must be permitted to use paid sick leave for their
own illness, injury or other health-related needs, including
preventive care; to assist a family member (or person who is
like family to the employee) who is ill, injured, or has other
health-related needs, including preventive care; or for reasons
resulting from, or to assist a family member (or person who is
like family to the employee) who is a victim of, domestic
violence, sexual assault, or stalking. Additional information
on contractor requirements and worker protections under the EO
is available at
https://url.us.m.mimecastprotect.com/s/IF3xCJ6Rm5upAk5xsGKzxN?domain=dol.gov.

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

The body of each wage determination lists the classification
and wage rates that have been found to be prevailing for the

cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

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

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate

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

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

WAGE DETERMINATION APPEALS PROCESS

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

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

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION"

BUILD AMERICA BUY AMERICA ACT
INTERIM REQUIREMENTS

Revised: 05/04/2022

The President of the United States signed the Bipartisan Infrastructure Law on November 15, 2021. As part of that law, the Build America Buy America Act ("the Act") goes into effect on May 14, 2022. All DWSRF financial assistance recipients awarded funding in Federal Fiscal Year 2022 (after October 1, 2022) are required to comply with the new Buy America preference requirements.

On April 18, 2022, the Office of Management and Budget (OMB) issued Initial Implementation Guidance on Application of Buy America Preference in the Federal Financial Assistance Programs for Infrastructure. Please note the requirements below may change once OMB issues final guidance.

Application of a Buy America Preference

The Act requires the following Buy America preference for an infrastructure project:

(1) all iron and steel used in the project are produced in the United States--this means all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States;
(2) all manufactured products used in the project are produced in the United States—this means the manufactured product was manufactured in the United States; and the cost of the components of the manufactured product that are mined, produced, or manufactured in the United States is greater than 55 percent of the total cost of all components of the manufactured product, unless another standard for determining the minimum amount of domestic content of the manufactured product has been established under applicable law or regulation; and
(3) all construction materials (*see Definitions*) are manufactured in the United States—this means that all manufacturing processes for the construction material occurred in the United States.

The Buy America preference only applies to articles, materials, and supplies that are consumed in, incorporated into, or affixed to an infrastructure project. As such, it does not apply to tools, equipment, and supplies, such as temporary scaffolding, brought to the construction site and removed at or before the completion of the infrastructure project. Nor does a Buy America preference apply to equipment and furnishings, such as movable chairs, desks, and portable computer equipment, that are used at or within the finished infrastructure project but are not an integral part of the structure or permanently affixed to the infrastructure project.

Waivers

When necessary, recipients may apply for, and the agency may grant, a waiver from these requirements. The agency may waive the application of the domestic content procurement preference in any case in which the agency determines that:

(1) applying the domestic content procurement preference would be inconsistent with the public interest;
(2) the types of iron, steel, manufactured products, or construction materials are not produced in the United States in sufficient and reasonably available quantities or of a satisfactory quality; or
(3) the inclusion of iron, steel, manufactured products, or construction materials produced in the United States will increase the cost of the overall project by more than 25 percent.

A request to waive the application of the domestic content procurement preference must be in writing. The agency will provide instructions on the format, contents, and supporting materials required for any waiver request. Waiver requests are subject to public comment periods of no less than 15 days and must be reviewed by the Made in America Office. There may be instances where an award qualifies, in whole or in part, for an existing waiver.

Definitions

"Construction materials" includes an article, material, or supply—other than an item of primarily iron or steel; a manufactured product; cement and cementitious materials; aggregates such as stone, sand, or gravel; or aggregate binding agents or additives—that is or consists primarily of:

• non-ferrous metals;
• plastic and polymer-based products (including polyvinylchloride, composite building materials, and polymers used in fiber optic cables);
• glass (including optic glass);
• lumber; or
• drywall.

"Domestic content procurement preference'' means all iron and steel used in the project are produced in the United States; the manufactured products used in the project are produced in the United States; or the construction materials used in the project are produced in the United States.

"Infrastructure" includes, at a minimum, the structures, facilities, and equipment for, in the United States, roads, highways, and bridges; public transportation; dams, ports, harbors, and other maritime facilities; intercity passenger and freight railroads; freight and intermodal facilities; airports; water systems, including drinking water and wastewater systems; electrical transmission facilities and systems; utilities; broadband infrastructure; and buildings and real property. Infrastructure includes facilities that generate, transport, and distribute energy.

''Project'' means the construction, alteration, maintenance, or repair of infrastructure in the United States.

Build America, Buy America (BABA) Act Requirements

The Contractor acknowledges to and for the benefit of the _____ ("Owner") and the _____ (the "Funding Authority") that it understands the goods and services under this Agreement are being funded with federal monies and have statutory requirements commonly known as "Build America, Buy America;" that requires all of the iron and steel, manufactured products, and construction materials used in the project to be produced in the United States ("Build America, Buy America Requirements") including iron and steel, manufactured products, and construction materials provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Owner and Funding Authority (a) the Contractor has reviewed and understands the Build America, Buy America Requirements, (b) all of the iron and steel, manufactured products, and construction materials used in the project will be and/or have been produced in the United States in a manner that complies with the Build America, Buy America Requirements, unless a waiver of the requirements is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the Build America, Buy America Requirements, as may be requested by the Owner or the Funding Authority. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Owner or Funding Authority to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Owner or Funding Authority resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the Funding Authority or any damages owed to the Funding Authority by the Owner). If the Contractor has no direct contractual privity with the Funding Authority, as a lender or awardee to the Owner for the funding of its project, the Owner and the Contractor agree that the Funding Authority is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the Funding Authority.

Build America, Buy America (BABA) Act Agreement Clause

Comply with all federal requirements applicable to the assistance received (including those imposed by the Infrastructure Investment and Jobs Act ("IIJA"), Public Law No. 117-58) which the Participant understands includes, but is not limited to, the following requirements: that all of the iron and steel, manufactured products, and construction materials used in the Project are to be produced in the United States ("Build America, Buy America Requirements") unless (i) the Participant has requested and obtained a waiver from the cognizant Agency pertaining to the Project or the Project is otherwise covered by a general applicability waiver; or (ii) all of the contributing Agencies have otherwise advised the Participant in writing that the Build America, Buy America Requirements are not applicable to the Project.

Comply with all record keeping and reporting requirements under all applicable legal authorities, including any reports required by the funding authority (such as EPA and/or a state), such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the applicable legal requirements and this Agreement may result in a default hereunder that results in a repayment of the assistance agreement in advance of the maturity of the Bonds, termination and/or repayment of grants, cooperative agreements, direct assistance or other types of financial assistance, and/or other remedial actions.

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01 11 00

SUMMARY OF WORK

PART 1 GENERAL

1.01 PROJECT

A. Project Name: "Water Treatment Facility”

B. Project Scope: The Project consists of the items of Work listed in Article 1 of 00 52 00 – Agreement.

C. Owner's Name: GREEN HILLS WATER AND SEWER DISTRICT, Huntsville, Utah.

1. Service District Engineer: Ryan Taylor, P.E. (Ardurra)

D. Design Engineer's Name: Ryan Taylor, P.E. and Bo Zhang, P.E. (Ardurra)

E. The Project shall be constructed according to the project specifications and drawings; and, except as specified in the Project Manual, according to the 2017 Utah Chapter APWA standard specifications and plans.

1.02 CONTRACT DESCRIPTION

A. Contract Type: A single prime contract based on a Stipulated Price as described in Agreement. The contractor shall be responsible for obtaining a building permit from Morgan County as well as coordination with Rocky Mountain Power and Dominion Energy (gas). The owner will pay fee’s for each permit / service directly.

PART 2 PRODUCTS

A. Products specified in the plans and specifications are intended for reference only. Equal products may be submitted in accordance with appurtenant specification herein.

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 31 19

PROJECT MEETINGS – SUPERCEEDS APWA SPECIFICATION SECTION 01 31 19

PART 1 - GENERAL

1.1 DESCRIPTION.

A. Work included: Included in this specification are the project requirements and associated responsibilities for sponsoring, assisting, and participating in project meetings related to the project construction and coordination. Engineer will schedule, coordinate, and facilitate meetings onsite and/or virtually as appropriate.

1.2 SUBMITTALS.

A. Agenda Items: Advise the Engineer at least 24 hours in advance of the project or construction meetings regarding all items to be added to the meeting agenda.

B. Meeting Minutes: The Engineer shall compile minutes of each project or construction meeting. The Contractor shall review the minutes for content and correctness. If the Contractor finds discrepancies or errors in the meeting minutes it should be addressed with the Engineer immediately.

C. Construction Schedule. Specification Section 013216, Project Construction Progress Schedule requires the Contractor to submit the draft construction schedule to the Engineer within five days after the effective date of the Agreement. Updated schedule shall be provided at each meeting.

PART 2 - PRODUCTS

No products are required in this section.

PART 3 - EXECUTION

3.1 PROJECT MEETINGS.

A. Pre-Construction Conference. A mandatory Pre-Construction Conference shall be held prior to the start of project construction. This conference is the appropriate and logical place for the participants (Owner, Engineer, Contractor, Subcontractors, Suppliers, Utility Companies, End Users and all other involved parties) to discuss and resolve the following issues related the execution of the construction contract. Mandatory attendance shall be required of the Contractor, Subcontractors, and major Suppliers performing work related to the construction contract.

The Pre-Construction Conference agenda topics for discussion or resolution shall be, but not limited to: progress payments, form of payment request, submittals requirements, insurance and bonding requirements, surveying and staking, quality control, labor requirements and reporting, correspondence and

management reporting, contract administration procedures, construction schedules and updating, project safety requirements, regulatory and permitting requirements, coordination, temporary facilities and controls, storage and staging areas, security, change order requirements, record drawings, final payment and project close-out procedures.

The Notice to Proceed typically will be issued at the Pre-Construction Conference when all contractual requirements are satisfied by the Contractor. The primary purpose for this conference is to establish acceptable ground rules related to the contract requirements. This will ensure that the Contractor understands the complete project requirements and coordinates the work to produce a completed project within the allotted time constraints specified in the contract.

Minimum Agenda Items (Distribution and Discussion):

1. Organization arrangement of Contractor's forces and personnel, subcontractors, material suppliers and Engineer.

2. Channels and procedures for project communications.

3. Construction Schedules.

4. Contract documents; including distribution of required copies of original documents and revisions.

5. Processing of shop drawing and submittals to the Engineer for review.

6. Processing of field decisions and change orders.

7. Rules and regulations governing performance of the work.

8. Procedures for safety, emergencies, security, quality control, housekeeping and other related matters.

9. Progress payment procedures.

B. **Weekly Construction Meetings.** Weekly "On-Site" construction meetings will be required for the purpose of discussing and reviewing project status on changes, progress, short-term scheduling, impacts to the construction process, submittals, outstanding correspondence and resolving critical issues or problems at the construction site. The Contractor, Subcontractors and Suppliers involved in the active prosecution of the work shall be in attendance at all of the Weekly Construction Meetings. Meeting may be hybrid, with both onsite and virtual attendance. Meetings will be held weekly through Final Completion.

Minimum Agenda Items:

1. Review, revise as necessary and approve minutes of previous meeting.

2. Review progress of work since last meeting, including status of submittals for approval.

3. Identify problems that impede planned progress, both short and long term.

4. Develop corrective measures and procedures to regain planned schedule or avoid possible delays.

5. Review work anticipated to occur in the forthcoming three-week period.

6. Review operational safety compliance and upcoming modifications as appropriate.

7. Coordinate utility relocations.

8. Complete other current business.

9. Once a month the Contractor and Engineer shall reconcile pay quantities, progress, and construction activity status. This will be the basis of preparation of the Contractor's application for monthly progress payment and construction schedule update.

C. Special Meetings. Special meetings may be held at the request of the Owner, Engineer, Contractor, subcontractors, or suppliers as required to discuss special construction topics. Special meetings may be necessary prior to the construction and/or installation of sensitive functions of a system or features. The purpose of these meetings is to coordinate the interface between all of the necessary project participants related to the installation.

PART 4 - MEASUREMENT AND PAYMENT

No separate measurement and payment will be made for the work required under this Section. All work shall be considered incidental to all other bid items.

END SECTION

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DIVISION 02

PROJECT CONSTRUCTION

SPECIFICATIONS ADOPTION AND ADDENDA

ADOPTION OF UTAH APWA 2017

The 2017 version of the Utah Chapter of APWA's Manuals of Standard Specifications and Plans are hereby adopted as the specifications which are to be followed for the Water Treatment Facility project for the Green Hills Water and Sewer District unless otherwise identified in the section below.

ADDENDUMS TO UTAH APWA 2017

The following documents are included as an addendum to the Utah APWA 2017 for the Water Treatment Facility project for the Green Hills Water and Sewer District. Where there is a conflict between APWA and the documents below, the documents below shall govern.

General Requirements

01 11 00 Summary of Work
01 31 19 Project Meetings

Structural

05 21 00 Steel Joist Framing
05 31 00 Steel Decking
05 50 00 Metal Fabrications
05 32 13 Pipe and Tube Railings

Architectural

06 10 00 Rough Carpentry
07 46 46 Fiber-Cement Siding
07 54 23 Thermoplastic Polyolefin (TPO) Roofing
07 62 00 Sheet Metal Flashing & Trim
07 90 00 Joint Protection

Civil

No addendums or modifications

Electrical

26 00 00 Electrical General Provisions
26 05 19 Low Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Hangers and Supports for Electrical Systems
26 05 33.13 Conduit for Electrical Systems
26 05 33.16 Boxes for Electrical Systems
26 05 43 Underground Ducts and Raceways for Electrical Systems
26 05 53 Identification for Electrical Systems
26 05 73 Power System Studies
26 08 00 Commissioning of Electrical Systems
26 27 26 Wiring Devices
26 50 00 Lighting System

Process Integration

40 05 93 Common Motor Requirements

40 61 13	Process Control Systems General Provisions
40 61 20	Process Control Systems Submittals
40 61 21	Process Control Systems Testing
40 61 26	Process Control Systems Training
40 61 93	Process Control Systems Input/Output List
40 61 96	Process Control Descriptions
40 63 43	Programmable Logic Controllers
40 66 00	Network and Communication Equipment
40 67 00	Control Panel Enclosures and Panel Equipment
40 67 63	Uninterruptable Power Supply
40 70 00	Instruments

DIVISION 26

ELECTRICAL

SECTION 26 00 00

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work includes, but is not limited to, the following principal systems and equipment:

1. 120/240-Volt system.
2. 480-Volt-System.
3. Automatic Transfer Switch.
4. Conduit and Raceways.
5. Lighting system.
6. Grounding.
7. Conductors.
8. Miscellaneous controls and Equipment.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. Data Required:

1. Submit shop drawings, product data and all other required information as specified in Division 1. Submittals are required on all products and items to be installed on this project.
2. Submittal data must show manufacturer's name, published ratings or capacity data, detailed equipment drawing for fabricated items, panel diagrams, wiring diagrams, installation instructions and other pertinent data.
3. Where literature is submitted covering a group or series of similar items, the applicable items must be clearly indicated. Mark through items not being provided and clearly identify all options being provided.
4. Do not combine submittals for multiple Specifications Sections.

B. Submit a letter showing all the exception to the specification. If no exceptions are taken the letter shall indicate no exception. Submittal will be rejected without

preliminary review if the letter is not submitted.

C. Submittal Items: Submittals are required for all equipment and materials to be used on this project. Submittals shall be complete with all pertinent information and installation details. Assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's Representative, and such procedures will not be cause for delay.

D. Terminal Connection Diagrams:

1. Submit terminal connection diagrams for approval prior to any wire installation.
2. Submit finalized terminal connection diagrams at the end of the Contract.
3. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the Engineer.

1.04 REFERENCE STANDARDS

A. A. Perform work, furnish and install materials and equipment in full accordance with the latest issue of the applicable rules, regulations, requirements, and specifications of the following:

1. Local laws and ordinances.
2. State and Federal Laws.
3. National Electrical Code (NEC).
4. State Fire Marshal.
5. Underwriters' Laboratories (UL).
6. National Electrical Safety Code (NESC).
7. American National Standards Institute (ANSI).
8. National Electrical Manufacturer's Association (NEMA).
9. National Electrical Contractor's Association (NECA) Standard of Installation.
10. Institute of Electrical and Electronics Engineers (IEEE).
11. Insulated Cable Engineers Association (ICEA).
12. Occupational Safety and Health Act (OSHA).
13. International Electrical Testing Association (NETA).
14. American Society for Testing and Materials (ASTM).
15. National Fire Protection Association (NFPA).
16. American Concrete Institute (ACI).

17. International Building Code (IBC).
18. Insulated Power Cable Engineers Association (IPCEA).
19. Association Edison Illuminating Company (AEIC).
20. Standard for Electrical Safety in the Workplace (NFPA 70E).

B. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory.

C. Product Quality: All electrical items shall be new and unused. Items such as cables, transformers, motors, control centers, etc., shall be newly manufactured for this project. Proof of purchase documents shall be provided upon request. Utilize products of a single manufacturer for each item.

1.05 QUALITY ASSURANCE

A. Regulations and permits:
   1. Regulations: Work, materials and equipment must comply with the latest rules and regulations of the following:
      a. National Electrical Code (NEC).
      b. National Electrical Safety Code (NESC).
      c. Standard for Electrical Safety in the Workplace (NFPA70E).
      d. National Fire Protection Association (NFPA70E).
      e. Occupational Safety and Health Act (OSHA).
      f. State and federal codes, ordinances and regulations.
      g. Local Electrical Code.
   2. Permits: Obtain certificates of inspection and other permits required as a part of the work.

B. Contractor qualifications:
   1. An acceptable Contractor for the work under this division must have personnel with experience, training, and skill to provide a practical working system. The Contractor shall have previous water and wastewater experience with at least 5 years in business.
      a. The Contractor shall be required to furnish acceptable evidence of having installed not less than three systems of size and type comparable to this project.
      b. The systems must have served satisfactorily for not less than 3 years.
      c. The superintendent must have had experience in installing not less than three systems.

d. The Contractor shall submit qualifications of his firm and resumes of his personnel who will work on this project.

C. General requirements for workmanship, equipment, and materials:

1. All electrical work shall be performed by workmen skilled in the electrical trade and licensed for the work by the local authority.
2. A licensed Master Electrician will be required for the issuance of a building permit for constructing, installing, altering, maintaining, repairing, or replacing any electrical wiring, apparatus, or equipment on any voltage level. A licensed Master Electrician or a licensed Journeyman Electrician holding a current license in the state of Utah is required to be on the job site during the performance of any electrical work. Master Electrician shall spend minimum of 2 hrs. per week at the job site reviewing work completed.
3. All cable splicing and termination methods and materials shall be of the type recommended by the splicing materials manufacturer for the cable to be spliced and shall be approved by the Engineer prior to installation.
4. All materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, the best practices of the trade, and in conformance with the Contract Documents. The Contractor shall promptly notify the Owner in writing of any conflict between any requirements of the Contract Documents and manufacturer's directions and shall obtain written instructions from the Owner before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Owner, he shall bear all costs arising in correcting deficiencies.
5. All equipment and materials shall be new, unless specifically noted otherwise, and shall bear the manufacturer's name, trademark and ASME, UL, and/or other labels in every case where a standard has been established for the particular item. Equipment shall be the latest approved design of a standard product of a manufacturer regularly engaged in the production of the required type of equipment and shall be supported by a service organization that is, in the opinion of the Owner, reasonably convenient to the site.
6. The Electrical design is based on preliminary equipment selections. If the contractor provides equipment that is larger than the selections, the contractor is responsible for upsizing all cables, starts, overloads, transformers, etc. to meet the National Electrical Code and provide an overall voltage drop of less than 5%. It is the responsibility of the Contractor to ensure that items furnished fit the space available with adequate room for proper operation and maintenance. He shall make measurements to certain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that, in the final inspection, will suit the true intent and meaning of the Plans, Specifications and Contract Documents.
7. The Contractor shall furnish and install all equipment, accessories, connections and incidental items necessary to complete the work, ready for use and operation

by the Engineer/Owner.

8. When the Engineer/Owner has reviewed equipment submittals and given instructions to proceed with the installation of items of equipment that require arrangements or connections different from those shown on the drawings, it shall be the responsibility of the Contractor to install the equipment to operate properly and in accordance with the intent of the Plans and Specifications, and he shall provide any additional equipment and materials that may be required. The Contractor shall be responsible for the proper location of roughing-in and connections by other trades. All changes shall be made at no increase in the Contract Amount or additional costs to other trades.
9. The Contractor shall support the installation of all equipment, plumb, rigid and true to line. The Contractor shall determine how equipment, fixtures, conduit, etc., are to be installed, and shall provide foundations, bolts, inserts, stands, hangers, brackets and accessories for proper support whether or not shown on the drawings.

D. System responsibility

1. The Contractor shall be responsible for:
    a. Complete systems in accordance with the intent of these Contract Documents.
    b. Coordinating the details of facility equipment and construction for all Specification Divisions which affect the work covered under Division 16, Electrical.
    c. Furnishing and installing incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.
    d. Coordinate the work with the instrumentation Contractor.
        1) The Instrument Contractor shall furnish and install the primary and secondary instruments, i.e. level element and level indicating transmitter, flow transmitter, etc.
        2) The conduit and wiring to and from the instruments shall be furnished and installed by the Electrical Contractor. Termination in the instrument shall be by the Instrument Contractor.
        3) All terminations in the control panel shall be by the Instrument Contractor.
        4) The Electrical Contractor shall provide termination drawings for the instrumentation Contractor.
        5) The equipment pad for the control panels, consoles and instrument panels shall be furnished by the Electrical Contractor.
        6) The Electrical Contractor shall coordinate the testing of the electrical system being furnished. He shall be responsible for the equipment he is supplying.

7) The Electrical Contractor shall be present at time of the instrument system testing and start-up. He shall be responsible to coordinate the testing of the facility with the Instrument Contractor.

8) The Electrical Contractor shall coordinate the interface requirement between each starter and control panel furnished under this Contract with the Instrument Contractor.

9) Written proof shall be furnished and submitted to the Engineer prior to installation to verify that a clear understanding has been reached between the Electrical Contractor and the Instrument Contractor for each control loop requirements, (e.g. type of contacts (momentary, maintained), interface relay requirement number of wires, terminal marking, control schematic information, and wiring diagrams).

2. Electrical plan drawings show only general locations of equipment, devices, and raceway, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceway, subject to the approval of the Engineer.

3. Submit to the Engineer in writing details of any necessary, proposed departures from these Contract Documents, and the reasons therefore. Submit such request as soon as practicable, and within ten (10) days after award of the Contract. Make no such departures without written approval of the Engineer.

4. Dimensions on electrical drawings shall be verified with structural, architectural, and mechanical drawings.

5. Where the Contractor is submitting a packaged system, Contractor shall meet the requirements of electrical specifications. This includes field cables, conduits, junction boxes, circuit breakers, combination starters, pushbuttons, pilot lights, and motors. Deviations shall not be accepted, unless approved in writing in advance. Control centers and special control cabinets wired to terminal blocks shall include the manufacturer's standard quality, unless specifically mentioned to the contrary on the drawings or in the specifications.

6. Maintain continuity of electric service to functioning portions of the process or buildings during hours they are normally in use. Temporary outages will be permitted during cutover work at such times and places can be prearranged with the Owner’s designated Representative. Such outages shall be kept to a minimum number and minimum length of time. Make no outages without prior written authorization of the Engineer. Include costs for temporary wiring and overtime work required in the Contract price. Remove temporary wiring at the completion of the work. The Contractor shall be responsible to provide and pay for temporary power to any facility during construction to facilitate the new construction. If a generator is needed the contractor shall be responsible for all the cost associated with, including fuel.

7. Unless shown in detail, the drawings are diagrammatic and do not necessarily give exact details as to elevations and routing of raceways, nor do they show all offsets and fittings; nevertheless, install the raceway system to conform to the structural and mechanical conditions of the construction.

8. Cabling inside equipment shall be carefully routed, trained, and laced. Placing cables so that they obstruct equipment devices is not acceptable.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Intent of contract documents:

1) The intent of the contract drawings or Plans is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system.

2) Electrical drawings are generally diagrammatic and show approximate location and extent of work.

3) Install the work complete, including minor details necessary to perform the function indicated.

4) In case of doubt as to work intended, or if amplification or clarification is needed, request instructions from the Engineer.

5) It is also the intent of these Contract Documents for the electrical and process system Contractor to coordinate with each other in order to provide a complete and workable system with all wiring, conduit and accessories required which may not be shown on the Plans.

6) The Plans and Specifications are intended to comply with listed codes, ordinances, regulations and standards.

B. Discrepancies:

1. Review pertinent drawings and adjust the work to conditions shown.
2. Where discrepancies occur between Plans, Specifications, and actual field conditions, immediately notify the Engineer in writing and ask for an interpretation.
3. Dimensions on electrical drawings shall be verified with structural, architectural and mechanical drawings.
4. Should installed materials or workmanship fail to comply, the Contractor is responsible for correcting the improper installation.
5. Additionally, where sizes, capacities, or other such features are required in excess of minimum code or standards requirement, provide those specified or shown.

C. Outlet and Equipment Locations:

1. Coordinate the actual locations of electrical outlets and equipment with building features and mechanical equipment as indicated on architectural, structural and mechanical drawings.
2. Review with the Engineer any proposed changes in outlet or equipment location.
3. Relocation of outlets before installation, up to 3 feet from the position indicated, may be directed by Owner without additional cost.

4. Remove and relocate outlets placed in an unsuitable location, when so requested by the Engineer.

1.07 DELIVERY, HANDLING AND STORAGE

A. Refer to individual sections for delivery, handling and storage instructions associated with each piece of equipment.

1.08 MAINTENANCE AND SPARE PARTS

A. Refer to individual sections for maintenance and spare parts associated with each piece of equipment.

1.09 EXTENDED WARRANTY

A. Refer to individual sections for maintenance and spare parts associated with each piece of equipment.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Condition: Materials and equipment provided under these Specifications must be new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer's latest standard design for the type of equipment specified.

B. NEC and UL: Products must conform to requirements of the National Electrical Code. Where Underwriters' Laboratories have set standards, listed products, and issued labels, products used must be listed and labeled by UL.

C. NEMA and IEC: Only NEMA rated equipment is acceptable. IEC or dual rated NEMA/IEC equipment are not acceptable.

D. Space Limitations: Equipment selected must conform to the buildings features and must be coordinated with them. Do not provide equipment that will not suit arrangement and space limitations.

E. Factory Finish: Equipment must be delivered with a hard surface, factory-applied finish so that no additional field painting is required.

F. Field Installation: All field installed equipment, conduit, etc., shall require Type 316 stainless steel nuts, bolts, washers, metal framing and supports, and other items as indicated on the Plans.

G. Seismic Design: All electrical equipment to be designed in accordance with the latest IBC & ASCE 7 code for Seismic Design.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. PROTECTION OF EQUIPMENT

1. Moisture:
   a. During construction, provide heaters to protect switchgear, transformers, motors, control equipment, and other items from moisture absorption and corrosion.
   b. Apply protection immediately on receiving the products and provide continuous protection.
   c. Store all equipment indoors in dry, well-ventilated and heated space.
2. Clean:
   a. Keep products clean by elevating above ground or floor and by using suitable coverings.
3. Damage:
   a. Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.
   b. Provide rodent damage protection to switchgear, transformer, etc and any other electrical equipment during any storage and/or construction times.
4. Finish:
   a. Protect Equipment per the manufacturer's requirements.

3.02 INSTALLATION

A. Cooperation with Other Trades:

1. Cooperation with trades of adjacent, related or affected materials or operations, and of trades performing continuations of this work under subsequent contracts, is considered a part of this work in order to effect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades.
2. Coordinated equipment layout in sufficient time to be coordinated with work of others, provide drawings and layout work showing exact size and location of sleeves, openings or inserts for electrical equipment in slabs, walls, partitions and chases.

B. Workmanship:

1. Work must be performed by workmen skilled in their trade. The installation must be complete whether the work is concealed or exposed.

C. Setting of Equipment:
   1. Equipment must be leveled and set plumb.
   2. Stainless Steel 316 enclosures mounted against a wall must be separated from the wall no less than 1/2-inch by means of corrosion resistant spacers or by 3 inches of air for freestanding units.
   3. Stainless Steel 316 bolts, nuts, and washers to anchor the equipment.

D. Sealing of Equipment:
   1. Permanently seal outdoor equipment at the base using concrete grout.
   2. Seal or screen openings into equipment to prevent entrance of animals, birds and insects.
   3. Use stainless steel mesh with openings not larger than 1/16-inch squares for screened openings.
   4. Seal small cracks and openings from the inside with silicone sealing compound.

E. Concealed Work: Conceal electrical work in walls, floors, chases, under floors, underground and above ceilings except:
   1. Where shown or specified to be exposed. Exposed is understood to mean open to view.
   2. Where exposure is necessary to the proper function.
   3. Where size of materials and equipment precludes concealment.

F. Equipment to be installed in Hazardous areas shall be in accordance with NEC article 500.

G. Installation and supply of electrical equipment shall be conformed to NEC 500, for classified area.

H. Project record documents
   1. Preparation:
      a. At the job site, maintain a set of white prints of the contract drawings.
      b. At the job site, maintain a set of equipment terminal connection diagrams, revisions to be included in the as built drawings.
      c. On the prints, record field changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings.
      d. Mark the drawings with a colored pencil. Record installed feeder conduits, dimensioning the exact location and elevation of the conduit.

2. Delivery: Deliver record drawings to the Engineer in the number and manner specified in Division 1 - General Requirements

I. Cutting and Patching

1. 1. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of the Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Do not cut beams for any reason. Following such work, restore surfaces neatly to original condition.

J. Load Balance

1. The Drawings and Specifications indicate circuiting to electrical loads and distribution equipment. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, etc.

K. Motor rotation

1. Before and after final service connections are made, check and correct as necessary the rotation of motors.
2. Coordinate rotation checks with the Engineer and the Contractor responsible for the driven equipment. Submit a written report to the Engineer for each motor verifying that rotation has been checked and corrected.

3.03 INSPECTION

A. Refer to individual sections for inspections to be performed for each piece of equipment.

3.04 FIELD TESTING

A. Test Conditions:

1. Place circuits and equipment into service under normal conditions, collectively and separately, as may be necessary to determine satisfactory operation.
2. Perform specified tests in the presence of the Engineer, as specified in Division 1- General Requirements and 26 - Electrical.
3. Furnish all instruments, wiring, equipment, and personnel required for conducting tests.
4. Demonstrate that the equipment operates in accordance with requirements of the plans and specifications.
5. No process equipment is to be operated until any associated HVAC equipment and auxiliary equipment is operational.

B. Test Dates: Schedule final acceptance tests sufficiently in advance of the Contract

completion date to permit completion of any necessary adjustment or alterations within the number of days allotted for completion of the Contract.

C. Retests: Conduct retests as directed by the Engineer of such time duration as may be necessary to assure proper functioning of adjusted or altered parts or items of equipment. Any resultant delay as a result of such necessary retests does not relieve the Contractor of his responsibility under this contract. Provide notice to Engineer and Owner of testing 30-days prior to testing.

3.05 FIELD PAINTING

A. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. If extensive damage is done to equipment paint surfaces, refinish the entire equipment in a manner that provides finish equal to or better than the factory finish, and that meets the requirements of the Specifications and is acceptable to the Engineer.

3.06 CLEANING

A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a first-class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

B. All temporary wiring, wiring devices and associated equipment shall be removed upon completion of the project.

END SECTION

SECTION 26 05 19

LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install, complete and ready for operation, electrical conductor systems as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 00 00 – General requirements.
2. 01 33 00 - Submittal Procedures.
3. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00: Submittal Procedures.

B. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

C. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

D. Submit a letter certifying full and complete compliance with the specifications, drawings and other project requirements. The letter shall list any exceptions or deviations from the specified requirements, if any and reasons for same. Exceptions or deviations shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ICEA - Insulated Cable Engineers Association.
2. AEIC - Association of Edison Illuminating Companies.
3. NFPA 70 – National Electrical Code.
4. UL 510 - Standard for Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
5. UL 44 - Thermoset-Insulated Wires and Cables.
6. ANSI/NEMA WC 70/ICEA S-95-658 – Power Cables Rated 2000 Volts or Less

for the Distribution of Electric Energy.

7. IEEE 1202 - Flame Testing of Cables for Use in Cable Tray.
8. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

1.05 QUALITY ASSURANCE

A. The general construction of the cable and the insulation material used shall be similar to that used for cable of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.

B. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the completed cable. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Check for reels not completely restrained, reels with interlocking flanges or broken flanges, damaged reel covering or any other indication of damage. Do not drop reels from any height.

B. Unload reels using a sling and spreader bar. Roll reels in the direction of the arrows shown on the reel and on surfaces free of obstructions that could damage the cable.

C. Store cable on a solid, well drained location. Unjacketed armored cable shall be stored indoors. Cover cable reels with plastic sheeting or tarpaulin. Do not lay reels flat.

D. Seal cable ends with heat shrinkable end caps. Do not remove end caps until cables are ready to be terminated.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Use the manufacturer's name, model or catalog number, if for the purpose of establishing the standard of quality and general configuration desired only.
2. Splices are not acceptable on this project, except at light fixtures and receptacles.

B. Conductors - 600 Volts

1. Single Conductors 600 Volts and Below:

   a. Unless otherwise indicated, all conductors shall be copper and shall be stranded. Solid conductors shall not be used. All conductors with the exception of grounding conductors shall be standard copper.

   b. Utilize only conductors meeting applicable requirements of UL 44, UL 1685, IECA S-95-658 (NEMA WC70).

   c. Provide conductors with type XHHW-2 insulation. Wire shall be TC rated where used in cable trays.

   d. Unless noted otherwise, conductor sizes indicated are based on copper conductors. Do not provide conductors smaller than those indicated.

   e. Where flexible cords and cables are specified, provide Type STJO, 600 volt, with the number and size of copper conductors indicated.

2. Single Pair (600 Volt No.16 AWG Twisted, shielded Pair Instrumentation Cable, Type TC):

   a. General: Single pair instrumentation cable designed for noise rejection for process control, computer, and data log applications. Suitable for installation in cable trays, conduit, or other approved raceways. Minimum cable temperature rating shall be 90° C dry locations, 75° C wet locations.

   b. Individual Conductors: Soft annealed copper, Class B, 7- strand concentric per ASTM B 8, 22 AWG, 7-strand copper drain wire.

   c. Insulation and Jacket: Each conductor XHHW-2. Pair conductors pigmented black and white. Jacket flame-retardant and sunlight and oil resistant PVC with 45 mils nominal thickness. Shield aluminum/Mylar overlapped to provide 100 percent coverage

   d. Dimension: 0.30 inch nominal OD

   e. Manufacturers: Alpha Wire Corporation, Belden, General Cable, the Okonite Company.

3. Single Triad (600 Volt No. 16 Twisted, Shielded Triad Instrumentation Cable, Type TC):

   a. General: Single triad instrumentation cable designed for noise rejection for process control, computer, or data log applications. Suitable for installation in cable tray, conduit, or other approved raceways. Minimum cable temperature rating shall be 90 C dry locations, 75 C wet locations.

   b. Conductors: Soft annealed copper, Class B, 7-strand concentric per ASTM B8, 22 AWG, 7-strand copper drain wire.

   c. Insulation and Jacket: Each conductor, XHHW-2 insulation. Triad conductors pigmented black, red, and white. Jacket flame-retardant and sunlight and oil

retardant PVC with 45 mils nominal thickness. Shield aluminum/Mylar, overlapped to provide 100 percent coverage.

d. Dimensions: 0.32-inch nominal OD.

e. Manufacturers: Alpha Wire Corporation, Belden, General Cable, the Okonite Company.

4. Equipment Grounding Conductors:

a. Refer to specification section 26 05 26: Grounding and Bonding for Electrical Systems for grounding conductor information.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. General

1. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii. Pulling compound shall be used. Use only UL listed compound compatible with the cable outer jacket and with the raceway involved.

2. CONTRACTOR is to provide and install all low voltage (120V, 208V, 480V, etc.) distribution equipment and hardware associated with this project as shown on the plan drawings.

3. Tighten screws and terminal bolts using torque type wrenches, and/or drives, to tighten to the inch-pound requirements of the NEC and UL.

4. Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means such as arc and fireproofing tapes, bundle throughout their exposed length conductors entering from each conduit with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 12 inches on centers.

5. Provide conductor sizes as indicated on the drawings with 600V rated insulation.

6. Use silicone filled pressure connectors. Place no more than one conductor in any single-barrel pressure connection.

7. Motors connector shall be crimp connectors or kernys varnish carbonic C130.

8. Soldered mechanical joints insulated with tape will not be acceptable.

9. Vinyl plastic insulating tape for wire and cable splices and terminations shall be

flame retardant, 8.5-mil thick minimum, rated for 105 C minimum meeting the requirements of UL 510. Acceptable product 3M-Scotch 88.

10. Provide terminals and connectors acceptable for the type of material used.
11. Arrange wiring in cabinets, panels, and motor control centers neatly cut to proper length. Remove surplus wire, and bundle and secure in an acceptable manner. Identify circuits entering motor control centers or other control cabinets in accordance with the conductor identification system specified herein.
12. For terminals designed to accept only bare wire compression terminations, use only stranded wire, and terminate only one wire per terminal. Tighten terminal screws with torque screwdriver to recommended torque values.
13. Attach compression lugs with a tool specifically designed for that purpose which provides a complete, controlled, crimp where the tool will not release until the crimp is complete. Use of plier type crimpers is not acceptable.
14. Cap spare conductors and conductors not terminated with UL listed end caps.
15. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer edges, and install bushings and protective strips of insulating material to protect the conductors.
16. For conductors that will be connected by others, provide at least 6 feet spare conductor in freestanding panels, and at least 2 feet spare in other assemblies. Provide more spare conductors in any particular assembly where it is obvious that more conductor length will be needed to reach the termination point.

B. Conductor Color Coding

1. For power conductors, provide all single conductors power cables with integral insulation pigmentation of the designated colors, except conductors larger than No. 6 may be provided with color-coding by wrapping the conductor at each end and at all accessible locations with vinyl tape. Where this method of color-coding is used, wrap at least six full overlapping turns of tape around the conductor covering an area 1-1/2 to 2 inches wide at a visible location.
2. Phase A, B, and C implies the direction of positive phase rotation.
3. Use owner's current color scheme. If owner does not have a consistent color scheme use the following:

Use the following colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts	Grounded Neutral	White
1-Phase, 3-Wire	One Hot Leg	Black
	Other Hot Leg	Red

208Y/120 Volts	Grounded Neutral	White
3-Phase, 4-Wire	Phase A	Black
	Phase B	Red
	Phase C	Blue
480Y/277 Volts	Grounded Neutral	Gray
3-Phase, 4-Wire	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow

C. Installation

1. Do not splice without permission of the OWNER'S REPRESENTATIVE. Locate splices, when permitted, only in readily accessible cabinets or junction boxes using terminal strips.
2. Cable Placement:
   a. Immediately prior to the placement of each cable or cable group, inspect the raceway to determine that installation is complete and that the interior is clean and free of all materials detrimental to the cable or its placement. Group all cable assigned to a particular conduit and pulled simultaneously, using cable grips and acceptable lubricants.
   b. Provide adequately sized raceways to accommodate the number and size of cable as specified, and in compliance with Article 300 of the National Electric Code. If at any time during the progress of the work raceways appear inadequate to accommodate the assigned cable, notify the Owner's Representative/Owner at once and discontinue further work on the questionable raceway until advised by the Owner as to how to proceed.
   c. Carefully check all cable as to size and length before pulling into conduits. Remove and replace cable pulled into the wrong conduit or cut too short at no additional cost to the Owner's Representative/Owner. Do not pull cable removed from one conduit or duct into another conduit or duct without permission of the Owner's Representative/Owner.
   d. Fishing and pulling shall be performed with flexible round non-metallic tape, carbon dioxide, or forced air propelled polyethylene cord, nylon rope, or manifold rope. No metallic cable or material that may damage or scratch the inside surface shall be pulled into any conduits.
3. Use woven wire cable grips to pull all low voltage single conductor cable, No. 2/0 and larger and all low voltage multi-conductor cable. Use pulling loops to pull single conductor cable smaller than No. 2/0. When a cable grip is used for pulling, the arc of the cable covered by the grip plus 6-inches shall be cut off and discarded.

4. Insert a reliable non-freezing type of swivel or swivel connection between the pulling ropes and the cable eye, or grip to prevent twisting under strain.
5. Do not exceed the maximum pulling tension recommended by the cable manufacturer. Pulling mechanisms of both the manual and power types shall have the rated capacity in tons clearly marked on the mechanism. Whenever the capacity of the pulling mechanism exceeds the recommended pulling tension of the cable as given by the cable manufacturer, a dynamometer shall be used to show the tension on the cable, and the indicator shall be constantly watched. If any excessive strain develops, stop the pulling operation at once and determine and correct the difficulty.

D. Conductor Arc and Fireproofing Tapes

1. Use arc and fireproofing tapes on 600-volt single conductors and cables, except those rated Type TC, throughout their entire exposed length at splices in manholes, handholes, vaults, cable trays, and other indicated locations.
2. Wrap together as a single cable conductor entering from each conduit.
3. Follow tape manufacturer's installation instructions. Secure the arc and fireproofing tape at frequent intervals with bands of the specified glass cloth electrical tape. Make each band of at least two wraps of tape directly over each other.
4. Arc and Fireproofing tape shall be 3M Scotch #77 or equal.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Pulling tensions shall be recorded for all cable runs longer than 200 feet.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install grounding and bonding equipment for the electrical system. It is the intention of this specification that all electrical equipment be grounded. Furnish labor, materials, equipment and incidentals necessary to install a complete grounding system in strict accordance with Article 250 of the National Electrical Code (NEC) as shown on the drawings or as specified herein. Electrical work shall be in accordance with division 26 05 00 Electrical General Requirements.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 05 00 – Electrical General Requirements

1.03 SUBMITTALS

A. Submittal shall be in accordance with Division 1 and shall include:

1. Grounding materials, equipment and processes.
2. Product Data: For each type of product supplied.
3. Field quality-control test reports.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings, and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI/IEEE Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
2. ANSI/UL 467 - Grounding and Bonding Equipment.
3. NFPA 70 - National Electrical Code.

1.05 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Measure the ground grid resistance with the earth test megger and install additional ground rods and conductors as required until the resistance to the ground conforms to National Electrical Code requirements. Ground resistance measurement shall not exceed 5 ohms.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPART PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ground Rods

1. Material: GROUND RODS: Copper-clad steel having a diameter of 3/4" and a minimum length of 10'.
2. Listing: UL 467.

B. Ground Cables

1. Stranded, tinned copper of 98% conductivity and as specified in Section 26 05 13 CONDUCTORS AND CABLES.

C. Conduit Ground Fittings

1. Fittings for bonding ground cable to the conduit shall be FCI Burndy Corp., type NE or Thomas & Betts No. 3951 series.

D. Ground Rod Boxes

1. Precast Box with cast iron lid. Lid shall read “ground rod” on lid. Brooks Precast Model. “3-RT” or approved equal. Ground rod boxes shall have an AASHO H-20 rating.

E. Ground Plate Electrodes

1. 20 gauge copper with terminated two (2) foot welded pigtail connection.

F. CONNECTIONS

1. Type:
    a. Unless otherwise noted, provide exothermic weld typed for all non-accessible and below-grade connections.
    b. For above grade connections provide bonds and clamps of a nonferrous material which will not cause electrolytic action between the conductor and the connector.
2. Listing: UL 467.
3. Acceptable Manufacturers:
    a. Below grade:
        1) Cadweld.
        2) Thermoweld.
    b. Above grade:
        1) Burndy.
        2) Ilsco.
        3) Erico.
        4) OZ/Gedney.
        5) T & B.

G. Certification

1. Contractor shall receive from the manufacturer proper training prior to execute the exothermic weld connection.

H. Wiring

1. Provide copper insulated conductors for bonding jumpers. All insulated grounding conductors shall be copper, stranded.
    a. Provide 600-volt insulated conductors having a green-colored XHHW insulation for equipment grounding conductors, or green heat shrink over XHHW insulation in accordance with NFPA 70E.
    b. Ground conductors shall be protected in conduit where subject to physical damage.

c. All exposed ground conductors shall be installed in conduits. Ground conductor attached to cable trays shall not be considered exposed.

d. Ground wire shall be un-insulated copper where ground wire is directly buried in earth or concrete.

I. Ground Bus

1. Round-edge tin plated copper bar with 98 percent International Annealed Copper Standard (IACS) conductivity.
2. Size the bus for not less than 25 percent of the cross-sectional area of the related feeder.
3. A minimum ground bus size of 3-inch by 2 inches is required.

J. Grounding for Instrumentation System

1. Ground Loop for instrumentation system shall be grounded at only one point to the building ground system.

K. Ground Loop

1. All ground loop conductor shall be bare tin-coated copper minimum wire size shall be #4/0 unless otherwise noted.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION (NOT USED)

3.02 INSTALLATION

A. System Ground

1. System Neutral:
   a. Where a system neutral is used, ground the system neutral conductor as required by NEC Article 250.
   b. Ground the system neutral only at the point of service and isolate it from ground at all other points in the system.
2. Separately Derived Systems: Ground neutrals of separately derived systems such as generators, transformers, etc., in accordance with NEC 250-30.
3. Size: Size the system grounding conductors to comply with NEC Table 250-66, unless shown larger.

B. Equipment Ground

1. Raceway Systems and Equipment Enclosures:

   a. Ground cabinets, junction boxes, outlet boxes, motors, controllers, raceways, fittings, switchgear, transformer enclosures, handrail, stair, steel pipe and other equipment and metallic enclosures.

   b. Ground equipment and enclosures to the continuous-grounded, metallic raceway system in addition to any other specific grounding shown.

   c. Provide bonding jumpers and ground wire throughout to ensure electrical continuity of the grounding system.

   d. Provide grounding-type insulated bushings for metal conduits terminating in equipment enclosures containing a ground bus and connect the bushing to the ground bus.

   e. Provide green insulated equipment grounding conductor for each feeder, power branch circuit, receptacle branch circuit and lighting branch circuit.

   f. Raceways shall not be used for equipment ground. Provide individual equipment ground wires for all equipment even if not shown on plans.

   g. Provide bonding jumper and bonding bushing on each metallic conduit entering or leaving the enclosure of the service equipment.

   h. Where grounding conductors are shown, bond the wires to metallic enclosures at each end and to intermediate metallic enclosures. Connect grounding conductors to grounding bushings on raceway. Where any equipment contains a ground bus, extend and connect grounding conductors to that bus. Run ground conductor inside conduits enclosing the power conductors.

   i. Make connections of any grounding conductors to motors ½ HP and above, or circuits 20 amps or above, by solderless terminal and a 5/16-inch minimum bolt tapped to the motor frame or equipment housing. Grounding clips mounted directly on the box, or with 3/8-inch machine screws. Completely remove all paint, dirt, or other surface coverings at grounding conductor at connection points so that good metal-to-metal contact is made.

   j. Ground metal sheathing and any exposed metal vertical structural elements of buildings. Ground metal fences enclosing electrical equipment. Bond any metal equipment platforms which support electrical equipment to that equipment. Provide good electrical contact between metal frames and railings supporting pushbutton stations, receptacles, instrument cabinets, etc., and raceways carrying circuits to these devices.

   k. Bond neutrals of transformers to the system ground network, and to any additional indicated grounding electrodes.

2. Size:

   a. When grounding and bonding conductors are not sized on drawings, size the grounding conductors in accordance with NEC Table 250-122.

b. Size bonding jumper so that minimum cross-sectional area is greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250-122.

3. Install sufficient ground rods in addition to those shown, or code required grounding so that resistance to ground as tested by standard methods does not exceed 5 ohms. Where more than one rod is required, install rods at least 6 feet apart.

C. Ground Connections

1. Unless shown otherwise, make connections of grounding conductors to ground rods at the upper end of the rod with the end of the rod and the connection point below finished grade.

2. Make connections of sections of outdoor ground mats (counterpoise) for substations or other equipment underground. Make connections of other grounding conductors generally accessible.

3. When making thermite welds, wire blush or file the point of contact to a bare metal surface. Use thermite welding cartridges and molds in accordance with the manufacturer's recommendations. After welds have been made and cooled, brush slag from the weld area and thoroughly clean the joint. For compression connectors, use homogeneous copper, anti-corrosion, surface treatment compound at connectors in accordance with connector manufacturer's recommendations. Use connectors of proper size for conductors and ground rods specified. Use connector manufacturer's compression tool. Notify Owner's Representative prior to backfilling any ground connections.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. The testing shall be performed in accordance with Section 26 08 00.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Hangers and supports for electrical equipment and systems.

B. Construction requirements for concrete bases.

1.02 RELATED WORK

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

C. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. Product Data:

1. Outdoor installation: 316 stainless steel slotted support systems.
2. Indoor installation: Galvanized steel slotted support systems.

B. Record data: Show fabrication and installation details for the following:

1. Trapeze hangers. Include Product Data for components.
2. Type 316 stainless steel slotted channel system for outdoors/galvanized steel slotted channel system for indoors and all bolts to be type 316SS.
3. Equipment supports and connections detail.

C. Welding certificates.

D. Field Test Report.

E. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

F. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or

deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. NFPA 70 – National Electric Code

B. NECA – National Electrical Contractor Association

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

2. Comply with NFPA 70.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension and shear force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of 3 times the applied force.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Support, Anchorage, and Attachment Components

1. Outdoor use: Use stainless steel 316 components for support, anchorage and attachment components for any supports unless otherwise noted.
2. Indoor use: Use galvanized steel components for support, anchorage and attachment components for any supports unless otherwise noted.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Allied Tube & Conduit.
    b. Cooper B-Line, Inc.; a division of Cooper Industries.
    c. ERICO International Corporation.
    d. GS Metals Corp.
    e. Thomas & Betts Corporation.
    f. Unistrut; Tyco International, Ltd.
    g. Wesanco, Inc.
    h. Channel Dimensions: Selected for applicable load criteria.
4. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
5. Conduit and Cable Support Devices: hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
6. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported.
7. Structural Steel for Fabricated Supports and Restraints:
    a. 316 Stainless Steel only for outdoor installations.
    b. Galvanized Steel for indoor installations.
8. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
    a. Adhesive Anchor Systems: Epoxy adhesive 316 Stainless Steel, for use in hardened portland cement concrete, with tension and shear capacities appropriate for supported loads and building materials where used.
        1) Manufacturers: Hilti Inc. only.
    b. Mechanical-Expansion Anchors: Wedge-type 316 Stainless Steel, for use in hardened portland cement concrete, with tension and shear capacities appropriate for supported loads and building materials where used.
        1) Manufacturers: Hilti Inc. only.

c. Powder-Actuated Fasteners: 316 Stainless Steel stud, for use in hardened portland cement concrete, steel, or wood, with tension and shear capacities appropriate for supported loads and building materials where used.

1) Manufacturers: Hilti Inc. only

d. Concrete Inserts: 316 Stainless Steel, Slotted support system units.

e. Clamps for Attachment to Steel Structural Elements: 316 Stainless Steel, type suitable for attached structural element.

f. Through Bolts: Structural type, hex head, and high strength. 316 Stainless Steel Toggle Bolts: 316 Stainless Steel.

g. Hanger Rods: 316 Stainless Steel.

9. Cast aluminum one-hole clam conduit supports are not acceptable.

2.02 FABRICATION

A. Fabricated Metal Equipment Support Assemblies

1. Description: Welded or bolted, structural steel shapes, shop or field fabricated to fit dimensions of supported equipment.

2. Materials: Comply with requirements in Division 5 Section "Metals" for 316 Stainless Steel/galvanized steel shapes and plates.

3. All outdoor equipment rack shall be provided with canopy to protect the equipment for being overheated by the sun. Canopy shall extend at a minimum 1 foot in front of the equipment enclosure.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for conduit as required by NECA 1 Table 1 when the maximum spacing is less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with 316 Stainless Steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Secure raceways and cables to these supports with two-bolt conduit clamps.

E. 316 Stainless Steel clamps designed for supporting single conduits may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.02 INSTALLATION

A. General Installation

1. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
2. All supports and fastening devices shall be stainless steel 316 unless when equipment is located in chlorine and ammonia environments in which case galvanized steel shall be utilized.
3. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 300 lb.
4. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   a. To New Concrete: Bolt to concrete inserts or Adhesive Anchor Bolt.
   b. To Masonry: Wedge type expansion anchors on hollow masonry units and expansion anchor fasteners on solid masonry units.
   c. To Existing Concrete: Adhesive Anchor System provided with lock washers and nuts shall be used in existing normal weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete slabs or wall less than 4 inches thick.
   d. Expansion Anchor Bolt can be used for concrete thickness is less than 4 inches to meet minimum.
   e. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
   f. To Light Steel: Sheet metal screws.
   g. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panel boards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint wind strength and anchorage requirements.
5. Drill holes for expansion anchors in concrete at locations to avoid reinforcing bars.

B. Installation of Fabricated Metal Supports

1. Comply with installation requirements in Division 5 Section "Metals" for site-

fabricated metal supports.

2. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
3. Field Welding: Comply with AWS D1.1/D1.1M.

C. Concrete Bases

1. Construct concrete bases of dimensions indicated but not less than 6 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
2. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3 Section "Cast-in-Place Concrete."
3. Anchor equipment to concrete base.
   a. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   b. Install anchor bolts to elevations required for proper attachment to supported equipment.
   c. Install anchor bolts according to anchor-bolt manufacturers written instructions.

D. Mounting Stands: Field mounted disconnects, pushbutton control stations, etc., shall be mounted on steel stands as shown on the Drawings. Where clearance requirements for stands may not be maintained, the Owner’s Representative may direct equipment to be wall-mounted adjacent to the drive, but in no case shall the distance from the drive motor to the control station exceed 3-ft.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Division 09 00 00 - Finishes for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply

galvanizing-repair coating to comply with ASTM A780.

3.06 CLEANING

A. Remove dirt, dust, or concrete spatter from hangers and supports using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

END SECTION

SECTION 26 05 33.13

CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein. A raceway system shall consist of materials designed expressly for containing wires and cables, including but not limited to, conduit, device bodies, conduit bodies, raceway boxes, and related materials.

B. Raceways and conductors that are listed on the raceway and conductor schedules are generally not shown on the Drawings, except where they are required to pass through a restricted or designated space. Raceways indicated to be run "exposed" on the schedules shall be run near the ceilings or along the walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes and hoists, lighting fixtures, doors and hatches, etc. Raceways indicated to be run concealed shall be run in the center of concrete floor slabs, in partitions, or above hung ceilings, as required.

C. This section specifies the furnishing and installation of electrical raceway systems.

1. Conduit:
    a. Rigid aluminum conduit.
    b. PVC-coated rigid aluminum conduit.
    c. Liquid-tight flexible metal conduit.
    d. PVC Schedule 40 conduit.
    e. PVC Schedule 80 conduit
2. Wireways.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. Submit to the Owner's Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. The ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC).
2. UL 1 - Safety Standard for Flexible Metal Conduit.
3. UL 5 - Safety Standard for Surface Metal Raceways and Fittings.
4. UL 651 - Standard for Schedule 40 and Schedule 80 Rigid PVC Conduit and Fittings.
5. UL 870 - Safety Standard for Wireways, Auxiliary Gutters, and Associated Fittings.
6. NEMA RN 1 - PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
8. UL 6 and 614 - Electrical Rigid Metal Conduit.
9. UL 360 - Liquid-tight Flexible Steel Conduit.
10. UL 467 - Electrical Grounding and Bonding Equipment.
11. NFPA 70 - National Electric Code.
12. NFPA 70E - Standard for Electrical Safety in the Workplace.

B. All equipment components and completed assemblies specified in this Section of the Specifications shall bear the appropriate label of Underwriters Laboratories

1.05 QUALITY ASSURANCE

A. Installer shall be specialized in installing PVC coated conduit with minimum 5 years

documented experience. Experience shall include training. Training to be submitted for approval prior to beginning work on this project.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of shipment. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Rigid Aluminum Conduit:

1. Conduit: Rigid copper free aluminum (alloy 6063-T1) conduit (RAC).
2. Fittings: For RAC use threaded aluminum.
3. Listing: UL 6A.
4. Acceptable RAC Manufacturers: [Wheatland Tube Company] Allied Tube and Conduit, Indalex, SAPA or [approved equal].
5. Acceptable Fittings Manufacturers: Appleton, Crouse-Hinds, Midwest, OZ/Gedney, Raco and listed conduit manufacturers.

B. PVC-Coated Rigid Aluminum Conduit:

1. Conduit: Rigid aluminum conduit plus a factory-applied, 40-mil-thick covering of polyvinyl chloride (PVC) bonded to the metal, and 2 mil polyurethane coating on the inside.
2. Fittings: Same as aluminum conduit fittings plus a factory-applied, 40-mil-thick covering of polyvinyl chloride (PVC) bonded to the metal.
3. Listing: UL 6.
4. Acceptable Conduit and Fittings Manufacturers: Killark, KorKap, OCAL,

[Triangle PWC Inc.], Perma- cote, Plasti-bond and Robroy Industries, Calbrite.

C. Liquid-tight Flexible Metal Conduit:

1. Conduit: Spiral-wound, square-locked, aluminum plus a bonded outer jacket of PVC.
2. Fittings: Compression sealed type aluminum.
3. Listing: UL 467 for fittings.
4. Acceptable Conduit Manufacturers: Allied tube and Conduits, Anaconda, Anamet, Liquatite, American Brass Co., Ultratite AEF by Southwire, American Flexible Conduit Co., Inc.; Universal Metal Hose Co.; ALFLEX or equal.
5. Fittings used with liquidtight flexible aluminum conduit shall be copper-free aluminum and shall conform to FEDSPEC AA50552, and UL-514B. Acceptable Fittings Manufacturers: Appleton, Crouse-Hinds, Midwest, OZ/Gedney, Raco, and listed conduit manufacturer.

D. PVC Schedule 40 Conduit:

1. Non-metallic rigid conduit made of polyvinyl chloride (PVC) manufactured in accordance with the National Electrical Code UL 651 and NEMA TC-2.
2. Fittings shall also be non-metallic.
3. Acceptable conduit and fittings manufacturers: Allied Tube and Conduit, Prime Conduit, CertainTeed Products, Electri-Flex, Heritage Plastics Central or approved equal.

E. Explosion Proof Seal and Fitting

1. Conduit seal: Explosion proof, aluminum conduit filling with fiber and compound as define by NEC Article 500 and as manufactured by Crouse -Hinds or Appleton.
2. Explosion proof fittings: aluminum fittings; flexible coupling to match the hazard as defined by NEC Article 500 and as manufactured by Appleton, Crouse-Hinds, O.Z./Gedney Co., or equal.
3. Explosion proof conduits and fillings shall be rated for 40% fill.

F. Bushing: High impact, thermosetting, phenolic insulation; 150 degrees C; as manufactured by Appleton “BBUH”, Blackburn, or OZ Gedney type A.

G. Ground bushings: Conduit grounding bushings shall consist of an insulated throat conduit bushing with an attached aluminum set screw lug. Each bushing shall be furnished with a plastic insert cap. The size of the lug shall be sufficient to accommodate the maximum ground wire size required by the NEC for the application. Grounding bushing shall comply with Fed. Spec. W-F-408, UL Standards 514B and 467, and shall be Crouse Hinds Lazy Lug, O-Z Gedney or approved equal.

H. Locknuts: Stainless Steel as manufactured by Appleton.

I. Hubs:

1. Cast aluminum with broad flat surfaces with gripping teeth on both sides of conduit entry. Hub portion on exterior side of entry shall contain "O" ring for watertight seal of conduit entry. Hubs shall be Myers Hub, Appleton or Efcor.

J. Conduit through-wall and floor seal: PVC coated malleable aluminum body with oversized sleeves, sealing ring, pressure clamp and rings and sealing grommet; hex head cap screw, as manufactured by OZ Gedney, type FSK.

K. Smoke and fire seals: Material shall be intumescent, one (1) part (requiring no mixing) and capable of expanding up to a minimum of eight (8) times. Material shall be U.L. classified with a fire rating equal to or greater than the penetrated number. Products to be in caulk, putty, wrap strip, sheet, or access kit foam and shall be 3M "Fire Barrier".

L. Conduit drains: Conduit drains shall be Crouse Hinds ECD Universal or approved equal.

M. Expansion Joints: Aluminum with internal grounding. Shall be provided with an external bonding jumper for conduits 4" and above. Expansion joint shall be SAXJG by Cooper Crouse-Hinds or equivalent by OZ Gedney.

N. Threaded nipples: As manufactured by Allied or Steel Duct. Conduit nipples shall have two (2) independent sets of threads. Running threads shall not be used. Utilize the conduit union when joining two (2) fixed conduits in a continuous run.

O. Escutcheons: Chrome-plated, sectional floor and ceiling plates, as manufactured by Crane No. 10.

P. Accessories: Reducers, washer, etc., shall be stainless steel.

Q. Weatherheads: Weatherheads shall be threaded aluminum for threaded rigid conduit application and shall not be a clamp type. Weatherheads shall be Crouse Hinds series F, O-Z type 17 or Appleton Series F.

R. End bells: PVC as manufactured by Prime Conduit, Cantex or equal by Heritage Plastics.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Place conduit or sleeves in the forms of walls and floor slabs for the free passage of wire or conduits.

B. Set conduit or sleeves in place a sufficient time ahead of concrete placement so as not to delay the work.

C. Apply sealing methods for sleeves through floors and through exterior walls, per details shown on plans.

D. Plugs or caps shall be installed before concrete placement begins.

3.02 INSTALLATION

A. Minimum Trade Size: 3/4 inch, except that 1/2-inch flexible metal conduit may be used in lengths not exceeding 72 inches for tap conductors supplying lighting fixtures and for switch legs. The minimum size for underground conduit shall be 1½" inch.

B. Conduit sizes, where not indicated, shall be N.E.C. code-sized to accommodate the number and diameter of wires to be pulled into the conduit.

C. Plastic coated metallic conduit lengths shall be joined with threaded metallic coupling that shall be each equipped with a 40 mil thickness sleeve that shall extend over the threads of the joined conduit. Each joint shall be watertight.

D. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, and at every 100 feet.

E. All conduit runs shall be watertight over their lengths of run. Slope conduits such that they drain, and install drain fitting as required to remove condensation from the conduit.

F. Install a drain fitting for all conduits subject to condensation. Condensation water shall never enter electrical or instrumentation enclosure.

G. Plastic jacketed flexible metal conduit shall be used to connect wiring to motors, limit switches, bearing thermostats, and other devices that may have to be removed for servicing. Unless otherwise indicated, maximum lengths of flex shall be thirty (30”) inches.

H. Application of Conduit Types:

1. All underground conduit including conduits under a concrete slab shall be PVC and shall be concrete encased. Shall be as specified under Section 26 05 43 Underground Ducts and Raceways for Electrical Systems. Exception taken for lighting circuits not located under roadways where direct buried conduit installation is permitted.

2. Provide PVC coated rigid galvanized steel conduit bends for all underground

PVC conduits bends. Only factory bended long sweep elbow are acceptable.

3. Exposed conduits inside dry ventilated areas, outdoors in non-corrosive atmosphere shall be rigid aluminum. Aluminum shall not come in contact with concrete at any point.
4. Exposed conduits in areas where chemicals are stored, handled, or utilized the conduit shall be PVC schedule 80.
5. Exposed conduits in high humidity, non-ventilated areas, constant or frequency wet areas, corrosive atmosphere areas the conduit shall be PVC coated aluminum.
6. At the transition from PVC to rigid aluminum conduit, provide a 12" section of PVC coated galvanized steel conduit with a minimum of 6-inches into the concrete. The PVC coated galvanized steel conduit shall be per the specification, field wrapping or applying by spray shall not be acceptable.

I. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with an approved tool. Cutting openings with a torch or other device that produces a jagged, rough cut will not be acceptable.

J. Installation Requirements:

1. Metallic Conduits:
   a. Continuous between enclosures such as outlet, junction and pull boxes, panels, cabinets, motor control centers, etc.
   b. The conduit must enter and be secured to enclosures so that each system is electrically continuous throughout.
   c. Where knockouts are used, provide double locknuts, one on each side.
   d. At conduit terminations, provide insulated bushings for conductor protection.
   e. Where conduits terminate in equipment having a ground bus, such as in switchgear, motor control centers and panelboards, terminate conduit with an insulated grounding bushing and extend a suitable grounding wire to the ground bus.
   f. Hubs of the same material shall be used at conduit termination.
2. Run concealed conduit as directly and with the largest radius bends as possible.
3. Run exposed conduit parallel or at right angles to building or other construction lines in a neat and orderly manner. Conceal conduit in finished areas. Unless otherwise shown, remaining conduit may be exposed.
4. Provide chrome-plated floor and ceiling plates around conduits exposed to view and passing through walls, floors, partitions, or ceilings in finished areas.
5. Select properly sized plates to fit the conduit when securely locked in place.
6. PVC Coated conduit and fittings shall be installed per manufacturer's specifications. Contractor shall be trained by the manufacturer and evidence of training shall be available at all times. Field bending of conduit is not acceptable.

All fittings shall be sealed by manufacturer recommended PVC compound.

K. Installation Methods:

1. Install each entire conduit system complete before pulling in any conductors.
2. Clean the interior of every run of conduit before pulling in conductors to guard against obstructions and omissions.
3. Cut all joints square, then thread and ream smooth.
4. Bends:
    a. Make bends with standard elbows or conduit benders in accordance with the NEC.
    b. Make field bends using equipment designed for the particular conduit material and size involved.
    c. Bends must be free from dents or flattening.
    d. Use no more than the equivalent of three 90-degree bends in any run between terminals and cabinets, or between outlets and junction boxes or pull boxes.
5. Conduit bodies may be used in lieu of conduit elbows where ease of installation and appearance warrants their use. Conduit bodies larger than 1-inch may be used only where approved.
6. Fastenings: Securely fasten and support exposed conduit to framing using stainless steel unistrut and straps of same material as unistrut with 316 stainless steel fastening hardware.
7. Provide a No. 30 nylon pulling line in conduits in which wiring is not installed under this work, such as telephone, signal, and similar systems. Identify both ends of the line by means of labels or tags reading "Pulling Line." Also, state the panel the conduit originated from. Apply write-on identification to empty conduits to identify each conduit as to terminus of other end and also to identify trade size of conduit.
8. Suitably cap conduit during construction to avoid water, dirt and trash entrance.
9. Use expansion-deflection fittings on conduit crossing structural expansion joints and on exposed conduit runs of more than 100 feet or where necessary. Provide bonding jumpers across fittings in metal raceway systems. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, and at every 100 feet.
10. Use expansion-deflection fittings on all conduit runs that transition from underground to above ground within 12” of grade level.
11. With a coupling, terminate concealed conduit for future use at structural surfaces. Install a pipe plug flush with the surface.
12. Openings around electrical penetrations of fire-resistance rated walls, partitions, floors or ceilings shall maintain the fire resistance rating using approved methods.

See NEC 300-21. Fire barrier shall be 3M 2001 RW silicone RTV foam or approved equal.

13. Conduits shall be installed with uniform slope which will permit drainage toward manholes, pull boxes, or building walls. Utilize conduit drain as required to remove condensate in the conduits.
14. Seal all conduits with pliable sealant such as "Duraseal" where entering boxes, manholes, switchgear, motor control centers, panelboards, enclosures, etc.
15. PVC coated conduit shall be installed by certified installer. PVC coated conduit installation shall follow manufacturer recommendation.
16. All termination at an enclosure shall be made from the bottom of the enclosure, no overhead penetrations are allowed. When conduits are located above the enclosure route the conduit at the same height as the bottom of the enclosure, install a drip lane at the end of the conduit and use flexible conduit to terminate at the bottom of the enclosure.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

A. All raceways shall be swabbed clean after installation. There shall be no debris left inside. All interior surfaces shall be smooth and free from burrs and defects that would injure wire insulation. Coordinate approval of cleanliness with the Owner’s representative.

END SECTION

SECTION 26 05 33.16

BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install outlet boxes, floor boxes, junction boxes, pull boxes and terminal boxes.

B. All boxes located outdoors containing heat sensitive equipment shall be factory painted white.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. Submit to the Owner's Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittals shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. ANSI/NEMA Publication No. OS 1 - Cast Aluminum Outlet Boxes, Device Boxes, Covers and Box Supports, and Steel Covers.

B. ANSI/UL 514 - Electrical Outlet Boxes and Fittings.

C. NFPA 70 - National Electric Code.

1.05 QUALITY ASSURANCE

A. The general construction of the boxes and the materials used shall be similar to that used for boxes of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.

B. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the boxes. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

B. Enclosures shall be stored in the original cartons in a favorable environment (cool and dry areas).

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENTED WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of shipment from the factory. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Outlet Boxes

1. Flush Device Boxes:

a. Provide cast aluminum boxes of sufficient size to accommodate wiring devices to be installed at outlet.

b. Extension rings shall not be acceptable.

c. Square or rectangular boxes may be supplied.

d. Unless otherwise noted, provide boxes 3-1/2-inches deep by 4 inches wide.

e. Boxes in hazardous locations shall be NEMA rated for the application.

f. Boxes in contact with masonry or concrete shall be gray steel.

2. Exposed Device Boxes: Provide FD aluminum boxes for surface mounting in areas having exposed conduit systems. Provide gray steel boxes in areas in contact with masonry or concrete. Coordinate box cover for proper use.

3. Boxes for Lighting Fixtures:

a. Provide aluminum octagonal boxes with fixture stud supports and attachments as required to properly support ceiling and bracket-type lighting fixtures.

b. Unless otherwise noted, provide boxes 2 inches deep by 4 inches wide.

c. Boxes in contact with masonry or concrete shall be grey steel.

4. Masonry Boxes:

a. Provide stamp metal masonry boxes.

b. Use boxes with 1-gang capacity in excess of the number of devices to be installed.

c. Extension ring covers shall not be acceptable.

5. Listing: UL 514.

6. Acceptable Manufacturers: Appleton, Bowers, Crouse-Hinds, Efcor, Midwest, OZ/Gedney, RACO, Steel City, T & B or approved equal.

B. Junction, Pull and Splice Boxes

1. Construction: Provide boxes conforming to NEC Article 314.

2. Interior Spaces: Provide surface mounted NEMA 12 aluminum boxes at least 4 inches deep, with continuous hinged cover.

3. Exterior Spaces: NEMA 4X stainless steel type 316 boxes at least 4 inches deep.

4. Embedded: Provide stainless steel 316 type with external recessed flanged cover when cast in concrete.

5. Listing: UL 514.

6. Acceptable Manufacturers: Hoffman, Keystone, OZ, Stahlin, Crouse-Hinds.

7. Hazardous location: Box shall be NEMA rated for the application.

8. Chemical areas: Box shall be rated NEMA 4X, PVC or fiberglass reinforced polyester. Fiberglass enclosures shall not be used in the presence of sodium

hypochlorite. Non-metallic boxes shall have UV inhibitors and shall not be mounted in direct sunlight.

C. Termination Cabinets & Boxes

1. Termination cabinets shall be NEMA 4X 316 stainless steel gasketed. Cabinets shall be of sufficient size to adequately contain all terminals, wire-duct, and cables as determined by the CONTRACTOR. Cabinets shall have removable doors (lift- off) not more than 30 inches wide and shall be equipped with a three-point locking latch handle.
2. Wire terminal blocks shall be square D type M Barrier Block system or equal.
   a. M4/6G or B 22014 AWG 6MM (0.234 inch) wide, grey blue, single level, 600 volt, 20A.
   b. M6/8G or B 22-8 AWG 8MM (0.315 inch) wide, grey blue, single level, 600 volt, 55A.
3. The wire terminal block system shall be for DIN rail mounting, and shall include fuse/switch blocks, circuit breaker block, and isolation switches.
4. Acceptable Manufacturers: Hoffman.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Coordinate location of all boxes with all other work.

B. Verify location of floor boxes with Engineer before installation.

3.02 INSTALLATION

A. Outlet Boxes

1. Flush Boxes:
   a. Unless otherwise indicated, mount all outlet boxes flush within 1/4-inch of the finished wall or ceiling line.
   b. Securely fasten outlet boxes in position using clips or other suitable means.
   c. Provide plaster covers for all boxes in plastered walls and ceilings.
2. Fixture Boxes: Where boxes for suspended lighting fixtures are attached to and supported from suspended ceilings, adequately distribute the load over the ceiling support members.

3. Mounting Height:
    a. Mounting height of a wall-mounted outlet box means the height from finished floor to horizontal center line of the cover plate.
    b. Where outlets are indicated adjacent to each other, mount these outlets in a symmetrical pattern with all tops at the same elevation.
    c. Where outlets are indicated adjacent, but with different mounting heights, line up outlets to form a symmetrical vertical pattern on the wall.
    d. Verify the final location of each outlet with Owner's Representative before rough-in.
    e. Remove and relocate any outlet box placed in an unsuitable location.
4. Back-to-Back Boxes:
    a. Do not connect outlet boxes back-to-back unless approval is obtained.
    b. Where such a connection is necessary to complete a particular installation, fill the voids around the wire between the boxes with sound insulating material.
5. Box Openings: Provide only the conduit openings necessary to accommodate the conduits at the individual location.

B. Floor Boxes
1. Completely envelop floor boxes in concrete except at the top. Increase slab thickness at boxes if required for bottom covering. Adjust covers flush with finished floor.

C. Junction and Pull Boxes
1. Pull boxes and junction boxes shall be provided to facilitate the installation of cable and wires. "Condulet" type fittings shall not be used in lieu of boxes when the conduit contains wire #4 AWG or larger.
2. Installation:
    a. Install boxes as required to facilitate cable installation in raceway systems.
    b. Generally provide boxes in conduit runs of more than 100 feet.
    c. Locate boxes strategically and make them of such shape and size to permit easy pulling of wire or cables. Size boxes in accordance to NEC Article 314.28 requirements.
3. Covers:
    a. Provide boxes so that covers are readily accessible and easily removable after completion of the installation.
    b. Include suitable access doors for boxes above suspended ceilings.
    c. Select a practical size for each box and cover.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 43

UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install concrete encasement around underground electrical raceways as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.
3. 31 00 00 – Earthwork.

C. Excavation, backfilling, fill and grading are included in Division 31.

D. Concrete formwork, concrete joints, joint accessories and cast in place concrete are included in Division 3.

E. Furnishing and installing electrical conduit and furnishing and placing electrical warning tape are included in Division 26.

1.03 SUBMITTALS

A. Submit to the Owner’s Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI C80.1, Specifications for Zinc-Coated Rigid Steel Conduit.
2. ANSI/ACI 301, Specifications for Structural Concrete for Buildings.
3. ANSI/ASTM A615, Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ANSI/NEMA TC6, PVC and ABS Plastic Utilities Duct for Underground Installation.
5. ANSI/NEMA TC9, Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ducts and Fittings

1. Unless otherwise noted, provide Schedule 40 PVC conduit encased in concrete. Provide fittings of the same type material as the conduit.
2. Provide direct buried galvanized steel conduit systems for outdoor lighting circuits where those do not cross roadways. At intersection with roadways, provide schedule 40 PVC conduit encased in concrete and reinforced with rebar. Extend rebar 5’ on both sides of the road.

B. Conduit and Fittings

C. Concrete

1. Provide concrete conforming to the following.
   a. Compressive strength: 3,000 psi at 28 days.

b. Slump: Not exceeding six inches.

c. Aggregate size: Use pea gravel.

d. Additive: Red ferrous oxide concrete coloring pigment mixed at the rate of 1-1/2 pounds per sack of cement. Sprinkled color on the top of the duct bank will not be acceptable.

e. All raceway concrete placements shall be continuous and water tight between manholes or handholes and between manholes or handholes and structures.

f. Encasement shall be reinforced at all road crossings and where indicated on the drawings.

g. Encasement shall be laid in trenches as and where indicated on drawings.

h. Provide not less than 4 inches of concrete between the outside of a raceway and the earth unless otherwise noted on the drawings. Provide not less than 2 inches of concrete between adjacent raceways unless otherwise noted on the Drawings. Form as specified in division 3.

i. Where raceways pass through concrete walls, concrete encasements shall be extended through the finished flush with inside surfaces. Watertight construction joints with waterstops conforming to division 3 shall be provided.

D. Reinforcing Bars

1. Provide Grade 40 steel reinforcing bars, for all duct banks.

E. Identifying Tape

1. Refer to specification section 26 05 53 Identification for Electrical Systems for detectable warning tape characteristics.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Location and Inspection

1. Before beginning trenching operations stake out the proposed duct bank routing and obtain approval of the Owner. After trenching has begun and before any ducts or conduits are placed, notify the Owner so that the trenching and installation may be inspected. Also notify the Owner prior to any placement of concrete for duct banks, so that he may observe the placing. Placing concrete on muddy trench bottoms will not be acceptable.

3.02 INSTALLATION

A. Construction

1. Duct bank configurations are detailed on the drawings. A minimum of 3-inch concrete cover shall be required on all sides of the conduits. Conduits shall be spaced with 3-inch clearance on all sides.

B. Excavation and Backfill

1. Excavation: Excavate trenches for installation of duct banks. Form the trench bottom to follow closely the specified grade and depth for the duct banks.
2. Backfill: Trenches may be backfilled with excavated soil and supplemented as necessary with select materials. Compact the backfill and mound slightly above natural grade, compact to 95%.
3. Restoration: Restore adjacent areas disturbed by trenching or backfilling to a condition equal to the original.

C. Placing of Duct Banks

1. Cover: Unless otherwise shown, provide a minimum 18” of earth and select materials cover. Coordinate grade with other work, if in conflict, rework grade at no cost to Owner.
2. Grade: Place duct banks with a minimum grade of four inches per 100 feet. Grade between manholes may be from one manhole to the next manhole or from a high point between manholes. Where terminating ducts inside of buildings, always slope the grade away from building to the nearest manhole.
3. Changes in Direction: Make changes in direction of runs exceeding a total of 10 degrees, either horizontal or vertical, by using long sweep bends. Long sweep bends must have a minimum radius of curvature of 3 feet and may be made up of one or more curved or straight sections. Manufactured bends having a minimum radius of curvature of three feet may be used at the ends of duct runs which are less than 100 feet in length.
4. Joints: Make joints in ducts and conduits watertight, in accordance with manufacturers recommendations. Stagger joints in adjacent ducts and conduits a minimum of six inches. Make joints between ducts and conduit with appropriate no-thread-to-threaded adapters. Use appropriate sealant.
5. Spacing: Unless otherwise shown, space ducts and conduits with 3” spacers. Place spacers or separators on not greater than five-foot centers. Use spacers or separators made of plastic, concrete or a suitable nonmetallic, nondecaying material.
6. Drainage: All conduit duct banks shall be sloped sufficiently to drain into manholes, pull boxes or sumps.

D. Placing of Concrete

1. Place concrete using chutes and tremies as necessary to limit the free drop of the mix to a maximum of two feet. Carefully rod or vibrate the concrete to aid uniform encasement of the ducts. Smooth the top of the pour with a float. Encase the conduits in concrete, a minimum thickness of three inches, on all sides.

E. Special Project Requirements

1. Contractor shall employ hand trenching at locations where existing underground utilities are present.
2. All damaged utilities should be repaired immediately in manner acceptable to the Owner at Contractor's expense. Any damaged cables shall be replaced in full. Splices shall not be acceptable. Damaged conduits shall be replaced between the two closest manholes and cables repulled.
3. Install a #4/0 bare copper grounding conductor centered over the ductbank. Bond ductbank grounding conductor to building or transformer ground loop at one end and to the manhole ground electrode at the other end.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Thoroughly clean all ducts and conduits before placing. During construction and after the duct line is completed; plug open ends of ducts and conduits to prevent the entrance of foreign matter. After the duct line has been completed, pull a flexible mandrel through each duct and conduit. The mandrel must not be less than 12 inches long with a diameter approximately 1/4 inch less than the inside diameter of the duct or conduit. After cleaning, place in each duct and conduit a No. 30 nylon line with a plastic tag on each end reading "Pulling Line", and a tag identifying the location of the other end.

END SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install tags/nameplate on all equipment, devices, instruments, conduit and conductor marking as indicated on the drawings and specified herein. Major equipment shall be furnished with nameplates in accordance with their individual specifications.

1.02 RELATED WORK

A. Division 26 00 00 – Electrical General Provisions.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. Submit to the Owner's Representative, in accordance with Division 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter showing all the exceptions to the specification. If no exceptions are taken the letter shall indicate no exception. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS (NOT USED)

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wire Markers

1. Provide heat shrinkable sleeves and machine printed legends at every conductor. Sleeves and legends shall be high resistant to abrasion, solvents and chemicals. Provide Tyco TMS, Brady Perma Sleeve XPS, or approved equal. Markers shall be white with black lettering.
2. Markers shall have conductor origin, termination and circuit number, terminal number whichever applies.
3. Large conductors, multi-conductor cable and tray cables to be identified with placards held on with wire ties and of the same quality as markers for smaller single conductors.
4. Cables in cable tray to be identified with place cards at the equipment and at 20 feet spans in between.
5. All control wiring in electrical equipment or manufactured supplied panel shall have wire markers.

B. Conduit Markers

1. Exposed Conduit
   a. Conduit markers to be stainless steel type permitting embossing on the job and attached to conduit with banding made of same material. Markers to be installed lengthwise and wrapped with clear adhesive tape.
   b. Conduits to be marked at the point of origin, the point of termination, upon crossing wall, each side of junction boxes and at 20-foot internals for all exposed and accessible conduits. Identify all exposed conduits by their panel, MCC, circuit numbers or loop numbers.
   c. Provide labels for high voltage conduit. Labels shall be vinyl for indoor exposed conduit or polyester for outdoor exposed conduit. Label shall be black letters on red/orange background. Labels shall be as manufactured by Thomas and Betts or Brady.

C. Nameplates

1. Nameplates:
   a. Externally mark electrical equipment by means of suitable nameplates identifying each and the equipment served.
   b. Provide each piece of equipment with a white phenolic nameplate with 3/16-inch-high black lettering secured to front of equipment.
   c. Supply blank nameplates for spare units and used spaces.

d. Actual nameplate legend, which may consist of up to three lines, will be provided to the Owner's Representative on submittals.

2. Nameplate Fasteners: Fasten nameplates to equipment only by means of appropriate 316 SS screws and gasket. Stick-ons or adhesives will not be allowed. Seal opening in order to maintain the NEMA rating of the enclosure.

    a. Nameplate Information: In general, the following information is to be provided for the types of electrical equipment as listed.

    b. Switchgear, Motor Control Centers and Distribution Panelboards: On the mains, identify the piece of equipment, the source, and voltage characteristics, i.e., 480V, 3PH, 3W, etc. For each branch circuit protective device, identify the load served and the primary side circuit number.

    c. Transformers: Identify the service source and load served.

    d. Panelboards: Identify the service source, panelboard designation and voltage characteristics.

3. Panelboards:

    a. Prepare a neatly typed circuit directory behind clear heat-resistant plastic for each panelboard. Directory shall include circuit identification, protective device type, trip rating, number of poles and rating of main lugs or main circuit breaker.

    b. Identify circuits by equipment served and by room numbers, where room numbers exist.

    c. Use equipment names and room numbers selected by the Owner's Representative; names and numbers may be different from those shown on plans.

    d. Indicate spares and spaces with light, erasable pencil markings.

    e. Provide a final set of the panel schedule in the O&M manuals.

    f. Provide a CD with the file for each Panel to the Owner with the O&M manual.

4. Boxes, Small Equipment:

    a. Pull boxes and similar items shall be marked with Nameplates.

    b. Provide identification labels for high voltage equipment and raceways with the legend "DANGER HIGH VOLTAGE". Mark all exposed high voltage raceways every 25 feet. Safety labels shall be self-sticking polyester and as manufactured by Thomas and Betts (Panduit) or Brady.

5. Power Receptacles: Use nameplate or engraved plate to identify power receptacles where the nominal voltage between a pair of contacts is greater than 150 volts with circuit number, voltage, and phases.

6. Wall Switches: Engrave the switch plate of the switch with the function of the switch.

D. Power Outlets, Switches, and Pilot Devices

E. Mark power outlets with voltage, phase, panel name, and circuit number.

F. Identify all wall switches, disconnect switches, etc. with nametags, circuits served, and panel origin, list to be approved by Owner's Representative/Owner.

G. Identify all push-button stations with their functions and equipment served.

H. Detectable Warning Tape

1. Shall be red metal detectable polyester with a subsurface graphics to seal the legend from acid, alkalis, and other soil substances.
2. Minimum width shall be 2".
3. Warning tape shall meet OSHA regulation for covering location of underground utility lines.
4. The legend shall show CAUTION: BURIED ELECTRIC LINE BELOW
5. The warning tape shall be Red with black lettering.
6. Acceptable manufacturer shall be Brady 91601 or approved equal.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Furnish and install nameplates for all panelboards, motor starters, motor control center cubicles, disconnect switches, instrument panels, dry type transformers and control stations.

B. Engrave the equipment designation, (e.g., "Starter Pump P1"), on nameplates in 3/16-inch black letters on white background of laminated phenolic. Securely fasten nameplates using stainless steel 316 sheet metal screws or rivets; or contact cement if enclosure is sealed. All switches, indicating lights, pushbuttons, meters and parameter indicators on panels shall be clearly identified with its function or tag, as required. Identification list to be approved by owner representative through the Owner's Representative.

C. Stainless Steel tags shall be used on instrument, motors and other devices, as applicable. The tags shall be affixed to the instrument with drive pins or stainless-steel chain in such a manner that it does not need to be removed to install the

instrument. Motors shall carry the tag assigned to its driven equipment, (e.g., P-101).

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 CLEANING (NOT USED)

3.06 FIELD PAINTING (NOT USED)

3.07 CLEANING (NOT USED)

END SECTION

SECTION 26 05 73

POWER SYSTEM STUDIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Short Circuit Studies, Protective Device Evaluation Studies, Arc Flash Studies and Protective Device Coordination Studies, shall be performed by an electrical service firm regularly engaged in power system studies.

B. The studies shall be submitted to the Owner's Representative prior to receiving final approval of the distribution equipment shop drawings, and/or prior to release of equipment for manufacture. If formal completion of the studies cause delay in equipment manufacture, approval from the Owner's Representative may be obtained for a preliminary submittal of sufficient study data to ensure that the selection of device ratings and characteristics will be satisfactory.

C. The studies shall include all portions of the electrical distribution system from the normal 480V power source or sources down to, and including, 480V, 3-phase loads, the 120/240-Volt distribution system, including 240V main sing-phase circuit breaker and all 240V, single-phase loads. Study shall also include all manufacturer supplied equipment. Normal system connections and those, which result in maximum fault conditions, shall be adequately covered in the study. System showing the largest load or partial list of the equipment on the bus will be rejected. One line diagram shall show all loads on the system. Combined circuits or partial one lines are not allowed. Utility owned transformer protection device shall be included in each power system study.

D. Protective relay devices with microprocessor-based settings shall be determined with the study.

E. The work associated with this section is to be performed by or under the direction of a professional engineer licensed by the State of Utah.

F. A comprehensive power system study shall be provided for the new treatment facility to include new utility equipment, main circuit breaker, 480V power panel, ATS, Generator, and downstream low voltage panelboard with associated electrical loads.

1.02 RELATED WORK

A. Division 26 00 00 – Electrical General Provisions.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. The results of the power system study shall be summarized in a final report. Six (6)

bound copies of the final report shall be submitted. Report to be sealed by a professional engineer licensed in the State of Utah. Submit a preliminary report for approval prior to release equipment for manufacture.

B. The report shall include the following sections:

1. Description, purpose, basis, and scope of the study and a full size (22”x34”) single-line diagram of that portion of the power system which are included within the scope of the study.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short circuit duties and commentary regarding same.
3. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
4. Fault current calculations, including a definition of terms and guide for interpretation of computer printout.
5. A letter from utility provider showing available short circuit current at the service entrance, X/R ratios, impedances and characteristics of upstreams protective devices.
6. A complete list of all recommended settings for all protective relays, including all solid state protective relay packages.
7. A complete detail of the Arc Flash Study analysis as specified in 2.04.
8. An arc flash label showing the information requested in section 2.
9. An electronic version of the analysis using SKM software, to be submitted for the final report.
10. The electronic version shall include the backup folder with all the libraries files.

1.04 REFERENCE STANDARDS

A. The power system studies provided shall be performed in accordance with the following standards:

1. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book).
2. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book).
3. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants.
4. NFPA 70E – National Electrical Safety Code.
5. OSHA 29-CFR, Part 1910 Sub part S.
6. IEEE 1584 - IEEE Guide for Performing Arc Flash Hazard Calculations.

1.05 QUALITY ASSURANCE

A. The company and individual(s) performing the study shall have a minimum 5 years documented experience in power system analysis and completed projects of similar size and scope.

B. The individual(s) performing the study shall be a registered Professional Engineer in the State of Utah.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Data Collection for the Studies

1. The Contractor shall provide the required data including field settings on existing equipment for preparation of the studies. The switchboard/switchgear and MCC manufacturer shall furnish the Contractor with a listing of the required data immediately after award of the Contract.
2. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings, and/or prior to release of the equipment for manufacturer.
3. The Contractor is responsible for gathering all manufacturer panel equipment data.

B. Short Circuit Study and Protective Device Evaluation Study

1. The short circuit study shall be performed with the aid of a digital computer program, SKM.
2. The study input data shall include the power company's short circuit contribution, resistance and reactance components of the branch impedances, the X/R ratios, base quantities selected, and other source impedances.
3. Calculate phase and phase-to-ground current and impedance.
4. Short circuit close and latch momentary duty values and interrupting duty values shall be calculated on the basis of assumed three-phase bolted short circuits at each switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel, and other significant locations through the system. The short circuit tabulations shall include symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio and impedance.
5. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, automatic transfer switches, and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Owner’s Representative's attention, and corrective measures implemented at no extra cost to the Owner.

C. Protective Device Coordination Study

1. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios, and characteristics of associated current transformers, and low voltage breaker trip characteristics, and settings.
2. The coordination study shall include all medium and low voltage classes of equipment from the building or plant service protective devices down to and including the largest rated device in the MCC low voltage motor control center and panelboard. The phase and ground overcurrent protection shall be included, as well as settings of all other adjustable protective devices.
3. The undervoltage relay setting shall be carefully selected in order to override momentary voltage drop conditions. In addition, a time delay relay shall be used to help override undervoltage conditions. Switchgear manufacturer shall coordinate with utility company to determine a suitable relay setting and time delay setting to override the distribution system normal/abnormal voltage drop conditions.
4. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves, and fuses. The coordination plots shall include the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand limits, and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis and on separate log sheets. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.
5. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, manufacturer and type, range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas, or inadequacies shall be promptly brought to the Owner’s Representative's attention.
6. The coordination study shall be calculated by means of computer software package, SKM.

D. Arc Flash Hazard Study

1. Perform an arc flash hazard study after the short circuit and protective device coordination study has been completed based upon IEEE Std 1584, “IEEE Guide for Performing Arc Flash Hazard Calculations.”

2. The study shall be calculated by means of computer software package SKM. Pertinent data, rationale employed, and assumptions in developing the calculations shall be incorporated in the introductory remarks of the study.
3. Determine the following:
    a. Flash Hazard Protection Boundary.
    b. Incident Energy.
    c. Working Distance.
    d. Required PPE Level.
    e. Shock Hazard Voltage.
    f. Limited Approach.
    g. Restricted Approach
    h. Prohibited Approach.
4. Produce an Arc Flash Warning label listing items a-h above. Arc flash label size shall be 3”x3” minimum. Also include the bus name, system operating voltage, and date of issue. Labels shall be printed in color and be printed on adhesive backed labels. See example below.



5. Produce Bus Detail sheets that list the items D 3 a-h from above and the following additional items.
    a. Bus Name.
    b. Upstream Protective Device Name, Type, and Settings.
    c. Bus Line to Line Voltage.
6. Produce Arc Flash Evaluation Summary Sheet listing the following additional items:

a. Bus Name.
b. Upstream Protective Device Name, Type, and Settings
c. Bus Line to Line Voltage.
d. Bus Bolted Fault.
e. Protective Device Bolted Fault Current.
f. Arcing Fault Current.
g. Protective Device Trip / Delay Time.
h. Breaker Opening Time.
i. Solidly Grounded Column.
j. Equipment Type.
k. Gap.
l. Arc Flash Boundary.
m. Working Distance.
n. Incident Energy.
o. Required Protective Fire Rated Clothing Type and Class.

E. Computer Software Developers
1. SKM System Analysis Inc.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION (NOT USED)

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Protective Device, Calibration, and Adjustment
1. The equipment manufacturer shall provide the services of a qualified field Owner's Representative and necessary tools and equipment to test, calibrate, and adjust the protection relays and circuit breaker trip devices as recommended in the

power system study.

2. As a part of this Contract, the manufacturer's system Owner’s Representative shall make one formal presentation in the Owner’s office to the Owner's personnel. The presentation shall include all training materials and visual aids.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 08 00

COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section provides the guidelines for testing of electrical equipment, cable, protective relays, circuit breakers, motor control centers, motors, and related apparatus to be used for the site interior and exterior electrical distribution system. This specification does not release the Contractor or vendor from any further testing required for safe commissioning of the equipment. All tests shall be completely recorded on forms provided at the end of this section. Tests shall be submitted to Engineer/Owner for approval.

B. Contractor will provide and pay the cost of electrical testing by an independent testing firm.

C. The Contractor to update the protective device settings with the final power system study acceptance.

1.02 RELATED WORK

A. Related equipment specification in all section of Division 26 Electrical.

1.03 SUBMITTALS

A. The testing result shall be summarized in a final report certified by the testing technician. Report shall be submitted per division 1 requirement.

B. The report shall include the following section:

1. Description, purpose, basis and scope of the work.
2. Field data sheet showing all visual, mechanical and electrical inspection done on the equipment. The data sheet shall show check mark and values of all the testing done; a description of the instrument used for testing.
3. A summary of the deficiency, concern, repairs and recommendation.
4. A table showing the final settings of all the adjustable equipment tested.
5. All the testing values shall be in accordance with the latest NETA standard.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or

deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. InterNational Electric Testing Association Standards (NETA) for acceptance testing of Electrical Distribution Apparatus, Publication 2.001, and IEEE Publication No. 141, are hereby made a part of this section, unless otherwise modified herein.

B. NETA Maintenance Testing Specifications for electrical power distribution equipment and system (latest edition).

1.05 QUALITY ASSURANCE

A. Testing firm shall have a minimum of five years of experience in providing acceptance testing for pumping stations. Testing shall be performed per the latest InterNational Electric Testing Association Standards (NETA) standard. This cost will be included in the Contract Bid.

B. The Contractor shall immediately correct all deficiencies discovered during testing by the independent firm. The independent testing firm has the final say on the acceptance of the equipment. If testing determine the equipment is deficient, contractor shall be responsible to fix the deficiency even if the manufacturer said the equipment is satisfactory.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Preparatory work:

1. Prior to the testing of any specific piece of equipment, the Contractor shall remove all shipping hardware and inspect for broken or missing parts and proper connections in accordance with the manufacturer's instructions.

3.02 INSTALLATION (NOT USED)

3.03 INSPECTION

A. Visual and Mechanical Inspection

1. Prior to any electrical testing Contractor shall perform a visual and Mechanical inspection as specified in the latest NETA standard.

B. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan on each major part piece of equipment (switchgear, transformer tap box, VFD). Remove front panels so joints and connections are accessible to portable scanner. Infrared testing shall be performed on loaded equipment.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.

2. Instruments, Equipment, and Reports:

a. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Prepare a certified report that identifies equipment included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.04 FIELD TESTING

A. All tests, other than Low Voltage Systems and Equipment, shall be supervised by the Engineer/Owner and the contractor. Contractor shall give a 30 days notice of all scheduled tests to the Engineer/Owner in writing.

B. Contractor shall notify the Engineer/Owner of scheduled dates of electrical equipment installation completion. Equipment testing shall be coordinated at this time by Contractor with Engineer/Owner and appropriate Manufacturer's Representatives.

C. Under this specification the Contractor shall perform the electrical tests on specified equipment ad specified herein. The Contractor shall supply all equipment required to perform all testing responsibilities.

D. Device

1. Air switches – Low voltage

a. Electrical Tests

1) Perform insulation-resistance tests on each pole, phase-to- phase and phase-to-ground for one (1) minute. Test voltage and minimum resistances should be in accordance with NETA Standard.

2) Perform contact-resistance test across each switch blade and fuse holder, or perform thermographic survey in accordance with the lastest NETA Standard.

2. Switchgear and Switchboard Assemblies
    a. Electrical Tests
        1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
        2) Measure contact resistance across each switchblade and fuseholder.
        3) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with switch closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or NETA Standard whichever is more stringent.
        4) Perform an overpotential test on each pole with switch closed. Test each pole-to-ground with all other poles grounded. Test voltage shall be in accordance with manufacturer's published data or NETA Standard whichever is more stringent.
        5) Measure fuse resistance.
        6) Verify cubicle space heater operation.
3. Transformers – Dry-type
    a. Small Transformers: Dry-Type, Air-Cooled (600 Volt and Below) (less than 100 kVA single-phase or 300 kVA three-phase)
        1) Inspect for physical damage, broken insulation, tightness of connections, defective wiring, and general condition.
        2) Thoroughly clean unit prior to making any tests.
        3) Perform insulation-resistance test. Calculate polarization index. Measurements shall be made from winding-to-winding and windings-to-ground. Test voltages and minimum resistance shall be in accordance with NETA Standard. Results to be temperature corrected in accordance with NETA Standard.
        4) Verify that the transformer is set at the specified tap.
4. Transformers – Liquid filled
    a. Single and 3-phase, liquid filled transformers rated 5KVA and larger, shall be tested in accordance with the "Transformer Test Report," or form provided by the Engineer.
    b. Record the following information and attach to the test report.
        1) Verify "tap changer" operation, if applicable, in all positions. Set and secure "tap changer" to position recommended by the Owner or Engineer.
        2) Verify proper operation of all fans, alarms, and other auxiliary and monitoring devices.
        3) Obtain insulating liquid sample from all liquid filled transformers. Submit sample to testing laboratory, approved by the Owner for analysis. Standard

insulating liquid tests, as required by the Owner or Engineer, shall be performed. Test results shall be delivered to the Owner within 30 days from sampling.

4) Perform insulation resistance tests at the test values shown below for the following equipment.

5) Tests shall be performed from each winding to ground and winding to winding. Primary and secondary sections shall be tested separately.

6) In no case shall the Manufacturer's recommended maximum test values or procedures be exceeded.

TRANSFORMER COIL RATING	TEST VOLTAGE
0-600 VOLTS	1,000 VOLTS
601-5,000 VOLTS	2,500 VOLTS
5,001-15,000 VOLTS	5,000 VOLTS
15,001-39,000 VOLTS	10,000 VOLTS

7) Provide additional tests and checks as recommended by the manufacturer before energizing.

8) Energize transformer. Measure and record primary and secondary volts and amps under no load and connected load conditions.

5. Cables – low-voltage, 600V maximum

   a. Electrical Tests

      1) Perform resistance measurements through bolted connections with low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

      2) Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.

      3) Perform continuity tests to insure correct cable connection.

6. Cables – medium-voltage

   a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

   b. Perform an insulation-resistance test utilizing a megohmmeter with a voltage output of at least 2500 volts. Individually test each conductor with all other conductors and shields grounded. Test duration shall be one minute.

   c. Perform a shield-continuity test on each power cable by ohmmeter method.

   d. Perform an acceptance test on cables, including terminations and joints, after cable system installation and before the cable system is placed into service. In accordance with ANSI/IEEE 400, ICEA S-93-639/NEMA WC 74, ICEA S-

94- 649 and ICEA S-97-682, testing can be performed by means of direct voltage (dc), alternating voltage (ac), partial discharge (pd), or very low frequency (VLF). The selection can be made only after an evaluation of the alternative methods. Test procedure shall be as follows, and the results for each cable test shall be recorded as specified herein. Test voltages shall not exceed 80 percent of cable manufacturer's factory test value or the maximum test voltage in latest NETA standard.

1) Ensure that the input voltage to the test set is regulated.
2) Current-sensing circuits in test equipment, when available, shall measure only the leakage current associated with the cable under test and shall not include internal leakage of the test equipment.
3) Record wet- and dry-bulb temperatures or relative humidity and temperature.
4) Test each cable section individually.
5) Test each conductor individually with all other conductors grounded. Ground all shields.
6) Terminations shall be adequately corona-suppressed by guard ring, field reduction sphere, or other suitable method, as necessary.
7) Ensure that the maximum test voltage does not exceed the limits for terminators specified in ANSI/IEEE 48, IEEE 386, or manufacturer's specifications.
8) Raise the conductor to the specified maximum test voltage and hold for 15 minutes. Refer to latest NETA standard.
9) If performed by means of direct voltage (dc), reduce the test set potential to zero and measure residual voltage at discrete intervals.
10) Apply grounds for a time period adequate to drain all insulation stored charge.
11) Spliced cables (new to existing)

e. When new cables are spliced into existing cables, the acceptance test shall be performed on the new cable prior to splicing in accordance with latest NETA standard.

f. After test results are approved for new cable and the splice is completed, an insulation-resistance test and a shield-continuity test shall be performed on the length of new and existing cable including the splice.

7. Switches, Vacuum, Medium Voltage

a. Electrical Tests

1) Perform resistance measurements through bolted electrical connections with a low-resistance ohmmeter, if applicable.
2) Perform a contact/pole-resistance test.

3) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with switch closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or NETA Standard

4) Perform vacuum bottle integrity (overpotential) test across each vacuum bottle with the contacts in the open position in strict accordance with manufacturer's published data. Do not exceed maximum voltage stipulated for this test. Provide adequate barriers and protection against x-radiation during this test. Do not perform this test unless the contact separation of each interrupter is within manufacturer's tolerance. (Be aware that some dc high-potential test sets are half-wave rectified and may produce peak voltages in excess of the manufacturer's recommended maximum.)

5) Remove a sample of insulating liquid, if applicable, in accordance with ASTM D 923. Sample shall be tested in accordance with the referenced standard.

a. Dielectric breakdown voltage: ASTM D 877
b. Color: ASTM D 1500
c. Visual condition: ASTM D 1524

8. Motor Control Center/Motor Starters, Medium Voltage

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with the latest NETA Standard

2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with starter closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data and NETA Standard whichever is more stringent. Perform insulation-resistance tests on contactor(s), phase-to-ground, phase-to- phase, and across the open contacts for one minute in accordance with the latest NETA Standard

3) Perform insulation-resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components, follow manufacturer's recommendation.

4) Test control power transformers in accordance with the latest NETA Standard

5) Perform an overpotential test in accordance with manufacturer's published data. If manufacturer has no recommendation for this test, it shall be in accordance with the latest NETA Standard

6) Perform vacuum bottle integrity test (overpotential), if applicable, across each vacuum bottle with the contacts in the open position in strict accordance with manufacturer's published data. Do not exceed maximum voltage stipulated for this test.

7) Perform contact resistance tests.

8) Measure blowout coil circuit resistance.

9) Measure resistance of power fuses.

10) Energize contactor using an auxiliary source. Adjust armature to minimize operating vibration where applicable.

11) Test motor protection devices in accordance with manufacturer's published data. In the absence of manufacturer's data, use the latest NETA Standard

12) Test starting transformers, if applicable, in accordance with the latest NETA Standard

13) Test starting reactors, if applicable, in accordance with the latest NETA Standard

14) Verify operation of cubicle space heater.

9. Surge Arresters, Surge Protection Devices (Low and Medium Voltage):

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.

2) Perform an insulation-resistance test at voltage levels in accordance with NETA Standard.

3) Test grounding connection in accordance with NETA Standard.

10. Circuit Breakers – Air, Insulated Case/Molded Case

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.

3) Perform a contact/pole-resistance test.

4) Perform adjustments for final setting in accordance with coordination study.

5) Determine long-time pickup and delay by primary current injection.

6) Determine short-time pickup and delay by primary current injection.

7) Determine ground-fault pickup and time delay by primary current injection.

8) Determine instantaneous pickup by primary current injection.

9) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.

10) Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and antipump function.

11) Verify operation of charging mechanism.

11. Circuit breakers – Air, low voltage, power

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.

3) Perform a contact/pole-resistance test.

4) Make adjustments to the trip settings in accordance with the coordination study.

5) Determine minimum pickup current by primary current injection.

6) Determine long-time pickup and delay by primary current injection.

7) Determine short-time pickup and delay by primary current injection.

8) Determine ground-fault pickup and time delay by primary current injection.

9) Determine instantaneous pickup by primary current injection.

10) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.

11) Verify correct operation of any auxiliary features such as trip, and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, antipump function, trip unit battery condition, and reset all trip logs and indicators.

12) Verify operation of charging mechanism.

12. Protective Relays

a. Electrical Tests

1) Perform insulation-resistance test on each circuit-to-frame. Do not perform this test on solid-state devices.

2) Perform the following tests on the nominal settings specified by the Owner/user's electrical Engineer:

a. Pickup parameters on each operating element.
b. Timing tests at two (2) or more points on time-current curve.
c. Pickup target and seal-in units.
d. Special tests as required to check operation of restraint, directional and other elements per manufacturer's instruction manual.
e. Conduct tests to verify satisfactory performance of each control feature.
f. Electrically confirm that CT and VT secondary circuits are intact.

13. Instrument Transformers

a. Electrical Tests – Current Transformers

1) Electrically confirm that CT secondary circuits are intact.

2) Perform a ratio verification test of each current transformer. This shall be performed using the voltage method or current method in accordance with ANSI C57.13.1 (IEEE Guide for Field Testing of Relaying Current Transformers).

3) Perform insulation-resistance tests on current transformer secondary winding. Value of test voltage on secondary wiring shall be 1000 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.

b. Electrical Tests – Voltage Transformers

1) Perform insulation-resistance tests on voltage transformers, winding-to-winding and windings-to-ground. Value of test voltage on secondary wiring shall be 500 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.

2) Electrically confirm proper secondary voltage.

3) Perform a dielectric withstand test on the primary windings with the secondary windings connected to ground. The dc dielectric voltage shall be in accordance with NETA Standard.

14. Metering

a. Electrical Tests

1) Check calibration of meters at all cardinal points.

2) Calibrate watthour meters to within manufacturer's published accuracy.

3) Verify all instrument multipliers.

4) Electrically confirm that CT and VT secondary circuits are intact.

15. Grounding Systems

a. Electrical Tests

1) Perform fall-of-potential test or alternative per IEEE Standard No. 81-2012 on the main grounding electrode or system.

2) Perform point-to-point test to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.

16. Ground-fault protection systems

a. Electrical Tests

1) Measure the system neutral to ground insulation resistance with the neutral disconnect link temporarily removed. Replace neutral disconnect link after testing. Notify equipment Owner or operator of any improper neutral to ground connections detected.

2) Measure insulation resistance of the control wiring at 1000 volts dc for 1 minute. If necessary, disconnect the solid state components.

3) Perform pickup tests as follows using primary injection.

a. Verify the relay does not operate at 90% of the set pickup current.
b. Determine the pickup current of the relay and verify that this current is no greater than 125% of the setting. Pickup must not be greater than 1200 amperes.

4) For summation type systems utilizing phase and neutral CT's, verify proper polarities by applying current to each phase-neutral CT pair. This test also applies to molded case breakers utilizing an external neutral CT.

a. Relay should operate when current direction is the same relative to polarity marks in the two CT's.
b. Relay should not operate when current direction is opposite relative to polarity marks I the two CT's.

5) Measure time delay of the relay at 150% of pickup or greater.

6) Verify the system is able to trip with control voltage at 55% of rated for systems utilizing ac control power and 80% of rated for systems utilizing dc control power.

7) Verify operation of zone interlock systems by simultaneously injecting current at the interlocked relays and monitoring the control signals.

17. AC motors

a. Electrical Tests – Induction Motors

1) Perform insulation-resistance tests in accordance with ANSI/IEEE Standard 43.

a. Motors larger than 200 horsepower: Test duration shall be for 10 minutes with resistances tabulated at 30 seconds, one (1) minute, and 10 minutes. Calculate polarization index.

b. Motors 200 horsepower and less: Test duration shall be for one (1) minute with resistances tabulated at 30 and 60 seconds. Calculate the dielectric absorption ratio.

2) Perform dc overpotential tests on motors rated at 1000 horsepower and greater and at 4000 volts and greater in accordance with ANSI/IEEE Standard 95.

3) Perform insulation power-factor or dissipation-factor tests.

4) Perform surge comparison tests.

5) Perform insulation-resistance test on pedestal per manufacturer's instructions.

6) Perform insulation-resistance test on surge protection device in accordance with NETA Standard.

7) Test motor starter in accordance with NETA Standard prior to re-energizing the motor.

8) Check resistance temperature detector (RTD) circuits for conformance with drawings. Check that metering or relaying devices using the RTD's are of the proper rating.

9) Check that the motor space heater is operating.

10) Perform a rotation test to ensure proper shaft direction if the motor has been electrically disconnected.

11) Measure running current and evaluate relative to load conditions and nameplate full-load amperes.

12) Perform vibration tests:

a. Motors larger than 200 horsepower: Perform vibration base line test. Amplitude shall be plotted versus frequency.
b. Motors 200 horsepower and less: Perform vibration and amplitude test.

18. Motor control centers/Motor starters, Low Voltage

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.

2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with starter closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data and NETA Standard whichever is more stringent.

3) Measure insulation resistance of each control circuit-to-ground.

4) Perform insulation-resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one

minute. For units with solid-state components, follow manufacturer's recommendation.

5) Test motor protection devices in accordance with manufacturer's published data and NETA Standard whichever is more stringent.

6) Test circuit breakers in accordance with NETA Standard.

7) Perform operational tests by initiating control devices.

19. Dry Type Power Factor Correction Capacitor:

a. Electrical Test

1) Perform resistance measurements through bolted connections with low-resistance ohmmeter, in accordance with latest NETA standard.

2) Perform winding-to-ground insulation-resistance tests. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use latest NETA standard.

3) Measure winding resistance.

4) Perform overpotential tests on each winding-to-ground.

20. Emergency System Transfer Switches

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA Standard

2) Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components or for control devices that cannot tolerate the applied voltage, follow manufacturer's recommendation.

3) Perform a contact/pole-resistance test.

4) Verify settings and operation of control devices.

5) Calibrate and set all relays and timers in accordance with latest NETA Standard.

6) Verify phase rotation, phasing, and synchronized operation as required by the application.

7) Perform automatic transfer tests:

a. Simulate loss of normal power.
b. Return to normal power.
c. Simulate loss of emergency power.
d. Simulate all forms of single-phase conditions.

8) Verify correct operation and timing of the following functions:

a. Normal source voltage-sensing relays.
b. Engine start sequence.
c. Time delay upon transfer.
d. Alternate source voltage-sensing relays.
e. Automatic transfer operation.
f. Interlocks and limit switch function.
g. Time delay and retransfer upon normal power restoration.
h. Engine cool down and shutdown feature.

21. Standby, Engine Generator
    a. Electrical and Mechanical Tests
        1) Test generator in accordance with latest NETA Standard.
        2) Test protective relay devices in accordance with latest NETA Standard
        3) Perform phase-rotation test to determine compatibility with load requirements.
        4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.
        5) Perform vibration test for each main bearing cap.
        6) Conduct performance test in accordance with ANSI/NFPA 110.
        7) Verify correct functioning of governor and regulator.
22. Fiber-Optic cables
    a. Field Test
        1) Perform cable length measurement and detect fiber fractures or other defects through analysis of the backscattering signal with an optical time domain reflector (OTDR).
        2) Perform a continuity test to detect splice fractures or other defects through analysis of the backscattering signal using the OTDR.
        3) Perform attenuation measurement of the cable loss with a multimode optical loss test set (MOLTS).
        4) Perform attenuation measurement of losses at each splice and connector.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 22 13

LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install three phase and single phase, individually mounted, dry-type transformers.

B. General purpose.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 – Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. The following information shall be submitted to the Owner's Representative:

1. Dimension drawing and weight.
2. Technical certification sheet.
3. Conduit entry/exit locations.
4. Transformer ratings including:
    a. Primary and secondary kVA.
    b. Voltage.
    c. Taps.
    d. Primary and secondary continuous current.
    e. Basic Impulse level for equipment over 600-volts.
    f. Impedance.
    g. Insulation class and temperature rise.
    h. Sound level.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI/NEMA Publication No. ST 20 - Dry-Type Transformers for General Application.
2. ANSI/UL 506 - Specialty Transformers.
3. NFPA 70 - National Electric Code.
4. UL 1561- Dry Type General Purpose and Power Transformers.

1.05 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. The general construction of the transformer and the materials used shall be similar to that used for transformers of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.
2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the transformer. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

B. Acceptable Manufacturers

1. ABB.
2. General Electric.
3. Siemens.
4. Square D.

1.06 EATON.SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of substantial completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ratings

1. Transformer shall be designed for continuous operation at rated kVA, voltages, phases and winding configurations are indicated on the drawings. Transformers must be rated for 60 hertz operation and shall be ventilated or totally enclosed type.

B. Coils

1. Windings: Use copper windings. Aluminum windings shall not be acceptable. The windings shall be treated to resist the effect of moisture.
2. Taps: Furnish transformers with full load rated taps in the primary windings as follows:

kVA Rating	Taps
3-15 kVA, single phase;	Two 5 percent taps below rated voltage
9-15 kVA, three phase	Two 5 percent taps below rated voltage
25-167 kVA, single phase	Two 5 percent taps below
30-150 kVA, three phase	below and two above rated voltage

3. All transformers shall be UL listed and certified and carry the UL label.

C. Insulation

1. Provide UL recognized 220°C insulation system capable of continuous operation

at 40°C ambient without exceeding 150°C winding temperature rise.

D. Sound Requirements

1. Average sound levels must not exceed the following values as measured in accordance with NEMA ST 20-4.12.

0 – 9	40
10 – 50	45
51 - 150	50

2.02 FABRICATION

A. Indoor: Unless otherwise specified or indicated, transformers installed in NEMA 1 area shall be ventilated type, with corrosion resistant finish.

B. Outdoor: For outdoor mounted transformers provide total enclosed NEMA 4X 316 stainless steel enclosure, enclosure shall be factory painted white.

C. Totally Enclosed Transformers: Totally enclosed non-ventilated transformers shall be installed in areas subjected to washdown or corrosives. The transformers shall be rated at insulation class of 220 C with 150 C temperature rise at ambient temperature of 40 C in a 316 stainless steel enclosure.

D. Wiring Compartment: Locate the wiring compartment below the core and coil. Have the compartment cooled by air circulation or insulated from the core and coil with a suitable thermal barrier.

E. Grounding: Ground the core of the transformer to the enclosure with a flexible grounding conductor sized according to NEC requirements.

F. Mounting Brackets: Furnish mounting brackets, as required, for wall or ceiling mounting of transformers rated 45 kVA and less.

G. Transformers shall be provided with integrated vibration insulation to completely isolate the core and coil assembly from the transformer enclosure.

H. Provide transformer nameplates of type 316 stainless steel, marked in accordance with NEC. Fasten nameplate to transformer with stainless steel screws or rivets.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Examine elements and surfaces to receive transformers for compliance with installation tolerances and other conditions affecting performance.

B. Check that concrete pads are level and free of irregularities.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Conduit Connections

1. Attach incoming and outgoing conduits to the transformer enclosure with 24-inch long flexible conduit.
2. Run a bonding jumper, sized per NEC Table 250-122, on inside and along the outside of flexible conduit.

B. Cable Connections

1. Make transformer cable connections with compression-type lugs suitable for termination of 75 C rated conductors. Position lugs so that field connections and wiring will not be exposed to temperature above 75 C.

C. Floor Mounting

1. Construct concrete pad for floor-mounted transformers in accordance with Section 26 00 00 - Electrical General Provisions and division 3.
2. Maintain a minimum of 6 inches free air space between enclosure and walls.

D. Wall Mounting

1. Securely anchor type 316 stainless steel mounting brackets to the wall to provide adequate transformers support.
2. Provide vibration isolation for mounting the transformers.

3.03 INSPECTION

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture’s recommendations.

B. Check all installed transformers for proper grounding, fastening and alignment.

3.04 FIELD TESTING

A. Refer to section 26 08 00 - Commissioning of Electrical Systems.

3.05 FIELD PAINTING

A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install distribution and branch circuit panelboards.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 – Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.
3. 26 43 13 – Surge Protective Devices for Low-Voltage Electrical Power Circuits.

1.03 SUBMITTALS

A. The following information shall be submitted to the Owner's Representative:

1. Breaker layout drawing with dimensions indicated and nameplate designation.
2. Component list.
3. Conduit entry/exit locations.
4. Assembly ratings including:
    a. Short-circuit rating.
    b. Voltage.
    c. Continuous current.
5. Cable terminal sizes.

B. Submittals shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or

deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. UL 50 - Cabinets and Boxes.
2. UL 67 - Electric Panelboards.
3. NEMA AB 1 - Molded Case Circuit Breakers.
4. NEMA AB 2 - Procedures for Verifying the Performance of Molded Case Circuit Breakers.
5. NEMA KS 1 - Enclosed Switches.
6. NEMA PB 1 - Panelboards.

1.05 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. The general construction of the panelboard and the materials used shall be similar to that used for panelboards of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.
2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the panelboard. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

B. Acceptable Manufacturers

1. General Electric.
2. Siemens.
3. Square D.
4. Eaton / Cutler Hammer.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bus

1. Material:

a. Provide tin plated, copper bus bars, 98 percent IACS conductivity, full-sized throughout their length.

b. Use buses with tin-plated contact surfaces.

c. Include a tin-plated copper bus bar ground bus in panelboard rated.

d. Full size (100% rated) insulated neutral bus shall be included in the panel board, shown with neutral. 200% rated neutral bus shall be supplied for panels designated on the drawings.

e. The ground and neutral bus shall be at least one terminal screw for each circuit.

f. Provide through feed or sub feed lugs where indicated.

g. Provide lugs and connection points on phase, neutral and ground bus suitable for copper conductors.

h. Spaces for future circuit breakers shall be bussed for the maximum devices that can be fitted.

2. Size bars as indicated and brace them to withstand the available symmetrical short circuit current.

3. Installation:

a. Install buses in allotted spaces so that devices can be added without additional machining, drilling or tapping.

b. Mount neutral bars, as required, on the opposite end of the main lugs.

B. Protective Devices

1. Circuit Breakers: Provide circuit breakers for the specified service with the

number of poles and ampere ratings indicated.

a. Provide breakers which are quick-make and quick-break on both manual and automatic operation.

b. Use a trip-free trip indicating breaker.

c. Incorporate inverse time characteristic by bimetallic overload elements and instantaneous characteristic by magnetic trip. Where indicated, provide ground fault circuit breakers (GFCB).

d. For 2-pole and 3-pole breakers, use the common-trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.

e. Unless otherwise indicated, provide circuit breakers with the following interrupting ratings:

   i. Each circuit breaker used in 120/208 Volt panelboards shall have an interrupting capacity of not less than 10,000 Amps, RMS symmetrical.

   ii. Each circuit breaker used in 277/480 Volt and 480 Volt panelboards shall have an interrupting capacity of not less than 42,000 Amps, RMS symmetrical.

   iii. GFCI (ground fault circuit interrupter) shall be provided for circuits where shown on the drawings. GFCI units shall be 1 Pole, 120 Volt, molded case, bolt-on breakers, incorporating a solid-state ground fault interrupter circuit insulated and isolated from the breaker mechanism. The unit shall be UL listed Class A Group I device (5 milliamp sensitivity, 25 millisecond trip time) and an interrupting capacity of 10,000 Amps, RMS.

   iv. Circuit breakers shall be as manufactured by the panelboard manufacturer.

f. Connect breakers to the main bus by means of a solidly bolted connection.

g. Use breakers which are interchangeable, capable of being operated in any position within the panel.

h. Each panelboard shall be equipped with a minimum of 20 percent spare breakers, with spaces, bus work, and terminators to complete the next standard size panelboards above the 20% requirement.

i. Independently mount breakers so that a single unit can be removed from the front of the panel without disturbing or removing the main bus, other units or other branch circuit connections.

j. Provide individual breaker handle lock for all circuits that supply exit signs, emergency lights, and fire alarm panels.

k. Provide GFI circuit breakers for heat trace circuit. The rating shall be as per NEC.

2. Surge Suppressor

a. All the 480V panelboards and 3 phase panelboards shall be provided with a surge protective device in accordance with Specification 26 43 13.

3. Service Entrance

a. The panelboard shall have a connection for housing and grounding neutral conductor.

b. Provide a UL label for the panelboard.

2.02 FABRICATION

A. Enclosure

1. Cabinet:

a. Construct cabinets in accordance with UL 50. Use painted galvanized sheet steel 16-gauge or more.

b. Provide a minimum 4-inch gutter wiring space on each side.

c. Reinforce cabinets and securely support bus bars and over-current devices to prevent vibration and breakage in handling.

d. Provide standard conduit knockouts in cabinet ends.

e. Finish cabinets of surface-mounted panelboards to match doors and trim as specified below.

f. Panelboards mounted outdoors shall be weatherproof and shall have a door behind door type construction.

g. Panelboards mounted outdoor in wet or corrosive areas shall have NEMA 4X stainless steel 316 enclosures.

h. Panelboards mounted indoor shall be NEMA 12 enclosures for areas classified as NEMA 12.

2. Doors and Trim:

a. Fabricate doors and trim from cold-rolled sheet steel.

b. Equip doors with flush-type combination catch and key lock.

c. Key all locks alike. Fasten trim for flush-mounted panelboards to cabinets by an approved means which permits both horizontal and vertical adjustment.

d. Trim for surface-mounted panelboards must fit the cabinet with no overhang.

e. Apply a finish to trim and doors consisting of two coats of enamel over a rust-inhibiting prime coat.

B. Circuit Identification

1. Directory:

a. For each panelboard, provide a directory frame mounted inside the door with a heat-resistant transparent face and a directory card for identifying the load served.

b. Type directory as specified in Section 26 05 53.

2. Nameplate:

a. Provide a black on white phenolic nameplate on the face of the panelboard using the following as an example:

Panel HA

277/480V, 30, 4W

Feeder from MCC-B/Section

b. The nameplate shall have a minimum thickness of 1/8" and be mounted above the panel door.

C. Listing

1. UL 67 - Electric Panelboards.

D. Special Requirements

1. All copper items, including wiring, terminal blocks, lugs, connectors, bus, etc., shall be tin plated copper.
2. All steel shall be primed and painted as specified. Galvanized items shall also be painted.
3. All hardware, including nuts, bolts, washers, screws, anchor bolts, door hinges, etc., shall be made of 316 stainless steel.
4. The panelboard steel parts shall be cleaned and sprayed in control cleaning solutions by a multi-stage spray washer. The operation shall produce a coating of a minimum of 150 milligrams per square foot to meet MIL Specification TT-C490. The primed metal parts shall be electrostatically coated with power paint to a thickness of 2.5mils. The paint finish shall withstand a minimum of 1000hours salt spray test.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Install panelboards in the locations as shown and as recommended in NEMA PB1.1.

B. In wet and corrosive areas, including outdoor locations, install stainless steel 316 panelboard enclosures on Type 316 stainless steel unistrut support to provide clearance behind the mounting surface.

C. In wet and corrosive areas, including outdoor locations, connect conduits to the bottom of the enclosure and to the lower 30 percent of the sides.

D. All conduit connections shall be by use of Myers hub.

E. Install the panelboards such that the center of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above the floor or working platform.

3.03 INSPECTION

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.

B. Check all installed panels for proper grounding, fastening and alignment.

3.04 FIELD TESTING

A. Refer to section 26 08 00 - Commissioning of Electrical Systems.

3.05 FIELD PAINTNG

A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete lighting and receptacle systems, including lighting fixtures, receptacles, switches, and all accessories and appurtenances as shown on the drawings and as specified herein.

1.02 RELATED WORK

1.03 DIVISION 26 ELECTRICAL

A. Submit shop drawings showing complete construction details for all equipment in compliance with Division 1 - General Provisions.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

D. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

1.04 REFERENCE STANDARDS

A. Wiring Devices shall be in compliance with the National Electrical Code, and shall be constructed in compliance with the Underwriters' Laboratories and shall be Underwriters' Laboratories labeled

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING, AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within

specified warranty period.

B. Warranty Period: One (1) year from date of shipment from the factory. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Switches:

1. Wall switches shall be of the heavy-duty specification grade, toggle action, and flush mounting quiet type.
2. Wall switches shall be of the following types and manufacturer, or equal.
    a. Single Pole: Arrow-Hart, Catalog No. 1221I, or Pass and Seymour 20AC1-I, or Leviton 1221-2I.
    b. Double Pole: Arrow-Hart, Catalog No. 1222I, or Pass and Seymour 20AC2-I, or Leviton 1222-2I.
    c. Three-Way: Arrow-Hart, Catalog No. 1223I, or Pass and Seymour 20AC3-I, or Leviton 1223-2I.
    d. Momentary Contact, 2 Circuit, Center Off: Arrow-Hart, Catalog No. 1895I, or Pass and Seymour 1250-I, or Leviton 1256-I.
    e. Weatherproof switch covers shall be Crouse-Hinds rain-tight Type DS with PVC coating where used with aluminum.
    f. Lock out attachment when used for instrument disconnect shall be NEMA 4X.
3. Switch to be installed in classified area shall be rated for application per NEC 500.

B. Receptacles:

1. Wall receptacles shall be 120 volts, single-phase, single or duplex, industrial specification hospital grade, and be of the following types:
    a. Duplex, 20A, 125V, 2P, 3W: Arrow-Hart, Catalog No. 8300I, or Pass and Seymour 9300-HG, or Leviton 8300-I.
    b. Ground fault interrupter, lockout type, duplex, 20A, 125V, 2P, 3W: Leviton 7899I.
    c. Stainless steel indoor mounting plate for GFCI receptacle: Arrow-Hart, Catalog No. S2G, or Pass and Seymour S-26N, or Leviton 84401-40.
    d. Weatherproof cover for GFCI receptacle in FS box while in use: Leviton 5997 GY.

e. Computer or computer related equipment: Leviton 8380IG, or Pass and Seymour, Catalog No. IG6362ISP, ivory with translucent surge suppressor, 5-20R, 20A, 125V duplex hospital grade with audible alarm.

2. Receptacles listed as weatherproof shall be provided with a watertight back box and hinged cover.

3. Receptacles to be installed in classified area shall be rated for the application per NEC 500.

C. Safety Switches

1. Safety Switches shall be of heavy duty, specification grade.

2. Switch shall be UL listed.

3. Switch shall be NEMA 4X 316ss when located outdoor.

4. Switch shall be NEMA 4X fiberglass when located in a chemical room.

5. Switch shall be NEMA 12 aluminum when located indoor in a controlled environment unless otherwise noted.

6. Switch located in classified area shall be rated for the application per NEC 500.

7. Switch shall be quick-make, quick-break construction.

8. Operating handle shall be of box mounted type that directly drives the switch mechanism suitable for padlocking in the off position with up to three padlocks. Switch shall be interlock defeat.

9. The interior shall be easily removable. The wiring gutter shall be clear of any obstructions and moving parts.

10. Fusible switch, fuse selection shall be rated for the application, minimum KAIC rating shall match the protective device on the line side of the switch.

11. Switch shall be provided with grounding kit.

12. Mount safety switches 48” above finished floor. No safety switches shall be mounted above a height that requires a ladder for access.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Wiring devices must be operating properly at final completion.

B. Provide hangers and support members for wiring devices as required for proper installation.

C. Provide appurtenances which include stud supports, stems, mounting brackets, frames, and plaster rings.

D. Support wiring devices from the building structure, or from furring channels. Furring channels must be a minimum of 1-1/2 inches wide.

E. Receptacle and Switch Installation:

1. Mounting Heights (from the bottom of the device):
    a. Mount receptacles 48 inches above finished floor except finished indoor areas.
    b. Mount outdoor receptacles at least 24 inches above finished grade.
    c. Mount receptacles in control room 12 inches above finished floor.
    d. Mount all wall switches 54 inches above finished floor.
    e. Mount thermostats 60 inches above floor.
2. Boxes:
    a. Finished areas such as offices: Flush mounted devices in aluminum boxes.
    b. Other areas: Surface mounted cast aluminum metal boxes.
3. Weatherproof Receptacle Lift Covers: Install with hinge pin horizontal at top of the finished plate. Provide oversized covers for plug-in devices.
4. Install receptacles with grounded blade up.
5. Switches and receptacles shall be mounted in 4” x 4” aluminum outlet boxes concealed in the office walls.
6. Indoor and outdoor boxes shall be grounded by use of a No. 12 green insulated ground wire run with the wiring per Division 16 specification.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. All GFCI outlets shall be tested per industry standard practices and manufacturer’s recommendations.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 28 16

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish labor, materials, equipment and incidentals necessary to install disconnects. Electrical work shall be in accordance with Division 26 – Electrical.

B. Section Includes:
1. Fusible switches.
2. Nonfusible switches.
3. Receptacle switches.
4. Molded-case circuit breakers (MCCBs).
5. Enclosures.

1.02 RELATED WORK

A. Division 26 – Electrical.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 – General Provisions and Division 26 - Electrical Specification Sections, apply to this Section.

1.03 SUBMITTALS

A. Submit per Division 01 – General Provisions and Section 26 00 00 –Electrical General Provisions.

B. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and Manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
1. Enclosure types and details.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate). When the AIC of the switch or circuit breaker is not indicated in the project plans, the AIC shall be the same as the AIC of the serving electrical supply connection (Switchboard, panelboard, or MCC).
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

C. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
   1. Wiring Diagrams: For power, signal, and control wiring.

D. Manufacturer's field service report.

E. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
   1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.04 QUALITY ASSURANCE

A. Submit per Division 1 – General Provisions, and Section 26 00 00 –Electrical General Provisions.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single Manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

1.05 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
   1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
   2. Altitude: Not exceeding 6600 feet (2010 m).

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then

only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Engineer no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Engineer's written permission.
4. Comply with NFPA 70E.

1.07 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

PART 2 PRODUCTS

2.01 FUSIBLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1. General Electric.
2. Square D.

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position. 0

D. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
    a. Hookstick Handle: Allows use of a hookstick to operate the handle.
    b. Lugs: Mechanical type, suitable for number, size, and conductor material.
    c. Service-Rated Switches: Labeled for use as service equipment.

2.02 NONFUSIBLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. General Electric.
2. Square D.

B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

F. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.

5. Hookstick Handle: Allows use of a hookstick to operate the handle.
6. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.03 RECEPTACLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. Hubble.

B. Type 4, IP66 Rated, Twist lock, amp rated, combination safety switch and receptacle

C. Receptacle: Twist lock, three-phase, four-wire or five-wire receptacle (one wire connected to enclosure ground lug).

2.04 MOLDED-CASE CIRCUIT BREAKERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
   1. General Electric.
   2. Square D.
   3. Approved Equal

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
   1. Instantaneous trip.
   2. Long- and short-time pickup levels.
   3. Long- and short-time time adjustments.
   4. Ground-fault pickup level, time delay, and I2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter-style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).

I. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self- powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor. (Provide only when shown on the single line, or required by code).
5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact. (Provide when indicated on drawing).
6. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay. (Provide when indicated on drawings).
7. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts. (Provide when indicated on drawing).
8. Alarm Switch: One NO contact that operates only when circuit breaker has tripped. (Provide when indicated on drawing).
9. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position. (Provide when indicated on drawing).

2.05 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 4X stainless steel.
3. Corrosion Areas: NEMA 250, Type 4X fiberglass.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X stainless steel.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 4X stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Division 26 – Electrical.
   1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
   2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL

A. Inspect and test according to NETA ATS.

B. Perform circuit breaker inspections and tests listed in NETA ATS.

3.05 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by Manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 05 73 – Power System Studies.

END OF SECTION

SECTION 26 36 23

AUTOMATIC TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches, X-series

2. Remote annunciation systems

B. Related Sections include the following:

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

1. Technical data on all major components of all transfer switches and other products described in this section. Data is required for the transfer switch mechanism, control system, cabinet, and protective devices specifically listed for use with each transfer switch. Include steady state and fault current ratings, weights, operating characteristics, and furnished specialties and accessories.

2. Single Line Diagram: Show connections between transfer switch, power sources and load

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Dimensioned outline drawings of assembly, including elevations, sections, and details including minimal clearances, conductor entry provisions, gutter space, installed features and devices and material lists for each switch specified.

2. Internal electrical wiring and control drawings.

3. Interconnection wiring diagrams, showing recommended conduit runs and point-to-point terminal connections to generator set.

4. Installation and mounting instructions, including information for proper installation of equipment to meet seismic requirements.

C. Manufacturer and Supplier Qualification Data

1. The 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.

2. The manufacturer of this equipment shall have produced similar equipment for a minimum period of 10 years. When requested, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Features and operating sequences, both automatic and manual.

2. List of all factory settings of relays, timers and protective devices; provide setting and calibration instructions where applicable.

E. Warranty documents demonstrating compliance with the project's contract requirements.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: The equipment supplier shall maintain a service center capable of providing training, parts, maintenance and emergency repairs to equipment, including transfer switch generator sets and remote monitoring equipment (if applicable) at the site within a response period of less than (eight hours or appropriate time period designated for Project) from time of notification.

1. The transfer switch shall be serviced by technicians employed by, and specially trained and certified by, the generator set supplier and the supplier shall have a service organization that is factory-certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

2. Submit names, experience level, training certifications, and locations for technicians that will be responsible for servicing equipment at this site.

3. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

B. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked as suitable for use in emergency, legally required or optional standby use as appropriate for the connected load.

D. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. Transfer switches and enclosures shall be UL 1008 listed and labeled as suitable for use in emergency, legally required, and optional standby applications.

2. CSA 282, Emergency Electrical Power Supply for Buildings, and CSA C22.2, No. 14-M91 Industrial Control Equipment

3. NFPA 70, National Electrical Code. Equipment shall be suitable for use in systems in compliance with Articles 700, 701 and 702.

4. Comply with NEMA ICS 10-1993 AC Automatic Transfer Switches

5. IEEE 446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications

6. EN55011, Class B Radiated Emissions and Class B Conducted Emissions

7. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity

8. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity

9. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity

10. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity

11. IEC 1000-4-6 Conducted Field Immunity

12. IEC 1000-4-11 Voltage Dip Immunity

13. IEEE 62.41, AC Voltage Surge Immunity

14. IEEE 62.45, AC Voltage Surge Testing

E. Comply with NFPA 99 – Essential Electrical Systems for Healthcare Facilities

F. Comply with NFPA 110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems, regardless of the actual circuit level.

G. The manufacturer shall warrant the material and workmanship of the transfer switch equipment for a minimum of five (5) year from the warranty start date. The warranty start date is the date of registered commissioning and start up or eighteen (18) months from date of shipment, whichever is sooner.

H. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, and etc. during the minimum noted warranty period described above.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify (Architect/Construction Manager/Owner) no fewer than (insert appropriate number) days in advance of proposed interruption of electrical service.

2. Do not proceed with interruption of electrical service without (Architect/Construction Manager/Owner's) written permission.

3. Do not energize any new service or distribution equipment without notification and permission of the (Architect/Construction Manager/Owner).

1.6 COORDINATION

A. Size and location of concrete bases and anchor bolt inserts shall be coordinated. Concrete, reinforcement and formwork must meet the requirements specified in Division 03. See section "INSTALLATION" for additional information on installation

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cummins

2. Kohler

3. ASCO

B. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by other manufacturers that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.

C. Transfer switches utilizing molded case circuit breakers do not meet the requirements of this specification and will not be accepted.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Provide transfer switches in the number and ratings that are shown on the drawings.

B. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer.

C. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.

D. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).

E. Resistance to Damage by Voltage Transients: 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.

F. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).

G. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.

2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.

3. Main switch contacts shall be high pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.

4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.

5. The transfer switch operation shall include the ability to switch to an open position (both sources disconnected) for the purpose of load shedding from the generator set.

6. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.

7. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1.

    a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality

8. Transfer switches designated on the drawings as “4-pole” shall be provided with a switched neutral pole switched which is switched simultaneously with phase poles.

H. Control: Transfer switch control shall be capable of communicating with the genset control, other switches and remote programming devices over a high-speed network interface.

I. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism

J. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.

K. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:

1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.

2. Exterior cabinet doors shall provide complete protection for the system’s internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.

3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with requirements for Level 1 equipment according to NFPA 110.

B. Indicated current ratings:

1. Refer to the Project drawings for specifications on the sizes and types of transfer switch equipment, withstand and closing ratings, number of poles, voltage and ampere ratings, enclosure type, and accessories.

2. Main contacts shall be rated for 600 VAC minimum.

3. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C (-40 to +140 degrees F), relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000 meters).

C. Relay Signal: 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.

D. Control: Transfer switch control shall be provided with necessary equipment and software to communicate with the genset control, other transfer switches, remote annunciation equipment, and other devices over a high speed control network.

E. Neutral Switching: Transfer switches designated on the drawings as 4-pole shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Substitute equipment using overlapping neutral contacts is not acceptable.

F. Automatic Transfer Switch Control Features

1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.

2. All transfer switch sensing shall be configurable from an operator panel or from a Windows XP or later PC-based service tool. Designs utilizing DIP switches or other electromechanical devices are not acceptable.

3. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device for load shedding purposes. On

receipt of this signal, the transfer switch shall switch to a neutral position when connected to Source 2. If Source 1 is available when the load-shed signal is received, the transfer switch shall connect to Source 1.

4. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.

5. The transfer switch shall provide a relay contact signal prior to transfer or re-transfer. The time period before and after transfer shall be adjustable in a range of 0 to 60 seconds.

6. The control system shall be designed and prototype tested for operation in ambient temperatures from - 40 degrees C to + 60 degrees C (- 40 to +140 degrees F). It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.

7. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

8. The transfer switch network monitoring equipment, when supplied, shall be provided with a battery-based auxiliary power supply to allow monitoring of the transfer switch when both AC power sources are non-operational.

G. Transfer Switch Control Panel: The transfer switch shall have a microprocessor-based control with a sealed membrane panel incorporating pushbuttons for operator-controlled functions, and LED lamps for system status indicators. The panel shall also include an alphanumeric display for detailed system information. Panel display and indicating lamps shall include permanent labels.

1. The indicator panel LEDs shall display:

   a. Which source the load is connected to (Source 1 or Source 2)

   b. Which source or sources are available

   c. When switch is not set for automatic operation, the control is disabled

   d. When the switch is in test/exercise mode

2. The indicator shall have pushbuttons that allow the operator to activate the following functions:

   a. Activate pre-programmed test sequence

   b. Override programmed delays, and immediately go to the next operation

   c. Reset the control by clearing any faults

d. Test all of the LEDs by lighting them simultaneously

3. The alphanumeric digital display shall be vacuum fluorescent-type, clearly visible in both bright sunlight and no-light conditions over an angle of 120 degrees, and shall display the following:

   a. AC voltage for all phases, normal and emergency

   b. Source status: connected or not connected.

   c. Load data, including voltage, AC current, frequency, KW, KVA, and power factor.

4. The display panel shall be password-protected, and allow the operator to view and make adjustments:

   a. Set nominal voltage and frequency for the transfer switch

   b. Adjust voltage and frequency sensor operation set points

   c. Set up time clock functions

   d. Set up load sequence functions

   e. Enable or disable control functions including program transition

   f. View real-time clock data, operation log (hours connected, times transferred, failures) and service history

H. Control Functions: Functions managed by the control shall include:

1. Software adjustable time delays:

   a. Engine start (prevents nuisance genset starts in the event of momentary power fluctuation): 0 to 120 seconds (default 3 sec)

   b. Transfer normal to emergency (allows genset to stabilize before load is transferred): 0 to 120 seconds (default 3 sec)

   c. Re-transfer emergency to normal (allows utility to stabilize before load is transferred from genset): 0 to 30 minutes (default 3 sec)

   d. Engine cooldown: 0 to 30 minutes (default 10 min)

   e. Programmed transition: 0 to 60 seconds (default 3 sec)

2. Undervoltage sensing: three-phase normal, three-phase emergency source.

3. Over-voltage sensing: three-phase normal, three-phase emergency source.

4. Over/under frequency sensing:

a. Pickup: +/- 5 to +/-20% of nominal frequency (default 10%)

b. Dropout: +/-1% beyond pickup (default 1%)

c. Dropout time delay: 0.1 to 15.0 seconds (default 5 sec)

d. Accurate to within +/- 0.05 Hz

5. Voltage imbalance sensing:

a. Dropout: 2 to 10% (default 4%)

b. Pickup: 90% of dropout

c. Time delay: 2.0 to 20 seconds (default 5 sec)

d. Bar graph meter panel, to display 3-phase AC Amps, 3-phase AC Volts, Hz, KW load level, and load power factor. The display shall be color-coded, with green scale indicating normal or acceptable operating level, yellow indicating conditions nearing a fault, and red indicating operation in excess of rated conditions for the transfer switch.

6. Phase rotation sensing:

a. Time delay: 100 msec

7. Loss of single-phase detection:

a. Time delay: 100 msec

I. Control features shall include:

1. Programmable genset exerciser: A field-programmable control shall periodically start and run the generator with or without transferring the load for a preset time period, then re-transfer and shut down the generator after a preset cool-down period.

2. In event of a loss of power to the control, all control settings, real-time clock setting and the engine start-time delay setting will be retained.

3. The system continuously logs information including the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. An event recorder stores information, including time and date-stamp, for up to 50 events.

4. Re-Transfer Inhibit Switch: Inhibits automatic re-transfer control so automatic transfer switch will remain connected to emergency power source as long as it is available regardless of condition of normal source.

5. Transfer Inhibit Switch: Inhibits automatic transfer control so automatic transfer switch will remain connected to normal power source regardless of condition of emergency source.

J. Control Interface

1. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

2. The transfer switch shall be provided with a network communication card, and configured to allow network-based communication with the transfer switch and other network system components, including the generator set(s) provided for the Project.

3. Unassigned Auxiliary Contacts: Two normally open, 1-pole, double-throw contacts for each switch position, rated 10A at 240 VAC.

K. Engine Starting Contacts

1. One isolated and normally closed pair of contacts rated 10A at 32 VDC minimum.

2.4 REMOTE ANNUNCIATOR SYSTEM

A. Functional Description: Remote annunciator panel shall annunciate conditions for indicated transfer switches. Annunciation shall include the following:

1. Sources available, as defined by actual pickup and dropout settings of transfer-switch controls.

2. Switch position.

3. Switch in test mode.

4. Failure of communication link.

B. Annunciator Panel: LED-lamp type with audible signal and silencing switch.

1. Indicating Lights: Grouped for each transfer switch monitored.

2. Label each group, indicating transfer switch it monitors, location of switch, and identity of load it serves.

3. Switch in test mode.

4. Lamp Test: Push-to-test or lamp-test switch on front panel.

C. Malfunction of annunciator or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically reverts to stand-alone, self-contained operation.

D. Automatic transfer-switch sensing, controlling, or operating function shall not depend on remote panel for proper operation. The remote annunciation system shall not prevent transfer to the alternate source when the primary power source fails, nor prevent return to the primary source if the alternate source fails

PART 3 - EXECUTION

3.1 INSTALLATION

A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details. See Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Floor-Mounting Switch: Anchor to floor by bolting.

1. Floor-mounted transfer switches (except drawout switches supported by wheeled carriages, which must be rolled out at floor level) shall be mounted on concrete bases complying with the following requirements:

a. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Division 26 Section "Hangers and Supports for Electrical Systems."

C. Annunciator Panel Mounting: Flush in wall, unless otherwise indicated.

D. Identify components according to Division 26 Section "Identification for Electrical Systems."

E. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Wiring to Remote Components: Match type and number of cables and conductors to control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.

B. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.

C. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 SOURCE QUALITY CONTROL

A. Prior to shipping, factory shall test and inspect components, assembled switches, and associated equipment to ensure proper operation.

B. Factory shall check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements.

C. Factory shall perform dielectric strength test complying with NEMA ICS 1.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: The supplier of the transfer switch(es) and associated equipment shall inspect, test, and adjust components, assemblies, and equipment installations, including connections, and report results in writing.

B. Manufacturer’s representative shall perform tests and inspections and prepare test reports.

C. After installing equipment and after electrical circuitry has been energized, installer shall test for compliance with requirements.

1. Perform recommended installation tests as recommended in manufacturer’s installation and service manuals.

2. After energizing circuits, demonstrate interlocking sequence and operational function for each switch.

a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.

b. Verify time-delay settings.

c. Verify that the transfer switch is accurately metering AC voltage and current.

d. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switch. Remove all access panels so joints and connections are accessible to portable scanner.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.

2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

3. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 DEMONSTRATION

A. After generator set installation, the generator and transfer switch supplier shall conduct a complete operation, basic maintenance, and emergency service seminar covering generator set and transfer switch equipment, for up to 10 people employed by the Owner.

1. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures.

2. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

3.6 SERVICE AND SUPPORT

A. The manufacturer shall supply the Service Provider with a complete set of the service and maintenance software required to support the product. The software shall be provided at a training class attended by the user, to qualify the user in proper use of the software. The software shall have the following features and capabilities:

1. The software shall allow adjustment of all functions described herein, adjustment of operating levels of all protective functions, and programming of all optional functions in the controller. Adjustments shall be possible over modem from a facility that is remote from the generator set.

2. The software shall be capable of storing and displaying data for any function monitored by the generator set control. This data shall be available in common file formats, and on graphical “strip chart” displays.

3. The software shall automatically record all control operations and adjustments performed by any operator or software user, for tracking of changes to the control.

4. The software shall display all warning, shutdown, and status changes programmed into transfer switch controller. For each event, the control shall provide information on the nature of the event, when it last occurred, and how many times it has occurred.

END OF SECTION

SECTION 26 41 13.13

LIGHTNING PROTECTION FOR BUILDINGS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install a lightning protection system for the new structure addition to the existing treatment building, tied into the existing building lightning protection system.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical General Provisions.

1.03 SUBMITTALS

A. Submit detailed installation drawings with complete description of all materials used, including cable, terminals, and supports, as specified in Division 1 - General Provisions.

B. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

C. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

D. Submit a letter certifying full and complete compliance with the specifications, drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reason for same. Exceptions or deviations shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. Comply with all requirements and codes of the National Fire Protection Association, the United States Bureau of Standards, and the Underwriters' Laboratories, Inc.

B. Electrical Component Standard: Provide work complying with applicable requirements of NFPA 70, "National Electrical Code".

C. NFPA and UL Compliance: Comply with requirements of NFPA Standard 780 and UL Standard 96 as applicable to lightning protection systems for building permits.

D. LPI Compliance: Comply with requirements of Lightning Protection Institute (LPI) Standards 175, 176, and 177, pertaining to lightning protection system material, components, installation, and quality assurance procedures.

E. UL Compliance: Comply with UL Standards 96 and 96A.

F. ANSI Compliance: Comply with applicable requirements of ANSI Standard C2.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Subcontractor: For this work engage the services of a subcontractor regularly engaged in installing lightning protection systems. The subcontractor must be accredited by the Underwriters' Laboratories, Inc. The subcontractor must employ competent personnel fully qualified in this work and able to meet existing local labor conditions.

2. Master Label: Upon completion, the lightning protection system must be inspected by the Underwriters' Laboratories, Inc. The system must qualify for a Master Label issued by UL and presented to the Owner.

B. Acceptable Manufacturers

1. Furnish all materials from ERICO, Robbins Lightning Inc. or approved equivalent. Other manufacturers will not be accepted unless their products are approved by the Underwriters' Laboratories, Inc.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Five (5) years from date of Shipment. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cables: Provide 16-gauge tin aluminum conductors with a minimum of 29 strands.

B. Air Terminals: Use chrome-tipped aluminum with aluminum base, unless the roof material is such that the combination of materials would form an electrolytic couple of such nature that the corrosion is accelerated in the presence of moisture.

C. Fittings: Supply tinned fitting of bolted type construction.

D. Screws and Anchors shall be stainless steel 316.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION (NOT USED)

3.02 INSTALLATION

A. Install conductors to ground devices in accordance with the specific code provisions of Underwriters' Laboratories, Inc. Securely bond all conductive metals within 6 feet of the lightning protection system. Make underground metal water pipes extending into building an integral part of the grounding system. Conceal all down conductors. Any exposed conductors must be approved by the Owner’s Representative.

B. Install the system for ease of future expansion.

C. Use no combination of materials that may form an electrolytic couple of such nature that corrosion is accelerated in the presence of moisture unless moisture is permanently excluded from the junction of such metals.

D. In order to meet UL96A requirement and to obtain a Master Label, contractor may submit a letter to request to switch to the appropriate aluminum equivalent where in contact with galvanize metal surfaces. Bi-metal connector shall be added at the transition to prevent galvanic corrosion. Copper components shall be used when installation is not on these metal surfaces.

E. Provide equipment grounding and bonding connections sufficiently tight to assure permanent and effective grounds and bonds.

3.03 INSPECTION

A. Inspect system for any loose connection.

B. Inspect proper grounding and bonding connections have been provided.

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 50 00

LIGHTING SYSTEM

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install a complete LED lighting system ready for operation as shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Section 01 33 00 – Submittal Procedures.

B. Section 26 00 00 – Electrical General Provisions.

C. Section 26 05 29 – Hangers and Supports for Electrical Systems.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of Division 1, Section 26 00 00 and as specified herein.

B. Submittals shall also contain information on related equipment to be furnished under this Specification but described in the related sections listed in the Related Work paragraph above. Incomplete submittals not containing the required information on the related equipment will be returned un-reviewed.

C. Manufacturer's technical information for the materials proposed for use in the systems.

D. For all light pole foundations shown to be installed in earth, provide installation and anchoring drawings that are stamped and sealed by a licensed engineer in the state of Utah. The soil condition shall be assumed to be disturbed earth. If compaction is assumed, a compaction test shall be performed on all foundation locations, showing the minimum field density assumed in the foundation design.

E. Submit manufacturer's name and catalog data for all lighting equipment specified in this Section and on the lighting fixture schedule.

F. Shop drawings:

1. Clearly indicate luminaire type and name of the job. Contractor shall endeavor to submit all luminaires, drivers and integral controls shop drawings at one time, in one package. Any re-submittals shall include all luminaire, driver and integral controls previously rejected or requiring further information. Specialty SSL, custom, or modified fixtures may be submitted as a separate package.

2. Reproductions of the contract drawings are not acceptable as shop drawings.
3. Indicate any dimensions and components for each luminaire that are not a standard product of the manufacturer.

G. Product Data: Provide dimensions, ratings and specific catalog number and identification of items and accessories and performance data.

H. Wiring Diagrams – as needed for special operation or interaction with other system(s)

I. Photometric Data: Where indicated below or for substitutions, supply complete photometric data for the fixture, including optical performance, rendered by NVLAP approved laboratory developed according to the methods of the Illuminating Engineering Society of North America. Submit electronically, in IESNA LM-63 standard format. Types XX and YY.

J. Submit photometric data for all substitute luminaries. Photometric reports are not required from specified manufacturers unless noted in paragraph H above.

K. Specification Sheets: If lacking sufficient detail to indicate compliance with contract documents, standard specification sheets will not be accepted. This includes, but is not limited to, luminaire type designation, manufacturer's complete catalog number, voltage, LED type, CCT, CRI, specific driver information, system efficacy, L70 life rating, and any modifications necessary to meet the requirements of the contract documents.

L. Substitutions shall include complete photometric data as outlined in paragraph H above and point by point calculations for the specific conditions on the project. Samples shall be required for consideration of any substitutions and must be submitted in accordance with the terms outlined in paragraph below.

M. Working Samples of all substitutions: Samples shall be 120 volts with cord and plug attached, and shall include specified LEDs and all modifications necessary to meet the requirements specified in the Contract Documents.

N. Energy Efficiency:
1. Submit documentation for Energy Star qualifications for equipment provided under work of this Section.
2. Submit data indicating luminaire efficiency.
3. Submit data indicating Ballast Efficacy Factor (BEF).
4. Submit data indicating Luminaire Efficacy rating (LER).
5. Submit data indicating color rendition index of light source.

O. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

P. Manufacturer's technical information for the materials proposed for use in the systems.

1.04 REFERENCE STANDARDS

A. All lighting fixtures shall be in accordance with the National Fire Protection Association (NFPA) NFPA 70 “National Electrical Code” (NEC) and shall be constructed in accordance with the latest edition of the Underwriters Laboratories (UL) "Standards for Safety, Electric Lighting Fixtures".

B. National Energy Policy Act of 2005, Public Law No. 109-58.

C. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information.

D. NFPA 70 - National Electrical Code.

E. IESNA LM-79-08 IESNA - Approved Method for Electrical and Photometric

F. Measurements of Solid-State Lighting Products.

G. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Sources.

H. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Sources.

I. IESNA TM-21 – Projecting Long Term Lumen Maintenance of LED Light Sources.

J. UL 8750 – Light Emitting Diode (LED) Equipment for Use in Lighting Products.

K. OSHA 29CFR1910.7 – luminaires shall be listed by national recognized testing laboratory approved by United Stated Department of Labor, Occupational Safety and Health Administration (OSHA).

1.05 QUALITY ASSURANCE

A. The luminaires shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) design quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification. These tests shall include: CCT, CRI, Lumen output and wattage. Tests shall be recorded, analyzed and maintained for future reference.

B. QA process and test results documentation shall be kept on file for a minimum period of seven years.

C. LED luminaire designs not satisfying design qualification testing and the production

quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, STORAGE AND HANDLING

A. Prior to jobsite delivery, the Contractor shall have successfully completed all submittal requirements, and present to the Owner/Engineer upon delivery of the equipment, an approved copy of all such submittals. Delivery of incomplete constructed equipment, onsite factory work, or failed factory tests will not be permitted.

B. Protect equipment during shipment, handling, and storage by suitable complete enclosures. Protect equipment from exposure to the elements and keep thoroughly dry.

C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Repaint damaged painted surfaces to the satisfaction of the Owner/Engineer.

D. Equipment shall be installed in its permanent location shown on the Drawings within seven calendar days of arriving onsite. If the equipment cannot be installed within seven calendar days, the equipment shall not be delivered to the site, but stored offsite, at the Contractor's expense, until such time that the site is ready for permanent installation of the equipment.

E. Shipping groups shall be designed to be shipped by truck, rail, or ship. Indoor groups shall be bolted to skids. Breakers and accessories shall be packaged and shipped separately.

1.08 MAINTENANCE/SPARE PARTS

1.09 EXTENDED WARRANTY

A. The manufacturer shall provide a warranty against loss of performance and defects in materials and workmanship for the Luminaires for a period of five years after acceptance of the Luminaires. Warranty shall cover all components comprising the luminaire. All warranty documentation shall be provided to customer prior to the first shipment

B. The equipment shall be warranted to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, it shall be replaced and the unit(s) restored to service at no additional cost (including parts, labor, and travel expenses) to the Owner.

C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Luminaires

1. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.
2. Each luminaire shall be designed to operate at an average operating temperature of 25 degrees C.
3. The operating temperature range shall be 0 degrees C to +25 degrees C.
4. Each luminaire shall meet all parameters of this specification throughout the minimum operational life when operated at the average operating temperature.
5. Nominal luminaire dimensions:

B. LED Sources

1. LED's shall be manufactured by, Nichia, Samsung or Osram.26 51 13 Interior Lighting Fixtures b) Lumen Output – minimum initial lumen output of the luminaire shall be as follows for the lumens exiting the luminaire in the 0-90 degree zone - as measured by IESNA Standard LM-79-08 in an accredited lab. Exact tested lumen output shall be clearly noted on the shop drawings.
2. Lumen output shall not decrease by more than 20% over the minimum operational life of 50,000 hours.
3. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
4. LED Boards shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED boards shall be upgradable.
5. Light Color/Quality-
    a. Correlated Color temperature (CCT) range as per specification, between 3500K, 4100K and 5000K shall be correlated to chromaticity as defined by the absolute (X, Y) coordinates on the 2-D CIE chromaticity chart.
    b. The color rendition index (CRI) shall be 80 or greater.
    c. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.

C. Power Supply and Driver

1. Driver: AccuDrive, 120 – 277 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
2. Driver shall be suitable for full-range dimming. The luminaire shall be capable of

continuous dimming without perceivable flicker over a range of 100% to 5% of rated lumen output with a smooth shut off function. Dimming shall be controlled by a 0-10V signal.

3. Driver shall be UL listed.
4. Maximum stand-by power shall be one Watt.
5. Driver disconnect shall be provided where required to comply with codes.
6. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements.
7. The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A, where failure does not mean a momentary loss of light during the transient event.

D. Electrical

1. Operation Voltage - The luminaire shall operate from a 50 or 60 HZ ±3 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output. The standard operating voltages are 120 VAC, 277 VAC, 480 VAC.

2. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
3. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage.
4. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference.
5. RF Interference: The luminaire and associated onboard circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
6. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.
7. All electrical components shall be RoHS compliant.

E. Exit Sign: UL listed. Provide with automatic power failure device with integral self-testing module and fully automatic high/low trickle charger in a self-contained power pack. Battery shall be sealed electrolyte type; shall operate unattended; and require no maintenance, including no additional water, for a period of not less than five years. LED exit sign shall have emergency run time of 1-1/2 hours (minimum). The light emitting diodes shall have rated lamp life of 70,000 hours (minimum).

PRODUCT TYPE WATTS/FIXTURE

All Exit Signs Fixtures 5 watts or less

F. Photometric Requirements

1. Luminaire performance shall be tested as described herein.
2. Luminaire performance shall be judged against the specified minimum illuminance in the specified pattern for a particular application.
3. Luminaire lighting performance shall be adjusted (depreciated) for the minimum life expectancy.
4. The performance shall be adjusted (depreciated) by using the LED manufacturer's data or the data from the IESNA Standard TM-21 test report, which ever one results in a higher level of lumen depreciation.
5. The luminaire may be determined to be compliant photometrically, if:
   a. The initial minimum illuminance level is achieved in 100% of the area of the specified lighting pattern.
   b. The measurements shall be calibrated to standard photonic calibrations.
   c. Add specific project requirements.

G. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
2. The LED manufacturer's maximum junction temperature for the expected life (Section 1.2.9 c) shall not be exceeded at the average operating ambient.
3. The LED manufacturer's maximum junction temperature for the catastrophic failure shall not be exceeded at the maximum operating ambient.
4. The luminaire shall have an UL IC rating.
5. The Driver manufacturer's maximum case temperature shall not be exceeded at the maximum operating ambient. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

H. Emergency Lighting Battery Units

1. Emergency lighting units shall be as specified in the "Lighting Fixture Schedule" shown on the Drawings.
2. Battery units shall be of the self-contained, fully automatic type with sealed lead acid batteries, volt-meters.
3. Unit enclosures shall be compatible to their environment and units shall comply with the requirements of NFPA 70 (NEC).
4. It shall be the responsibility of the contractor to provide all necessary mounting hardware.

5. Shall be factory installed and provide a range of 800 to 1400 lm of light for 90 minutes. Output is based on the size and wattage of the luminaire.
6. Integral or remote test switch shall be provided as per specification.

I. Flexible Fixture Hangers

1. Flexible fixture hangers used in non-hazardous areas shall be type ARB and flexible fixture supports used in hazardous areas shall be Type EFH as manufactured by the Crouse-Hinds Co., similar by Appleton Electric Co; Killark a Division of Hubbell Inc.
2. Where required in Section 26 00 00, all pendent-mounted and recessed in suspended ceilings, recessed lighting fixtures shall be provided with four anti-sway supports to meet Type I seismic requirements.

J. Fixtures

1. Refer to drawing for fixture ID and model number.

K. Lighting Pole

1. Provide 20’ tall square aluminum base pole.
2. Provide 14’ tall square aluminum base pole.
3. Pole shaft shall be one piece 6006, 6061, 6063 aluminum alloy, heat treated to a T6 temper.
4. Hand-hole shall be 2”X4” minimum, cover and fasteners included.
5. Non-structural steel fasteners shall be stainless steel.
6. Steel anchor bolts shall be 316 stainless steel. Nuts and washers shall be stainless steel.
7. Pole shall be SSA2044GP4K8/SSA1444GP4K8, satin Brush.

L. Lighting Controller

1. Lighting Controller shall have 32-channel, 365-day/astronomical time clock, with modem.
2. Large display which acts as programming interface.
3. Non-volatile memory which holds all programming indefinitely.
4. Battery back-up for time-of-day.
5. Controller shall have a minimum of eight relays.
6. Enclosure: NEMA 1 for indoor, unless noted otherwise. NEMA 4X for outdoor.
7. Operating voltage: 120/277VAC.
8. Manual override of individual relays, zones or entire panel.
9. Provide digital switches for local control using CAT % cable and RJ45

connectors.

10. Lighting Controller Model: BlueBox GR1408 SM NE4X 8NOL DTCMOD DV DTCID.
11. Chelsea Digital Switch.

2.02 FABRICATION

A. Luminaire Construction

1. Luminaire housing to have no visible welding, screws, springs, hooks, rivets, bare LEDs or plastic supports.
2. The luminaire shall be a single, self-contained device, not requiring onsite assembly for installation. The power supply and circuit board for the luminaire shall be integral to the unit.
3. Luminaires shall be fabricated from post painted cold rolled steel and shall be a rigid structure with integral T-bar clips.
4. Finish: Polyester powder coat painted with 92% high-reflective paint after fabrication.
5. Reflector: rugged one-piece cold rolled steel with embossed multi-facets, echoing the frequency of the refractor prisms to distribute soft light at multiple angles, without flashing thus reducing high luminance contrast.
6. End caps shall be sloped at 70 degrees to create depth.
7. Luminaire to have smooth transition between T-bar and reflector arch. No doorframe or exposed hardware.
8. Polymeric materials (if used) of enclosures containing either the power supply or electronic components of the luminaire shall be made of UL94VO flame retardant materials. Luminaire lenses are excluded from this requirement.
9. Integral Grid Clips required on recessed mounted luminaires along with integral tie wire mounting points.
10. Luminaire to have air removal capability as specified.
11. The assembly and manufacturing process for the SSL luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPATATION (NOT USED)

3.02 INSTALLATION

A. Each fixture shall be a completely finished unit with all components, mounting and/or hanging devices necessary, for the proper installation of the particular fixture in its designated location and shall be completely wired ready for connection to the branch circuit wires at the outlet.

B. All flush mounted fixtures shall be supported from the structure and shall not be dependent on the hung ceilings for their support.

C. Fixtures noted to be installed flush in suspended ceilings shall be of mounting types suited for the type ceiling involved. It shall be the responsibility of the electrical contractor to verify the ceiling types prior to ordering fixtures.

D. Fixture to be recessed mounted in suspended lay-in grid ceiling, dry wall or other ceiling type up to 1 ½ inch thick. Contractor to verify exact ceiling type prior to ordering luminaires to insure compatibility with ceiling thickness. Provide ceiling adaptor as required to accommodate ceiling thickness up to 2 inches. Bottom of luminaire shall be flush with ceiling.

E. Flexible fixture hangers shall be used for all pendant mounted fixtures. Fixtures two feet long and larger shall be supported with a minimum of two fixture hangers.

F. Conduit run in areas with hung ceilings shall be installed in the space above the hung ceiling as close to the structure as possible. Conduits shall be supported from the structure.

G. Exterior lighting poles shall be mounted plumb.

H. Fixture locations are shown on the Drawings in approximate locations; however exact locations shall be coordinated so as to avoid conflicts with HVAC ducts, equipment, and other obstacles.

I. Where the Drawings state a particular mounting height, it shall imply that the bottom of the fixture shall be mounted at the stated mounting height above the finished floor, unless specifically noted otherwise.

J. The minimum mounting height for the bottom of lights and exit signs shall be 80 inches above the finished floor in compliance with Americans with Disabilities Act (ADA).

K. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 501.

L. Flangeless fixtures for recess mounting in drywall shall be provided with mud ring and plaster guard, install per manufacturer’s instructions.

M. Install all required hardware and mounting brackets to secure luminaires to structure per local code requirements.

N. Bond luminaires and metal accessories to branch circuit equipment grounding conductor.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Perform field inspection, testing, and adjusting in accordance with manufacturer's recommendations.

B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

C. Test and calibrate all controls associated with luminaires, i.e. integral photo cells and occupancy sensors.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Clean electrical parts to remove conductive and deleterious materials.

B. Remove dirt and debris from lens enclosures.

1. For cleaning acrylic lenses or diffusers, use a feather duster or dry cotton cheesecloth to rid the lens/diffuser of any minor dust. For fingerprints, smudges, or other dirt present, use an ammonia-based cleaner (such as Windex) and wipe carefully with cotton cheesecloth (so as to avoid injury from any prismatic texture of the lens).
2. Job site contamination may not necessarily be removed using the above recommendations. In that case the lens would need to be replaced.

C. Clean photometric control surfaces as recommended by manufacturer.

D. All fixtures shall be left in a clean condition, free of dirt and defects, before acceptance by the Engineer.

END SECTION

DIVISION 40

PROCESS INTERCONNECTIONS

SECTION 40 61 96
PROCESS CONTROL DESCRIPTIONS

1. CONTROL STRATEGY 1 – LOOP 1 – EXISTING WELL PUMPING

1.1 Purpose

The Well pumping system delivers water from the Maple well to the Treatment Building.

1.2 References

P&ID Sheet N1.0

1.3 System Description

The Maple well pumping system includes one submersible pump with a maximum capacity of ~128 GPM. A magnetic flowmeter should be installed on the discharge lines from the pump to record and monitor flow.

1.4 Equipment and Instrumentation

P-100 Maple well pump system. Will be controlled by a new VFD.

FIT-201 Flow Meter

1.5 Alarms

Low flow Alarm

High flow Alarm

Low well water level alarm

1.6 Operation

During regular operation, the pumps are activated when the water level in the Maple tank drops to __ feet or in the Lower Kelly tank drops to __ feet. Upon activation, the pump discharges water (pump to waste) for a duration of __ minutes at ~100 GPM which can be adjusted by the operator in the control system or manually. Subsequently, the discharged water is directed into the treatment building for further processing. Flow measurement into the treatment building is done by a magnetic flowmeter. The flow rate from the well is varied to maintain the water level in the active Tri-mite finished water tank. And /or match total outflow.

2 CONTROL STRATEGY 2 – LOOP 2 – CHEMICAL DOSING

2.1 Purpose

The purpose of the chemical dosing system is to add oxidizing agent, coagulant, and polymer to the feed.

2.2 References

P&ID Sheet N2.0
P&ID Sheet N2.1

2.3 System Description

The chemical and polymer dosing system will be located in the treatment building, which comprises two dedicated chemical dosing systems and one polymer dosing system. The first chemical dosing system will be dedicated to Potassium permanganate to oxidize manganese. The second chemical dosing system will be dedicated to Iron chloride (coagulant). The polymer dosing system will be dedicated to the pre-engineered polymer recommended by the Tri-mite manufacturer. Both the chemical and polymer dosing systems will utilize pumps to transfer chemicals/polymer from their respective tanks to the feed line through CPVC pipes routed in the field, facilitated by manufacturer-supplied chemical dosing skids.

2.4 Equipment and Instrumentation

Potassium Permanganate storage Tank

Iron Chloride storage Tank

Polymer storage Tank

FRP Tank

Influent turbidity Meter

Chemical mixers

Polymer mixer

Chemical feed pumps

Polymer feed pumps

Calibration Column

Pressure Transducer

Static Mixer

2.5 Alarms

Low Turbidity

High Turbidity

2.6 Elevations

Pump Inlet CL = Field Route

Pump Outlet CL = Field Route

2.7 Operation

Prior to the chemical dosing system, the initial turbidity of the water is gauged using the influent turbidity meter. If the initial concentration falls within the NPDWR MCL limits, both the chemical and polymer dosing can be deactivated, and the flow can be redirected around the Tri-mite via the 3" field piping to the chemical disinfection system. However, should the initial turbidity exceed the NPDWR MCL limits, potassium permanganate chemical is introduced into the feed line, with an adjustable feed rate based on flow rate measurement from the influent flow meter. The water is then directed through the FRP tank to allow for retention time for manganese oxidation, as illustrated in P&ID sheet N2.0. Subsequent to the FRP tank, coagulant is introduced, adjustable by the operator based on flow rate measurement from the influent flow meter. After coagulation, the water traverses through the static mixer, and polymer is added, with an adjustable feed rate based on flow rate measurement from the influent flow meter, before being directed to the Tri-mite. Flow is directed to one Tri-mite system at a time and alternated. Furthermore, during backwash of one Tri-mite, the second Tri-mite system is engaged.

3 CONTROL STRATEGY 3 – LOOP 3 – TRI-MITE

3.1 Purpose

The purpose of the Tri-Mite coagulate, flocculate, filter the feed water and pump the effluent to the chemical disinfection system.

3.2 References

P&ID Sheet N3.0.
P&ID Sheet N3.1.

3.3 System Description

Tri-Mite is a factory assembled treatment and filtration system.

3.4 Equipment and Instrumentation

Inlet Meter

Backwash Meter

Filter liquid level Transmitter

Clarifier Pressure Transmitter

Filter Headloss Transmitter

Air Scour blower pressure switch

Effluent Turbidimeter

Turbidimeter Controller

Turbidimeter Maintenance lit

Air blowers

Backwash pump

Effluent pump

3.5 Alarms

High Level Alarm

Low Level Alarm

3.6 Operation

Tri-mite is a pre-engineered, factory-assembled treatment system. Please refer the equipment specifications provided by the manufacturer for Tri-mite Controls and operation sequence. Following polymer dosing, the feed line connects to the Tri-mite influent line via field routing. The effluent line is field routed from the Tri-mite effluent pump to chemical disinfection. The suction for the backwash pump should be connected to the water distribution line (4" PVC) as depicted in P&ID sheets N3.0 and N3.01. The 6" waste line from Tri-mite connects to the plant drain, which, in turn, is connected to the city sewer. The initial Tri-mite operates until backwash is needed, at which point treatment shifts to the second Tri-Mite.

The interface between the Tri-Mite PLC and the Treatment Plant Main PLC should include Hand/Off/Auto buttons for each Tri-Mite unit on the main plant HMI (Human-Machine Interface). Additionally, the Main PLC interface should display the status of the Tri-Mite System and any associated alarms.

4 CONTROL STRATEGY 4 – LOOP 4 – CHEMICAL DISINFECTION

4.1 Purpose

The purpose of the Chemical Disinfection system is to expose the treated effluent to an strong oxidizing agent sodium hypochlorite which oxidizes any microorganisms in water. This also helps to maintain the residual chlorin in the distribution system.

4.2 References

P&ID Sheet N.0

4.3 System Description

The chemical disinfection system introduces sodium hypochlorite (NaOCl) solution into the Tri-mite effluent line. Due to strong oxidizing properties of NaOCl, any microorganisms present in the Tri-mite effluent undergo oxidation. Operating with a design flowrate of 125 gallons per minute (GPM), the system administers NaOCl in a dosage proportionate to the flow rate within the channel.

4.4 Equipment and Instrumentation

NaOCl storage Drum

NaOCl feed pump

Calibration column

Tri-mite effluent Magnetic flowmeter

Chlorine Analyzer

4.5 Alarms

High Level Alarm

Low Level Alarm

4.6 Elevations

Field routing

4.7 Operation

The Chemical Disinfection System functions by introducing NaOCl into the effluent from the Tri-mite system. Two NaOCl pumps are installed, with one operating during normal operations and the other serving as a backup, as depicted on sheet N4.0 of the P&ID's. Monitoring of disinfection residual is necessary for the Chemical Disinfection System. This can be achieved through a chlorine analyzer installed downstream of the NaOCl feed. The disinfected water line is linked to the nearby booster pump skid for pumping to the storage tanks.

5 CONTROL STRATEGY 5 – LOOP 5 –BOOSTER PUMP SKID

5.1 Purpose

The purpose of the booster pump skid is to pump the treated water from the treatment building to Maple storage tank or Lower Kelly storage tank.

5.2 References

P&ID Sheet N4.0.

5.3 System Description

The chlorinated effluent from the Tri-mite is conveyed through booster pumps to the Maple and Lower Kelly storage tanks. The booster skid consists of three pumps arranged in a manner allowing the discharge ends to be redirected, enabling the feeding of either storage tank individually.

5.4 Equipment and Instrumentation

Secondary Effluent Pump Station

P-500	Lower Kelly Booster pump
P-501	Maple Tank Booster pump 1
P-502	Maple Tank Booster pump 2
PG	Pressure gauge

5.5 Alarms

High pressure alarm

Pump fault

5.6 Elevations

5.7 Operation

The booster pump skid is specifically designed to pump the chlorinated water to both the Maple storage tank and the Lower Kelly storage tank. The booster pump skid will consist of two Maple tank booster pumps (duty & standby) mounted on a skid, with a third pump (Lower Kelly booster pump) positioned adjacent to them.

The Maple tank booster pumps will activate when the water level in the Maple tank falls below the preset level of 5 feet below the overflow elevation (user adjustable). Similarly, lower Kelly booster pumps will activate when the water level in the Lower Kelly tank falls below the preset level of 5 feet below the overflow elevation (user adjustable). The pump speed will be varied to maintain a set point of 2 feet below the overflow elevation and will run at minimum flow when above the set point. Pumps will shut down if the water level rises to 6 inches below the overflow. The combined pumping from both the Kelly and Maple tanks shall not exceed 100 GPM. The Maple tank will be prioritized in the event more water is called for then is available.

DIVISION 41

Booster Pumps

SPECIFICATION FOR NSF 61 CLOSE-COUPLED
VERTICAL MULTISTAGE VFD WATER BOOSTER SYSTEM

SECTION #: 4100.2-VFD

WORK INCLUDED - Packaged Pumping System

PART 1 - GENERAL

1.1 DESCRIPTION

A. Purpose: To provide a single source responsible for the manufacture and warranty of a prefabricated, skid mounted, fully automatic variable speed pumping system and enclosure. The pumping system shall automatically maintain a constant discharge pressure regardless of varying flow demands within the station rating.

B. The pumping system shall conform to the specifications herein in all aspects. This specification covers the minimum requirements but should not be considered to be all inclusive. It is the successful vendor's responsibility to include all necessary appurtenances to provide for a complete, smooth operating, and reliable pump system. The manufacturer shall supply a complete set of general arrangement drawings, electrical power schematics, and control schematics in the operation and service manual.

C. Manufacturers seeking authorization to furnish their product shall be a registered ISO9001:2015 manufacturer and shall hold a current Quality Management Certificate for the assembly of custom packaged pumping systems and controls for use in commercial, irrigation, municipal, industrial, and fire applications.

1.2 REFERENCES

A. American National Standards Institute (ANSI)

B. American Society for Testing and Materials International (ASTM):

1. A36: Standard Specification for Carbon Structural Steel.
2. A48: Standard Specification for Gray Iron Castings.
3. A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
4. Al05: Standard Specification for Carbon Steel Forgings for Piping Applications.
5. A276: Standard Specification for Stainless Steel Bars and Shapes.
6. A307: Carbon Steel Bolts and Studs.
7. A582/A582M: Standard Specification for Free-Machining Stainless Steel Bars.
8. B 148: Standard Specification for Aluminum-Bronze Sand Castings.

C. American Society of Mechanical Engineers (ASME)

1. ASME B 16.5: Pipe Flanges and Flanged Fittings

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D. American Water Works Association (AWWA)

E. American Petroleum Institute (API)

F. Hydraulic Institute (HI)

G. National Electric Code (NEC)

1. National Electrical Manufacturers Association NEMA – MG 1

1.3 MANUFACTURER

A. The pumping system shall be of the type manufactured by **TIGERFLOW** Systems, LLC or approved equal. The station manufacturer shall be certified to provide a UL listing for both the control panel and the pump unit as a complete system, to ANSI-NSF-61 certification standards. For consideration of a proposed equal system, the contractor shall furnish the following data for evaluation;

1. A complete specification for the pumping system proposed as an equal.
2. A statement of full conformance to the specifications signed by an authorized representative of the manufacturer.
3. layout drawing showing overall dimensions and all piping discharge locations.
4. Complete submittal data for all major equipment such as pumps, motors, control components, valves, and motor starters.
5. one-line electrical schematic showing power wiring.
6. Manufacturer's electrical control panel UL508A file number.
7. A copy of the manufacturer's certificate of insurance showing as a minimum, general liability coverage of $1,000,000 and an excess liability coverage of $5,000,000.

1.4 SUMMARY

Furnish and install a **TIGERFLOW** Series **VMS-4000-VFD-NSF** (Duplex, Triplex, Quadraplex) Model #**TBD** UL/C-UL Listed **IAMPO N-5169 NSF/ANSI-61** Listed engineered **Variable Speed** packaged water Booster System. The system shall be rated for a system flow of **100** GPM at a system pressure of **180** PSIG including a suction pressure of **-1** PSIG minimum, **2** PSIG maximum.

1.5 QUALITY ASSURANCE

- All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
- Equipment shall be a manufacturer’s standard product presently in commercial production.

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- The manufacturer shall have in place a quality assurance program to assure the quality of the material furnished.
- NIST Traceable test facility
- Package shall be manufactured in an ISO 9001 certified facility

1.6 THIRD PARTY TESTING AND CERTIFICATIONS

Package shall be:

- **UL/C-UL QCZJ Listed as a system** for its intended use.
- **NSF/ANSI 61 certified for potable drinking water by IAPMO, NSF, UL or other ANSI third party testing agency.**
- In compliance with:
  - OSHA Federal Regulations 29 CFR 1910.303 and 399
  - NFPA Pamphlet #70 (National Electric Code) Article 90-7,
  - City of Los Angeles Approval Code, CMR248
  - ASHRAE 90.1 (2010) compliant

1.7 QUALIFICATIONS

- The manufacturer shall have a minimum of twenty years manufacturing and application experience.
- Upon request from the engineer, the pump station manufacturer shall demonstrate proof of financial responsibility with respect to performance and delivery date.
- Upon request from the engineer, the pump station manufacturer shall provide proof or evidence of facilities, equipment and skills required to produce the equipment specified herein

1.8 APPROVED MANUFACTURERS

Base bid: **TIGERFLOW**

Alternates: Must supply written certification that the pump system and manufacturer are Listed NSF/ANSI 61 certified for potable drinking water.

1.9 SUBMITTALS & INSURANCE CERTIFICATIONS

Submittals shall be in accordance with requirements of general specifications. Submit 6 copies to the engineer for approval. All submittals must include the following:

- Complete shop drawings and complete wiring diagrams. All drawings must be Inventor or AUTO-CAD electrical; complete with 3-D drawings available in Inventor, CAD, or Revit.
- Provide written certification that manufacturers' pump system is NSF/ANSI-61 certified for potable drinking water.
- Provide written certification that manufacturers' production facility is NSF/ANSI-61 certified to manufacture packaged pumping systems for potable drinking water.







- Furnish written certification of the manufacturers listing with Underwriters Laboratories as an approved manufacturer of control panels.
- Furnish written certification that the manufacturer is listed by UL/C-UL as an approved manufacturer of factory assembled pumping systems.
- A complete, easily readable functional description of the proposed equipment.
- Upon completion of the installation, the results of the field and acceptance tests as specified under this section of the specification shall be submitted to the engineer.
- Furnished written certification from the manufacturers' representative of the proper installation of the station.
- Provide written certification that, a nationally recognized manufacturer of package pump systems, manufactures the pump system. A corporate officer must sign this certification.
- Provide written certification that pump system and pump system manufacturer are NSF/ANSI 61 certified for potable drinking water by a third party ANSI certifier.
- Operation and maintenance manuals:
  Submit complete operations and maintenance information for this specific equipment. The engineer shall review these manuals for completeness. They shall include complete parts list including manufacturers' reference and ordering number, the local representative name, address and phone number, the model and serial number of the system.
- The manufacturers shall submit a certificate of product liability insurance for no less than five million dollars ($5,000,000)

PART 2 – PRODUCTS

2.1 PUMPS AND MOTORS

Pumps shall be **NSF-61 approved**, series **4000**, cast iron, stainless fitted, mechanical seal vertical multistage centrifugal type each coupled to a **3600 RPM, 460 Voltage, 3 Phase, 60 Hz**, ODP premium efficiency motor.
Pump No. **1 and 2** shall be a **Model TBD, 100 GPM at 515' TDH, 30 HP**
Pump No. **3** shall be a **Model TBD, 100 GPM at 130' TDH, 7.5 HP**

2.2 VALVES

Isolation Valves: **2.5**" Individual pump suction and discharge valves shall be NSF 61 certified lug or grooved type butterfly valves with lever operators. Provide a **2.5**" wafer style non-slam check valve NSF 61 certified on the discharge of each pump.

2.3 GAUGES *(OPTIONAL)*

Provide two Gauge stand with (**0 to 100 PSI and one 0 to 300 PSI**) **4**" diameter liquid filled stainless steel case gauges, isolation valves and stainless steel sensing lines.

2.4 POWER AND CONTROLS

Provide UL Listed, NEMA 1, **TIGER'S EYE Mark V** Solid State, Power and Control Panel consisting of:

- UL/C-UL 508 Label
- Single point power connection

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- Through door control power disconnect with safety interlock to prevent door from being opened while in ON position.
- Fused 120 V AC control voltage transformer
- Fused 24 V DC power supply, 1 Watt.
- Suction and system pressure transducers
  - All wetted parts are to be stainless steel.
  - 4-20 mA signal with a minimum accuracy of ±1%.
- Micro Controller: PLC with non-volatile memory (battery backup not required)
- **TIGERFLOW "TAP" Technology ASHRAE 90.1 compliant**
- **Tuning – TIGERFLOW Stepped Proportional Response**
- Operator interface: 6-inch color scale touch screen HMI (Human Machine Interface) including but not limited to the following:
  - Main Screen with the following features:
    - Individual pump HOA (Hand – Off – Auto) switches
    - Pump run indication, including current % speed
    - Pump Failure indication
    - Current pressures readings in psig (suction and system)
    - Current flow in GPM (if flowmeter specified)
    - Adjustable manual (hand) speed setting
    - Direct access to menu screen
  - Menu screen providing direct access to all system settings and status screens
  - Pump settings screen displays current settings and allows user changes
    - Lead and lag pump start and stop pressures, psig.
    - Lead and lag pump ON and OFF delay times, seconds
  - Alarm settings screen displays current settings for all alarms and allows user changes.
    - Low suction alarm settings
      - Low suction pressure, psig
      - ON and OFF delays, seconds
      - Manual or automatic reset
    - Low system alarm settings
      - Low system pressure, psig
      - ON and OFF delays, seconds
      - Manual or automatic reset
    - High system alarm settings
      - High system pressure, psig
      - ON and OFF delays, seconds
      - Manual or automatic reset
    - High suction economy mode
      - Economy mode suction pressure, psig
      - Economy mode enable / disable
      - ON and OFF delays, seconds
  - Separate Alarm Silence and Alarm Reset buttons
  - Current system status screen displays:
    - Pump(s) currently running
    - Active alarms and warning messages
  - System event history screen displays a minimum of the last 10 system events, including pump start /stops, alarm conditions and alarm acknowledgements.
  - Pump run time screen displays the total operating time for each pump. Provide individual resets for each pump run time
  - Lead pump alternation options will include:
    - Automatic alternation on lead pump shutdown.
    - Manual alternation when operator touches alternate button
    - Timed alternation:

- Daily (user specified time of day)
- Weekly (user specified day of week and time of day)
- Monthly (first week of month on user specified day of week and time of day)

- -Multi Level Security
  - 8 Password protected security levels (field changeable passwords)

- Common alarm relay provides dry contacts for customer monitoring.
- Alarm horn, 85 db, annunciates all alarm conditions.

2.5 VARIABLE FREQUENCY DRIVES (VFD)

Each drive will have individual disconnects and short circuit protection. Drive manufacturer must provide a two-year minimum warranty.

Drives will be configured to provide the following operating features:

- Drive keypad will have manual, off and automatic mode selection and will be accessible to operators without opening an enclosure.
- When in automatic, drive will run upon closure of the respective run permissive contact
- When in automatic and with a run permissive signal, drive speed will respond to a 0-10 V DC speed reference signal from pump controller.
- Drive will provide a limited number of automatic resets for fault conditions and will maintain a history of faults.

2.6 FLOW METER *(OPTIONAL)*

Provide a brass, insertion type paddle wheel flow meter with frequency / pulse output. Flow meter must allow field calibration for pipe sizes ranging from 3 to 36-inches. Provide Data Industrial 220B or approved equal.

2.7 HYDRO-PNEUMATIC TANK *(OPTIONAL)*

Provide a Section VIII, ASME Code, National Board stamped, hydro-pneumatic tank. Tank shall be provided complete with a NSF approved replaceable bladder, bottom connection, air fill valve, tank drain valve and gauge. Tank shall be: (Model TF-132E, 132 gallon, 150 PSI) (Model TF-185E, 185 gallon, 200 PSI).

The hydro-pneumatic tank shall be (skid mounted) (adjacent to system) with feed line and full port ball valve on discharge header (remote mounted as shown per drawings) (no tank – continuous run operation).
Note: Adjacent mounting requires contractor field connection.

2.8 PUMP SEQUENCING

- PRESSURE SEQUENCING *(Packages without a flow meter)*

Lag pump(s) are staged ON and OFF based on pressure only. When system pressure falls to a lag pump start pressure for the defined on-delay time period, lag pump starts. If system pressure continues to fall, addition lag pumps (if available) will start as pressure falls to the respective start pressure settings. Pumps are stage OFF, one at a time, in reverse order of start as system pressure setpoint is maintained for the pump OFF-delay time period.

- PRESSURE AND FLOW SEQUENCING *(Packages with a flow meter)*

Lag pump(s) are staged ON and OFF based on pressure and flow. When system pressure falls to a lag pump start pressure or if flow exceeds lag pump start flow for the defined on-delay time period, lag pump starts. If system pressure continues to fall or if flow continues to increase, addition lag pumps (if available) will start as pressure falls to the respective start pressure settings or as flow exceed the respective start flow settings. Pumps are stage OFF,

one at a time, in reverse order of start as system pressure setpoint is maintained and flow becomes less than pump start settings for the pump OFF-delay time period.

PART 3 - EXECUTION

3.1 FACTORY FABRICATION

Provide each system as a complete package system on an open structural steel mounting frame, piped, tubed, mounted and wired. Unit shall be factory primed and painted with machine grade finish coat. All welding shall be performed by ASME Section 9 certified welders. System shall be (Horizontal) (Vertical) construction. Branches, suction and discharge headers shall be: Schedule 40, 304 stainless steel 4" grooved connections. System manufacturer shall isolate all ferrous from all non-ferrous materials.

3.2 FACTORY TEST

The package shall be electrically and hydrostatically tested before shipment, in addition, each system shall be factory tested from 0-100% of flow and pressure. **Provide certified X-Y test report. NIST traceable tes**t.

3.3 SITE COMMISSIONING AND TRAINING

The factory authorized local representative shall provide (4) hours of startup and field training.

3.4 WARRANTY

Each **TIGERFLOW** system shall be warranted for a period of (24) months from date of delivery.

DIVISION 46

Water and Wastewater Equipment

SECTION 46 07 13

PACKAGED WATER TREATMENT EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Tri-Mite, a pre-engineered system consisting of a pretreatment and filtration system capable of treating surface water or groundwater to meet potable standards contained in a single shippable tank. The Tri-Mite is a factory assembled system as per these specifications for installation by the contractor.
2. Chemical blending, Feed and storage system
3. Adsorption clarifier.
4. Clarifier/Filter.

B. Related Requirements:

1. Section 033000 - Cast-In-Place Concrete: Concrete foundation for packaged sewage treatment plant.
2. Section 055000 - Metal Fabrications: Miscellaneous metalwork and fasteners as required by this Section.
3. Section 055013 - Metal Service Platforms: Operating and access platforms as required by this Section.
4. Section 055300 - Metal Gratings: Operating and access platform flooring as required by this Section.
5. Section 134713 - Cathodic Protection: Passive cathodic protection to buried metallic utility piping, buried metal structures, and buried metal tanks using sacrificial galvanic anodes.
6. Section 260583 - Wiring Connections: Wiring connections to equipment.
7. Section 262923 - Variable-Frequency Motor Controllers: Three-phase variable-frequency motor controllers of pulse-width-modulated design, for variable-speed drives.
8. Section 312316 - Excavation: Excavating requirements for Site structures, under slabs-on-grade and utilities.
9. Section 312316.13 - Trenching: Trenching and backfilling for Site utilities and other subgrade sitework.
10. Section 312323 - Fill: Backfilling required at Site structures to subgrade elevations and fill under interior and exterior slabs-on-grade.
11. Section 331416 - Site Water Utility Distribution Piping: Piping and accessories normally encountered with water distribution piping to connection with Site water distribution systems.
12. Section 400506 - Couplings, Adapters, and Specials for Process Piping: Piping components common to process piping systems.
13. Section 400551 - Common Requirements for Process Valves: Execution requirements for valves required by this Section.

14. Section 400593 - Common Motor Requirements for Process Equipment: Electric motors and their accessories normally supplied as part of equipment assemblies.

1.2 DEFINITIONS

A. Clarification: Treatment process that removes suspended solids from water. Clarification may be accomplished by gravity settling, in which solids settle to the bottom of a settling tank, or by adsorption bed clarification, in which solids are captured by a bed of media suspended in the tank from water flowing upward.

B. Coagulation: Treatment process that causes colloid-size suspended solids in source water to coalesce into clumps with sufficient mass to settle under the influence of gravity.

C. Filtration: Treatment process that removes small, suspended solids after the clarification process by means of granular media. Water may flow through media by gravity or may be forced through media by hydraulic pressure.

D. Flocculation: A process wherein colloids come out of suspension in the form of floc or flakes by the addition of a clarifying agent.

E. Iron: Contaminant that may cause discoloration or staining of plumbing fixtures and laundry. Dissolved iron is removed by an oxidation process.

F. Manganese: Contaminant (often associated with iron) that may cause staining of plumbing fixtures and laundry. Dissolved manganese is removed by an oxidation process.

G. Suspended Solids (SS): Small solid particles that remain in suspension in water.

1.3 REFERENCE STANDARDS

A. American Public Health Association, American Water Works Association, and Water Environment Federation:

1. Standard Methods for the Examination of Water and Wastewater.

B. American Welding Society:

1. AWS D1.1/D1.1M - Structural Welding Code - Steel.

C. ASTM International:

1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
2. ASTM A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. SSPC: The Society for Protective Coatings:

1. SSPC SP 10 - Near-White Blast Cleaning.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate installation and startup of Work of this Section with **Engineer**.

1.5 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum **one week** prior to commencing Work of this Section.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer's product data for system materials and component equipment.

C. Shop Drawings:
1. Indicate system materials and component equipment, including detailed wiring and control diagrams.
2. Approval drawings showing dimensions, construction and installation details, materials used, and shipping and operating weights.
3. Indicate complete information concerning fabrication, installation, anchoring, fasteners, and other details.
4. Manufacturer's literature and catalog cuts of purchased items.
5. Show evidence of being able to provide the quality of equipment and services described in this specification, the equipment supplier shall submit their ANAB-accredited ISO 9001 quality system certification. AIAO-BAR accredited systems are not a recognized equivalent and are therefore specifically prohibited. The quality procedures shall provide for a means of qualifying all sub-vendors and shall specify that the fabrication facility is a critical vendor and shall require inspection. The quality system shall be audited on-site by a third-party independent registrar at least annually. Certification shall remain in effect throughout the project start-up.

D. Manufacturer's Certificate: Certify that **products** meet or exceed **specified requirements**.

1. Certify installation is completed according to manufacturer's instructions and that packaged water treatment plant is ready for startup, testing, and operation.
2. Submit manufacturer's affidavit certifying tanks have been designed to resist loading and attest to structural adequacy; calculations are **not** to be submitted.

E. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations (In/Out concentrations, Flowrate, Hydraulic loading, Solids loading, differential pressure, etc.) and assumptions for tanks, railings, and other structural components.

F. Manufacturer's Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures, anchoring, and layout.

G. Source Quality-Control Submittals: Indicate results of **factory** tests and inspections.

H. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

I. Manufacturer Reports: Indicate results of manufacturer's inspections and instructions issued.

J. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.
2. Submit manufacturer's approval of installer.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

C. Operation and Maintenance Data: Submit list of equipment, accessories, and tools needed to maintain and calibrate equipment.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:

1. Furnish **one set** of manufacturer's recommended spare parts.

C. Tools: Furnish special **wrenches** and other devices required for Owner to maintain.

1.9 QUALITY ASSURANCE

A. Perform Work according to 2017 APWA specs standards.

B. This specification covers the furnishing of WesTech Engineering, LLC, water treatment equipment as Base Bid. The equipment and material specified is deemed most suitable for the proposed water treatment system. The contractor shall prepare his bid on the basis of the materials and equipment listed herein. Any bid using other than the Base Bid equipment will be considered nonresponsive and the bid will not be considered for award. The contract will be

awarded to the lowest responsible bidder incorporating the Base Bid equipment. Prequalified Alternates will not be considered until after award of contract.

C. The Base Bid Equipment shall be: MICROFLOC™ products TRI-MITE® 2TM-100A Water Treatment System as manufactured by WesTech Engineering, LLC or approved equal.

D. The Tri-Mite is a pre-engineered system consisting of a pretreatment and filtration system contained in a single shippable tank. The Tri-Mite is a factory assembled system as per these specifications for installation by the Contractor.

E. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install and test (if applicable) the treatment, and shall furnish and install all piping and fittings, all valve (pneumatic, hydraulic) piping, all wiring and conduit, plus valves not furnished by the plant supplier as shown on the plans, to include couplings, check and isolation valves, and all other manual valves for pneumatic or hydraulic service.

F. Manufacturer's Verification:
1. The treatment system shall be furnished by a single manufacturer who shall comply with the following:
2. The single manufacturer supplying equipment to this specification shall furnish proof of a minimum of 100 installations and 10 years of manufacturing treatment systems as specified.
3. Due to a potential for higher-than-normal turbidities, the system manufacturer must furnish proof of a minimum of 3 operating plants that have similar systems treating over 40 NTU raw water for sustained periods of time, and spike loading in excess of 200 NTU.
4. Due to a potential for higher-than-normal Iron and Manganese, the system manufacturer must furnish proof of a minimum of 3 operating plants that have similar systems treating over 4 mg/L Iron and 0.4 mg/L of Mn raw water for sustained periods of time, and spike loading in excess of 8 mg/L Iron and 2.5 mg/L of Mn.
5. Due to a potential taste and odor problem, or to provide the capability for carbon adsorption, the system manufacturer shall furnish proof of the system's ability to perform properly while feeding Powdered Activated Carbon at a minimum dosage level of 25 mg/l. This must be demonstrated by a minimum of 3 pilot studies and/or operating plants showing positive results.
6. The system must be capable of operating at a range of 50 percent to 150 percent of the standard design flow.
7. In addition to normal start-up service, the systems detailed above shall be fully operational including the demonstration of a fully automated control sequence for the backwash and flush of the system, based on reaching design terminal headloss in both the filter and clarifier.
8. Components of the packaged treatment system shall be certified to NSF® Standard 61. Specifically, the Adsorption Clarifier media and filtration media shall satisfy this requirement.

G. Maintain **copy** of each standard affecting Work of this Section on Site.

1.10 QUALIFICATIONS

A. Manufacturer:

1. Company specializing in manufacturing products specified in this Section with minimum **ten** years of **documented** experience.
2. Provide contact information for 3 operating plants for which the manufacturer has provided equipment:

    a. Similar systems treating over 40 NTU raw water for sustained periods of time and spike loading of up to 200 NTU.
    b. Due to a potential taste and odor problem, or to provide the capability for carbon adsorption, the system manufacturer shall furnish proof of the system's ability to perform properly while feeding Powdered Activated Carbon at a minimum dosage level of 25 mg/l. This must be demonstrated by a minimum of 3 pilot studies and/or operating plants showing positive results.

B. Installer: Company specializing in performing Work of this Section with minimum **ten** years of **documented** experience **and approved by manufacturer**.

C. Licensed Professional: **Professional engineer** experienced in design of specified Work and licensed **at Project location in State of Utah**.

D. Welders: AWS-certified within previous 12 months, according to AWS D1.1/D1.1M.

1.11 WORK INCLUDED

A. The Tri-Mite is a pre-engineered system consisting of a pretreatment and filtration system contained in a single shippable tank. The internal components and all ancillaries shall be factory assembled items not provided are to be furnished and installed by the contractor.

B. The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish, install and test the treatment, and shall furnish and install all interconnecting piping and fittings as shown on the plans, all interconnecting wiring and conduit, plus valves not furnished by the plant supplier as shown on the plans, to include couplings, check and isolation valves, and all other manual valves for pneumatic or hydraulic service.

C. The Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish, install and test the treatment equipment complete with piping, internals and appurtenances.

D. In order to assure the highest quality control, the equipment supplier and Manufacturer shall be one in the same.

E. The following items are a part of this section and shall be furnished by one manufacturer to ensure a properly designed and integrated water treatment system.

1. Factory built steel modular tanks, each designed using an up-flow Adsorption Clarifier® section followed by a down flow gravity filter with Mixed Media.

2. The treatment system shall include chemical treatment, Adsorption Clarification, Mixed Media Filtration, automatic process valves, and a system control panel.

3. An air scouring system including air blowers and automatic valves for the operation of this system to flush the Adsorption Clarifier section and to aid in filter backwash.

4. The filtration section shall consist of Mixed Media with a direct retention underdrain system. The underdrain system shall provide for simultaneous air/water and water only backwashing. The high-rate water only backwash of the filter shall be 15-18 gpm/ft2.

Note: The design backwash rate listed is based on a temperature of 25 degrees C. The actual backwash water rate must be adjusted 2% up or down for each degree Celsius difference above or below from design temperature, i.e. above 25° C increase by 2%, below 25° C decrease by 2%.

1.12 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. A warranty shall be provided covering all materials and workmanship for twelve (12) months from the initial startup or eighteen (18) months from ready-to-ship notification, whichever occurs first.

PART 2 - PRODUCTS

2.1 PACKAGED WATER TREATMENT SYSTEM

A. Manufacturers:

1. The Base Bid Equipment shall be: MICROFLOC™ products TRI-MITE® 2TM-100A Water Treatment System as manufactured by WesTech Engineering, LLC or approved equal.

B. Substitutions: Contractor may submit other manufacturer's equipment for consideration as an alternative to the equipment specified as the Base Bid. An addendum will be issued at least five days before the bid date naming alternate suppliers that conform to the specifications and are approved to bid equipment for the project. To qualify alternate equipment, the contractor shall provide the following information to the Engineer at least fifteen days prior to the bid date:

1. Drawings, specifications, and product literature with adequate detail to determine that what is proposed will meet the requirements of the plans and specifications. This design pre-submittal shall be complete and shall include as a minimum, the following:
    a. Detailed Layout Drawings.
    b. Detailed component specifications and catalog cut sheets.
    c. Process P&ID Drawing.
    d. Detailed list of variations required from original design, referencing appropriate sections of the specifications and locations on the drawings.
    e. History of the process offered, including pilot data and experience treating a similar raw water.

f. Installation list including actual scale-up data from pilot testing to full scale plant operation, also including plant contact names and telephone numbers.
g. All other data as required in Section 1.1 - Quality Assurance.
h. A detailed System Performance Guarantee for 2 years

2. A list of ten installations of similar type and size with plant addresses and telephone numbers treating a similar raw water. The engineer and owner may contact these installation sites to determine experience. The alternate equipment supplier shall also provide a list of total Tri-Mite plants. The total number of units installed shall not be less than twenty for experience purposes.

3. Evidence of manufacturing capability including a description of facilities, the number and professional qualifications of personnel, and quality control practices. The alternate equipment supplier shall identify major outside fabricators for the purpose of determining experience.

4. Show evidence of being able to provide the quality of equipment and services described in this specification, the equipment supplier shall submit their ANAB-accredited ISO 9001 quality system certification. AIAO-BAR accredited systems are not a recognized equivalent and are therefore specifically prohibited. The quality procedures shall provide for a means of qualifying all sub-vendors and shall specify that the fabrication facility is a critical vendor and shall require inspection. The quality system shall be audited on-site by a third-party independent registrar at least annually. Certification shall remain in effect throughout the project start-up.

5. Evidence of technical capability to design and check out the complete alternate system, including modifications which will be required in structures, foundations, and equipment provided by others.

6. Evidence of financial responsibility adequate to complete the project and assure viability of equipment warranty.

7. A complete listing of changes which will be required in the contract plans and specifications to accommodate the alternate equipment.

8. Alternate bidders shall guarantee, in writing, signed by an officer of the company that the equipment offered will provide comparable or superior features, performance quality, and materials of construction as the equipment specified. Prior approval of the alternate equipment shall not constitute final approval of specific equipment, but rather constitute only approval of the respective equipment manufacturers to provide price quotations based on equipment meeting the specifications. Alternate equipment manufacturers shall modify their standard products as necessary to meet all provisions of the specifications without exception.

9. A photocopy of the alternate equipment manufacturer's quotation must be attached to the bid documents, to assure that the alternate equipment bid is in accordance with the equipment which has been prequalified.

10. The cost of any change’s incidental to installation of the alternate equipment such as electrical wiring, relocation of piping, engineering supervision, as built drawings, etc., shall be borne by the contractor with no additional expense to the Owner.

11. If after installation the alternate equipment does not perform in accordance with the specifications or other deficiencies are noted, the owner will require the modification or replacement of such equipment to meet the specifications at no additional expense.

C. Furnish materials according to 2017 APWA Specs standards.

D. Description:

1. This equipment shall consist of one (1) Tri-Mite 2TM-100A Water Treatment System consisting of two units with associated equipment to comprise a complete system.

2. The units shall be for treating raw water of the following approximate characteristics at a flow rate of 100 gpm per unit (200 gpm total system flow).

E. Performance and Design Criteria:

1. Operating Range: 50 percent to 150 percent of average daily flow rate.
2. Influent Criteria:
   a. Iron: 8 mg/L.
   b. Manganese: 2.5 mg/L.
   c. Turbidity: 75 NTU

3. Produce effluent quality from treatment plant final clarifier with following maximum limits:

   a. Turbidity: 5 NTU.
   b. Iron: 0.3 mg/L.
   c. Manganese: 0.05 mg/L.

2.2 CHEMICAL BLENDING AND FEED SYSTEM

A. General

1. The work to be accomplished under this section consists of three chemical feed assemblies as shown on the plans and as specified herein for installation by the contractor. All other chemical feeds shall be furnished and installed by the Contractor.

B. Coagulant feed consists of:

1. One 200-gallon HDPE (polyethylene) open top tank with cover, Level indicator and High/Low level alarm.

2. One clamp mounted, direct drive mixer, 1/4 hp, 115/230V, 60 cycle, single phase with stainless steel shaft and dual propellers.

3. Two chemical feed pumps, positive displacement, diaphragm type, electronic control by the AQUARITROL PLC Program, 168 gpd. One pump shall be for feeding coagulant chemical to the Tri-Mite system. The second pump provided as a spare for backup.

4. Included is a pump mounting bracket, calibration column, injection connection, suction and discharge polyflow tubing and fittings.

C. Oxidant feed consists of:

1. One 100-gallon HDPE (polyethylene) open top tank with cover, Level indicator and High/Low level alarm.

2. One clamp mounted, direct drive mixer, 1/4 hp, 115/230V, 60 cycle, single phase with stainless steel shaft and dual propellers.

3. Two chemical feed pumps, positive displacement, diaphragm type, each 38.4 gpd. One pump shall be for feeding oxidant chemical to the Tri-Mite system. The second pump provided as a spare for backup.

4. Included is a pump mounting bracket, calibration column, injection connection, suction and discharge polyflow tubing and fittings.

D. Polymer feed consists of:

1. One 100-gallon HDPE (polyethylene) open top tank with cover, Level indicator and High/Low level alarm.

2. One clamp mounted, gear drive mixer, 1/4 hp, 115/230V, 60 cycle, single phase with stainless steel shaft and dual propellers.

3. Two chemical feed pumps, one per each Tri-Mite tank, positive displacement diaphragm type, manually adjustable output, 31.2 gpd each.

4. Included is a pump mounting bracket, calibration column, injection connection, suction and discharge polyflow tubing and fittings, and a tank mounted chemical disperser.

5. Chemical feed pump sizing is based on a maximum polymer dosage of 0.5 mg/L at 0.25 percent solution strength.

E. Note: Chemical feed systems are matched to the particular water supply. Based upon a raw water analysis, or results of pilot testing, this section may include other feed systems, examples:

1. Sodium Hypochlorite

2. Soda Ash

3. Caustic Soda

4. Fluoride

2.3 ADSORPTION CLARIFIER DETAILS

A. The Adsorption Clarifier units shall have the dimensions shown on the drawings providing the total surface area shown in the table above. Clarification shall be accomplished using granular adsorption media specifically manufactured for use in water treatment. The medium shall be

designed to optimize the removal of coagulated particles with a minimum of headloss. The clean bed headloss through the Adsorption Clarifier media shall be less than 18 inches at 10 gpm per square foot. The Adsorption Clarifier media shall be able to build solids to a headloss of six feet without disruption or movement of the clarifier media.

B. The adsorption media retention screen shall be a corrosion resistant assembly that allows free passage of water but contains the adsorption media particles. The retainer assembly shall be easily accessible and removable from the top of the tank.

C. A 48-inch depth of adsorption media shall be provided. Media shall be buoyant with specific gravity of less than 1.0. A media retention screen with aluminum screen support shall be provided to allow for upflow, restrained operation eliminating any chance of fluidizing the bed during operation. However, to allow for proper cleaning, the media shall be easily fluidized by the addition of small amounts of diffused air. Clarifier media that is not restrained and/or media that will not easily fluidize by the addition of air shall not be considered acceptable.

D. Buoyant media shall be manufactured of virgin HDPE beads. At least one-half of the beads in the bed shall be rolled to produce an elliptical shape and shall also be scarified to place a groove on the media surface. The rolled and scarified shape provides improved floc retention inside of the clarifier bed. Bead media that does not include the rolled and scarified design is not acceptable due to its lower capability of floc retention.

E. NSF 61 approval of the buoyant media is required, and a copy of the NSF approval shall be submitted with the contractor's bid. Bids without a copy of the NSF approval shall be rejected.

F. Adsorption Clarifier Media and retention screens are shipped installed.

G. Influent flow to the Adsorption Clarifier section shall be regulated by an influent flow control system for each unit will consist of a magnetic flow meter and modulating influent flow control valve. The rate of treatment for each unit will be set at the local control panel and maintained by the meter-modulating valve system. The influent flow control valve will be factory installed as part of the tank assembly and the influent meter will be shipped loose for contractor field installation.

H. The Adsorption Clarifier section shall be equipped with an air scour system consisting of a fixed distribution grid with non-clog air diffusers consisting of a slotted plastic nozzle body. The air distribution laterals shall be constructed from a corrosion resistant material. The clarifier compartment shall be provided with a screened outlet to allow for draining of water without loss of media.

I. Clean Adsorption Clarifier media shall be able to be floated over to the filter side of the tank for clarifier draining, air and water piping inspection and/or service. The media shall be able to be floated back to the clarifier section of the tank without media loss or damage within an eight-hour shift per tank.

J. Adsorption Clarifier media and retention screens are shipped factory installed.

K. Non-buoyant alternates using an up flow unrestrained media are not acceptable.

2.4 FILTER DETAILS

A. The total filter area shall be as shown in the table in Section 2.1 B of this specification. The filter shall be designed for gravity flow with the flow rate regulated by a level controller and modulating effluent butterfly valves. The filter underdrain system shall be a direct retention media support type as outlined in paragraph D.4 of this specification section.

B. The Contractor will need to install the level controller and bracket in the field.

C. The filter media shall be a 30 inch deep Mixed Media separation bed composed of three materials, each of different size and specific gravity, providing uniform void distribution from coarse to fine in the direction of flow. The Mixed Media shall consist of 18 inches of anthracite coal, 9 inches of silica sand and 3 inches of high-density sand. The top of the bed shall consist of material of approximately 1.1-millimeter particle size, and the bottom of approximately 0.2 millimeters particle size. Dual media systems are not acceptable as an alternate to Mixed Media.

D. Media shall meet the requirements of AWWA B100, latest revision.

E. The filter media shall be supplied by the manufacturer and the silica sand and high-density sand shall be shipped installed, and the anthracite is shipped in bags for ease of installation. The manufacturer will advise exact volume of each layer of Mixed Media to be installed by the Contractor.

F. The manufacturer shall furnish and install the stainless-steel direct retention flat panel v-wire underdrain. The underdrains shall accommodate air and water backwash and be specifically designed to provide uniform distribution of air, water, and simultaneous air/water during backwashing. Underdrains that have a perforated pipe insert or support gravels are not considered acceptable.

2.5 CLARIFIER/FILTER PACKAGE SYSTEM CONSTRUCTION

A. Tank Fabrication

1. The major components shall be of the size and configuration shown on the drawings and fabricated of 0.3125-inch-thick minimum steel plate, except the bottom which should be a minimum of 0.250 inch thick, suitably braced and supported. In no case shall a single steel plate wall separate filtered and unfiltered water. A double bulkhead shall be provided with free drainage from the space between, to indicate leaks.

2. Influent, effluent and waste connections shall be flanged.

3. The clarification and filtration processes shall be contained in single, rectangular steel tanks. Both production water and wastewater shall be conveyed in a single steel trough which spans the entire width of the tank. The trough shall have an integral tank overflow section that will allow the full plant design flow to run to waste without overflowing the tank.

B. Plant Process Valves

1. The treatment plant manufacturer shall furnish and install all process control valves in sizes shown on the drawings. Automatic valves for influent, Adsorption Clarifier air scour, filter effluent, filter to waste, backwash, waste, and filter air assisted backwash shall be provided for each tank.

2. Automatic valves with electric motor actuator shall be provided for process valves. Valves 1-1/ 2 inches and smaller shall be ball type with bronze body, brass ball and Teflon * seats. Valves 2 inches and larger shall be wafer butterfly valves with nylon coated ductile iron disc, EPDM seat, 316SS stem and cast-iron body. Valves shall be manufactured by Bray.

3. Motor actuators shall have 120V, 60 Hz supply. NEMA 4 enclosure. Actuators shall be manufactured by Bray.

4. A manual wafer-type butterfly valve, complete with handwheel operator, shall be provided for backwash rate setting.

5. Automatic modulating influent valves shall be provided when multiple units are to be installed.

6. The valves noted above shall be furnished by the manufacturer and shall be factory installed.

7. The Contractor shall furnish and install all valves not furnished by the manufacturer as shown on the plans. This item to include couplings, check and isolation valves, and all other manual valves for pneumatic or hydraulic service.

C. Plant Blowers

1. The treatment plant manufacturer shall furnish and install an air scour blower on each unit as shown on the plans. Low pressure air for scouring the Adsorption Clarifier and Mixed Media filter materials shall be supplied by a single-stage regenerative type blower of aluminum alloy construction. The unit shall be dynamically balanced, have a close coupled TEFC motor and inlet/outlet silencers. Additional components include an inlet filter, a high-pressure safety valve and a dirty filter indicator. Each blower shall be sized for 44 scfm @ 3.2 psi, 2 HP, 230/460 VAC, 3 phase, 60 Hz and manufactured by FPZ.

D. Pumps

1. The treatment plant manufacturer shall furnish and install one effluent and one backwash pump per unit. Pumps shall be centrifugal, end suction, close coupled with TEFC Motor. The effluent pump shall be sized for 100 gpm, 3 HP, 230/460 VAC, 3 phase, 60 Hz. The backwash pump shall be sized for 360 gpm, 10 HP, 230/460 VAC, 3 phase, 60 Hz. The pumps shall be manufactured by Goulds.

2.6 PLANT CONTROL

A. The treatment plant manufacturer shall furnish and install a process control panel and a power panel containing all necessary control functions and internal wiring. The controls shall be

completely assembled and mounted in NEMA 4/12 painted steel enclosures. The process control panel shall provide automatic starting and stopping of the unit, based on clearwell level.

B. The process control panel shall be a NEMA 4/12 painted steel, single door enclosure containing a programmable logic controller (PLC), input and output modules, power supplies, circuit breakers, surge arrestors, relays, etc., all shop wired to a marked terminal strip and tested before shipment. Mounted on the front of the control panel shall be an operator interface terminal (OIT) and ON-OFF power switch with light. The PLC shall have an Ethernet network available for external interface utilizing Ethernet/IP. The PLC shall be equal to an Allen Bradley CompactLogix. The OIT shall be equal to an Allen Bradley 10 in. Panelview Plus 7 color touchscreens.

C. The power panel shall be a NEMA 4/12 painted steel, single door enclosure containing IEC starters for the effluent pumps, air blowers, and backwash pumps and a rotary disconnect with main breaker.

D. The control panel and instruments shall be mounted on the tank with studs or on brackets mounted to the tank. All interconnecting wiring and piping to all tank mounted devices to be made by the filter manufacturer prior to shipment. All other interconnecting wiring and piping to remote mounted devices are by the contractor.

E. The control system shall provide means for initiating an automatic flush cycle for each Adsorption Clarifier section by elapsed run time, adjustable clarifier headloss pressure transmitter or push button. The clarifier transmitter shall be equipped with a local display and will allow pressure trending and initiation of the flush sequence. Analog signals shall be continuous 4-20 mA and the discrete signals shall allow for adjustable set-points. During the flush cycle, collected solids shall be removed by proper sequencing of valves and the blower. Return to service shall be automatic. An interlock shall be provided so that only one unit can be flushed at a time. A selector switch shall be provided for selecting either automatic or manual operation of each unit.

F. The control system shall provide means for initiating an automatic backwash and air scouring of each Mixed Media Filter by elapsed run time, preset filter headloss transmitter or push button. The filter transmitter shall be equipped with a local display and will allow pressure trending and initiation of the backwash sequence. The device shall also provide protection of the underdrain during backwash in the event of over-pressurization. Analog signals shall be continuous 4-20 mA and the discrete signals shall allow for adjustable set-points. An interlock shall be provided so that only one filter can backwash at a time. The control system shall automatically sequence valves, blowers, and pumps during the backwash cycle. Return to service shall be automatic.

G. The control system will also automatically initiate a backwash on effluent high turbidity and will shut the plant down and initiate an alarm should the backwash fail to substantially reduce effluent turbidity after an operator selected time delay setting.

H. A three-point clearwell level switch supplied by the contractor will stop production of water upon high level, prevent backwash on low level, and cancel backwash on low-low level.

2.7 Automatic Chemical Control

A. Chemical addition control shall be provided by the PLC in the control panel by use of an AQUARITROL® process control loop. The controller shall be capable of automatically changing chemical dosage by pacing chemical feeders to maintain plant effluent turbidity at an established setpoint. The Contractor shall provide for the services of the supplier of this equipment to provide technical direction during installation prior to plant start-up, and to accurately calibrate related equipment.

B. Control Inputs

1. Effluent Turbidity
   a. The manufacturer shall furnish and install effluent turbidimeters as shown on the plans. Each tank shall have one effluent turbidimeter with sample solenoid valve. The AQUARITROL PLC Program shall receive a 4-20 mA signal from the automatically selected filter effluent turbidimeter and shall adjust the coagulant dosage to maintain this signal at the setpoint. The unit shall also include an adjustable time lag from the point of chemical addition to the point of turbidity measurement to assure that the system is responding accurately to current treatment conditions before another change is initiated. The setpoint shall be manually adjustable by the plant operator through the OIT.
   b. The turbidity monitoring system shall include one turbidimeter per tank and one interface unit. The system shall be capable of functioning as a single or dual sensor system and shall have two 4-20 mA outputs and three setpoint alarms, each equipped with an SPDT relay with unpowered contacts.
   c. The turbidimeter shall be a microprocessor-based, continuous-reading, on-line nephelometric instrument meeting all design and performance criteria specified by USEPA Approved Hach Method 10258. The low range online laser turbidimeter consists of a Class 1 650nm (EPA) or 850 nm (ISO) laser light source and 360° x 90° detection system with predictive diagnostics designed to continuously monitor turbidity in a sample stream. The turbidimeter shall offer the choice of formazin-based (20 or 1 NTU) or instrument comparison-based calibration methods. Accuracy shall be ± 2 percent of reading from 0 to 40 NTU.
   d. The interface unit shall allow operators to control sensor and network functions with user-friendly, menu-driven software, and shall provide data logging of measurement data from one or two turbidimeters for 15-minute, 1 hour, 24 hours, 30 days, or 180 days, and the capability to transfer data to a computer or printer via direct MODBUS communications. The interface unit and internal DC power supply shall be housed in NEMA-4X (indoor) industrial metal/plastic enclosure, and the power supply shall automatically accept input in the range of 100 to 230 Vac, 50/60 Hz. All system components shall be ETL listed to UL 61010A-1, certified to CSA C22.2 No. 1010.1 and CE certified by manufacturer to EN61010-1. All system components shall be CE certified to EN 61326 (industrial levels) for immunity and emissions, Class A. All system components shall be meet FCC Part 15 for North America and Canadian Interference-Causing Equipment Regulation ICES-003 and CISPR 11 Class A levels for the rest of the world. The turbidimeter shall be Hach TU5300 sc low range turbidimeter with SC-4500 controller or equal.

C. Outputs
1. Output to the coagulant feed pumps shall be 4-20 mA to control the pump stroke (or pump speed).

2.8 POWER PANEL

A. The manufacturer shall furnish and install on the one unit (main unit) one power panel containing motor starters, protectors, and contactors for the electrical power for the blowers, effluent pumps, and backwash pumps.

2.9 JUNCTION PANEL

A. The manufacturer shall furnish and install on the one unit (secondary unit) one junction panel. This panel shall allow for interconnect for the secondary unit to the main unit.

2.10 CATHODIC PROTECTION

A. As specified in 2017 APWA Standard Specs.

2.11 FASTENERS AND LIFTING LUGS

A. Lifting Lugs: Furnish lifting lugs to facilitate field installation of tanks; locate and reinforce to enable lifting of assemblies without causing structural damage to units.

B. Fasteners: As specified in APWA Standard Specs.

2.12 FINISHES

A. Oil, grease, dirt, rust, mill scale, and foreign matter shall be removed from the interior tankage surface by a method defined by the Steel Structures Painting Council (SSPC Spec-latest revision).

B. Tank interior shall receive at the factory, one coat Tnemec Series 21-1255 (Beige) primer, or equivalent, followed by one (1) stripe coat one coat of Tnemec Series 21-WH16 (Off-White) paint, and one (1) coat of Tnemec Series 21-WH16 (Off-White) finish paint or equal, suitable for potable water service.

C. Tank exterior, except for the bottom, shall be factory painted with one coat of Tnemec Series 21-1255 (Beige) primer, or equal, followed by one coat of Tnemec Series 73-B5712 (WesTech Blue), or equal.

D. Tank bottom shall be bare, for the field placement onto a mastic base pad coating or impregnated felt to be provided and installed by the contractor.

2.13 SOURCE QUALITY CONTROL

A. Quality Requirements: Requirements for testing, inspection, and analysis as per 2017 APWA Standard Specs.

B. Assemble complete packaged water treatment plant at factory to ensure fitting of units, piping, and equipment prior to shipment.

C. Owner Witnessing: Allow witnessing of factory inspections and test at manufacturer's test facility. Notify Owner at least **seven** days before inspections and tests are scheduled.

D. Certificate of Compliance: When fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.

1. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Execution and Closeout Requirements: Requirements for installation examination as per 2017 APWA Standard Specs.

B. Verify layout and orientation of treatment unit, accessories, and piping connections.

C. Verify that foundation is installed with anchor bolts correctly located.

3.2 INSTALLATION

A. The Modular Water Treatment System shall be installed as shown on the Contract Drawings and specified herein.

B. The Manufacturer shall be present during placement of filter Mixed Media that is not pre-installed.

C. The Manufacturer shall inspect the installation of all equipment in this section prior to start-up in order to verify that the equipment has been properly installed and operates properly as a system and individually.

D. The Manufacturer after the equipment has been properly installed shall calibrate the equipment with the Owner’s operator present.

E. The Manufacturer’s representative shall be present for seven (7) days in two (2) trips of installation assistance described above.

F. Effluent quality laboratory analysis shall be provided by the Owner.

G. Installation Standards: Install Work according to 2017 APWA specs standards.

3.3 Preassembly

A. The TM-100A units will be factory preassembled with both clarifying and filter media (less anthracite) installed, plus effluent and backwash pumps, air scour blowers, valves, and instruments as listed in the specifications. Installation requirements will include proper location of the unit on the jobsite base pad, installation of anthracite coal, filter level transmitter plus

bracket, chemical feed systems, and completion of electrical and piping connections to and from the unit.

3.4 FIELD QUALITY CONTROL

A. Quality Requirements: Requirements for inspecting and testing as per 2017 APWA Standard Specs.

B. Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing as per 2017 APWA Standard Specs.

C. Startup and Performance Testing:

1. Performance Testing of Treatment Plant:

a. After field adjustments are completed, test treatment unit under operating conditions continuously for three consecutive days to demonstrate unit compliance with design criteria.
b. Test for influent and effluent suspended solids concentrations, Iron, Manganese, and turbidity. In addition, test effluent for total coliform bacteria.
c. Take one sample of influent and effluent at 8:00 AM and 4:00 PM on each of three days for total of six influent and six effluent samples.
d. Conduct sampling under supervision of manufacturer's field representative and in presence of Engineer.
e. When water treatment plant does not meet specified performance criteria within 60 days, modify system to meet performance criteria and rerun performance test; equipment modifications are subject to approval of Engineer.
f. When water treatment unit fails to meet specified performance criteria within 60 days, remove unit from Project Site and replace with unit capable of meeting performance criteria.
g. Perform tests according to Standard Methods for the Examination of Water and Wastewater.

D. Manufacturer Services:

1. Furnish services of manufacturer's representative experienced in installation of products furnished under this Specification for not less than 7 days in two trips on Site for installation, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.
2. Demonstrate equipment startup, shutdown, routine maintenance, alarm condition responses, and emergency repair procedures to Owner's personnel.

END OF SECTION 460713

SECTION 46 33 44

PERISTALTIC METERING PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Peristaltic metering pumps and accessories for Sodium Hypochlorite Disinfection.

B. Related Requirements:

1. 2017 APWA Standard Plans
2. 2017 APWA Standard Specs.

1.2 REFERENCE STANDARDS

A. U.S. General Services Administration:

1. ZZ-R-765 - Commercial Item Description: Rubber, Silicone.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with **Owner**.

1.4 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence Work to prevent interference with **Owner's operation**.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data:

1. Submit pump performance characteristics.
2. Submit electrical characteristics and connection requirements.
3. Submit manufacturer model number, dimensions, service sizes, and finishes.

C. Shop Drawings:

1. Submit detailed and certified dimensional Shop Drawings for materials and equipment, including wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details.

D. Manufacturer's Instructions:

1. Submit detailed instructions on installation requirements, including storage and handling procedures, anchoring, and layout.
2. Submit application, selection, and hookup configuration.
3. Submit hanging and support requirements and recommendations.

E. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

F. Manufacturer Reports: Indicate that equipment has been installed according to manufacturer's instructions.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

C. Operation and Maintenance Data: Submit maintenance instructions for equipment and accessories.

1.7 QUALITY ASSURANCE

A. Ensure that materials of construction on pump liquid end are compatible with chemicals listed in schedule following END OF SECTION.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept pumps on-Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Store products in areas protected from weather, moisture, or possible damage.
2. Do not store products directly on ground.

D. Handle products to prevent damage to interior or exterior surfaces.

PART 2 - PRODUCTS

2.1 PERISTALTIC-TYPE METERING PUMPS

A. Manufacturers:
1. Blue-White
2. EMD Millipore Corporation.
3. Omega Engineering, Inc.
4. ProMinent Fluid Controls, Inc.
5. Watson-Marlow Pumps Group; Spirax-Sarco Engineering Company.

B. Substitutions: **Not permitted**.

C. Furnish materials according to 2017 APWA Standard Specs an NSF/ASI 61standards.

D. Description: Self-priming peristaltic metering pump.

E. Capacity:

1. Discharge Capacity: 0.08 – 17 gph.
2. Discharge Pressure: Max of 110 psi.
3. Process Fluid Viscosity: Max of12,000 Centipoise.

F. Operation:

1. Electrical Characteristics: As specified in 2017 APWA Standard Specs and following:

a. **1/8 hp**.
b. Voltage: 115 V, **single** phase, 60 Hz.
c. Suction Lift: Max 30ft at sea level
d. Maximum operating Temperature: 14 ^{0}F to 115 ^{0}F

2. Motors: As specified in Section **400593 - Common Motor Requirements for Process Equipment**.
3. Disconnect Switch: Factory mounted **at equipment**.

G. Controls:

1. **Adjustable settings from digital keypad**.
2. Flow Direction: Toggle switches.

H. Materials:
1. As recommended by manufacturer for chemical and process fluid and dosing chemical.

2.2 ACCESSORIES

A. Tubing:

1. Material: As recommended by manufacturer for 12.5% Sodium Hypochlorite solution.

2. Size and Wall Thickness: **As indicated on pipe schedule.**
3. Pressure Rating: As indicated on **pipe schedule**.

B. Cables: 2-foot pump connecting cable with plug and 10-foot (3-m) signal input cable.

C. **Plastic** wall-mounted shelf for each pump.

D. Calibration Column:

1. **One** graduated calibration column; materials of construction compatible with chemicals being used.
2. Size calibration column for two-minute run time at maximum capacity of largest pump.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation Standards: Install Work according to 2017 APWA Standard Specs standards.

3.2 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Pre-operational Check: Before operating system or components, vent air from system to ensure water in pump.

C. Startup and Performance Testing:

1. Test metering pump flow rate by measuring time to fill or by draining calibration column with potable water.
2. Operate each chemical feed system on clear water for continuous period of four hours.
3. Hydrostatically test system piping for leaks at 11**0** psi.

D. Equipment Acceptance:

1. Adjust, repair, modify, or replace components failing to perform as specified, and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

E. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

3.3 DEMONSTRATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

C. Demonstrate system control functions and alarms.

END OF SECTION 463344

SECTION 46 41 17 01

INLINE STATIC MIXERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Inline static mixers.

1.2 DEFINITIONS

A. PVC: Polyvinyl chloride.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

B. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with **installation of process piping**.

1.5 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum **one week** prior to commencing Work of this Section.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information, including system materials, component equipment, and performance characteristics.

C. Shop Drawings:

1. Submit dimensional drawings and details.
2. Indicate schedule of equipment components.
3. Indicate materials of construction.
4. Indicate installation requirements, including fasteners and other details.
5. Indicate mounting details.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit detailed instructions regarding installation requirements, including storage and handling procedures.

F. Source Quality-Control Submittals: Indicate results of **factory** tests and inspections.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

I. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.
2. Submit manufacturer's approval of installer.

1.7 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified according to NSF 61 and 372.

B. Perform Work according to 2017 APWA Specs standards.

C. Maintain **copies** of each standard affecting Work of this Section on Site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum **three** years' **documented** experience.

B. Installer: Company specializing in performing Work of this Section with minimum **three** years **documented** experience **and approved by manufacturer**.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.10 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

A. Execution and Closeout Requirements as per 2017 APWA Standard Specs.

B. Furnish **five-**year manufacturer's warranty for static mixers.

PART 2 - PRODUCTS

2.1 INLINE STATIC MIXERS

A. Manufacturers:

1. Koflo Corporation.
2. Komax Systems, Inc.
3. Substitutions: **As per Engineer approval**.
4. Furnish materials according to 2017 APWA Specs standards.

B. Description: Fixed arrangement of stationary baffles enclosed in a pipeline.

C. Performance and Design Criteria:

1. Pipe Diameter: 3 inches.
2. Number of Elements: 3.
3. Length: 14 inches.
4. Nominal Flow Rate: 75 gpm.
5. Pressure Loss: 3.26 psi.

D. Materials:

1. Housing:

a. **CPVC; ASTM D1784**

2. Elements: **PVC; ASTM D1784**.
3. Connections:
   a. PVC: As specified in Section 400531 - Thermoplastic Process Pipe.

E. Finishes:

1. Internal Coating: **PTFE**.
2. External Coating: **None**.

2.2 SOURCE QUALITY CONTROL

A. Quality Requirements: Requirements for testing, inspection, and analysis as per 2017 APWA Standard Specs.

B. Provide shop inspection and testing of completed assembly.

C. Owner Inspection:

1. Make completed static mixer available for inspection at manufacturer's factory prior to packaging for shipment.
2. Notify Owner at least **seven** days before inspection is allowed.

D. Owner Witnessing:

1. Allow witnessing of factory inspections and test at manufacturer's test facility.
2. Notify Owner at least **seven** days before inspections and tests are scheduled.

E. Certificate of Compliance:

1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that field dimensions are as indicated on **Shop** Drawings.

C. Inspect existing flanges for nonstandard bolt-hole configurations or design and verify that static mixer and flange mate properly.

3.2 INSTALLATION

A. According to manufacturer instructions.

B. Installation Standards: Install Work according to 2017 APWA Specs standards.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

C. Equipment Acceptance:

1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

D. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

END OF SECTION 464117

SECTION 46 41 17 02

INLINE STATIC MIXERS WITH CHEMICAL INJECTION PORT AND INJECTION QUILL FOR SODIUM HYPOCHLORITE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Inline static mixers with chemical injection port and Injection Quill.

1.2 DEFINITIONS

A. PVC: Polyvinyl chloride.

1.3 REFERENCE STANDARDS

A. ASTM International:

1. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

B. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with **installation of process piping**.

1.5 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum **one week** prior to commencing Work of this Section.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information, including system materials, component equipment, and performance characteristics.

C. Shop Drawings:

1. Submit dimensional drawings and details.
2. Indicate schedule of equipment components.
3. Indicate materials of construction.
4. Indicate installation requirements, including fasteners and other details.
5. Indicate mounting details.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit detailed instructions regarding installation requirements, including storage and handling procedures.

F. Source Quality-Control Submittals: Indicate results of **factory** tests and inspections.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Manufacturer Reports: Certify that equipment has been installed according to manufacturer instructions.

I. Qualifications Statements:

1. Submit qualifications for manufacturer and installer.
2. Submit manufacturer's approval of installer.

1.7 QUALITY ASSURANCE

A. Materials in Contact with Potable Water: Certified according to NSF 61 and 372.

B. Perform Work according to 2017 APWA Specs standards.

C. Maintain **copies** of each standard affecting Work of this Section on Site.

1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum **three** years' **documented** experience.

B. Installer: Company specializing in performing Work of this Section with minimum **three** years **documented** experience **and approved by manufacturer**.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.10 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.11 WARRANTY

A. Execution and Closeout Requirements as per 2017 APWA Standard Specs.

B. Furnish **five-**year manufacturer's warranty for static mixers.

PART 2 - PRODUCTS

2.1 INLINE STATIC MIXERS WITH INJECTION QUILL

A. Manufacturers:

1. Koflo Corporation.
2. Komax Systems, Inc.
3. Substitutions: **As per Engineer approval**.
4. Furnish materials according to 2017 APWA Specs standards.

B. Description: Fixed arrangement of stationary baffles enclosed in a pipeline.

C. Performance and Design Criteria:

1. Pipe Diameter: 3 inches.
2. Number of Elements: 3.
3. Length: 23 inches.
4. Injection Port Diameter: 0.75 inches
5. Nominal Flow Rate: 75 gpm.
6. Pressure Loss: 3.26 psi.
7. Injection Quill: 3-inch Length with 45^{O} Beveled Tip.

D. Materials:

1. Housing:

    a. **CPVC; ASTM D1784**

2. Elements: **PVC; ASTM D1784**.
3. Connections:
    a. End Connection: Flanged.
    b. Injection Port: Female Threaded
    c. Injection Quill: 0.5-inch Female by 0.5-inch Male NPT

E. Finishes:

1. Internal Coating: **PTFE**.
2. External Coating: **None**.

2.2 SOURCE QUALITY CONTROL

A. Quality Requirements: Requirements for testing, inspection, and analysis as per 2017 APWA Standard Specs.

B. Provide shop inspection and testing of completed assembly.

C. Owner Inspection:

1. Make completed static mixer available for inspection at manufacturer's factory prior to packaging for shipment.
2. Notify Owner at least **seven** days before inspection is allowed.

D. Owner Witnessing:

1. Allow witnessing of factory inspections and test at manufacturer's test facility.
2. Notify Owner at least **seven** days before inspections and tests are scheduled.

E. Certificate of Compliance:

1. If fabricator is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at fabricator's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved fabricator.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Execution and Closeout Requirements: Requirements for installation examination according to 2017 APWA Specs standards.

B. Verify that field dimensions are as indicated on **Shop** Drawings.

C. Inspect existing flanges for nonstandard bolt-hole configurations or design and verify that static mixer and flange mate properly.

3.2 INSTALLATION

A. According to manufacturer instructions.

B. Installation Standards: Install Work according to 2017 APWA Specs standards.

3.3 FIELD QUALITY CONTROL

A. Quality Requirements: Requirements for inspecting and testing according to 2017 APWA Specs standards.

B. Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing according to 2017 APWA Specs standards.

C. Equipment Acceptance:

1. Adjust, repair, modify, or replace components failing to perform as specified and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.

D. Furnish installation certificate from equipment manufacturer's representative attesting that equipment has been properly installed and is ready for startup and testing.

END OF SECTION 464117

GREEN HILLS WATER & SEWER DISTRICT - MAPLE WELL WATER TREATMENT FACILITY

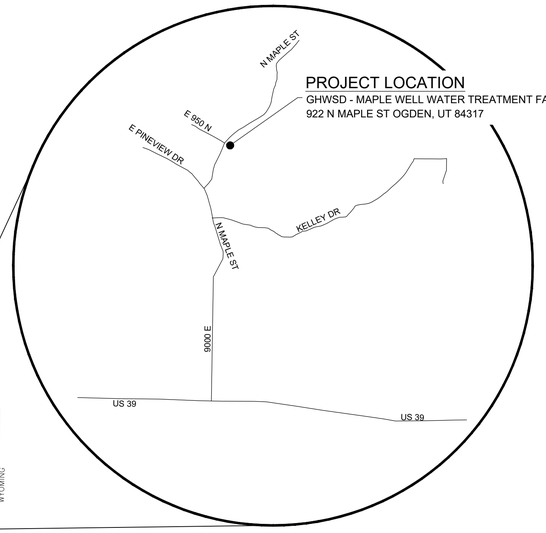
OGDEN , UTAH

WEBER COUNTY

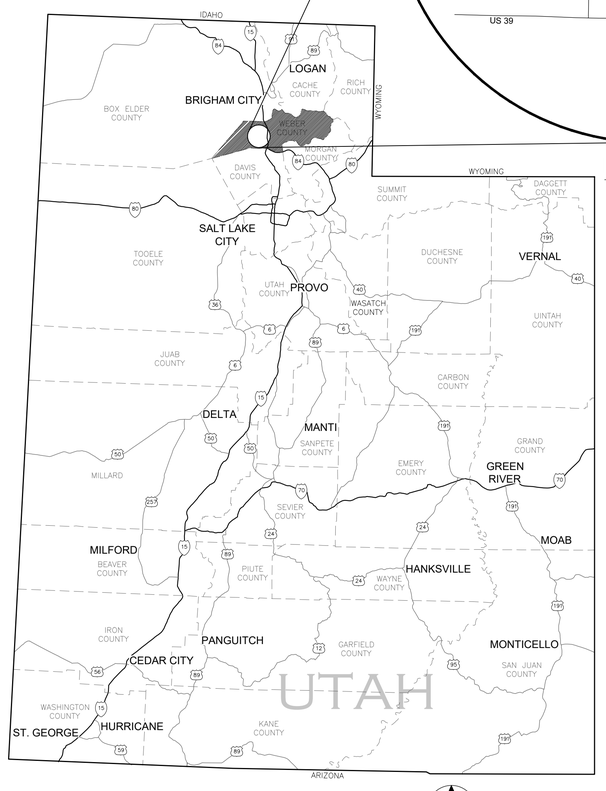
90% REVIEW SET MAY 2024

811 CALL BEFORE YOU DIG!
PRIOR TO COMMENCING UNDERGROUND WORK
DIAL: 811
WWW.BLUESTAKES.ORG

NOTE:
THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN APPROXIMATELY ONLY PRIOR TO CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INFORM ALL UTILITY COMPANIES OF THE CONSTRUCTION SCHEDULE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MAY OCCUR BY FAILURE TO EXACTLY LOCATE AND PROTECT ALL UTILITIES.



PROJECT LOCATION
GHWSD - MAPLE WELL WATER TREATMENT FACILITY
922 N MAPLE ST OGDEN, UT 84317



VICINITY MAP
NTS

LOCATION MAP
NTS



NOTICE TO CONTRACTORS

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY AND HOLD THE GREEN HILLS WATER AND SEWER DISTRICT, AND THE DESIGN CONSULTANT HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

UNAUTHORIZED CHANGES & USES: THE DESIGN CONSULTANT PREPARING THESE PLANS WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES TO OR USES OF THESE PLANS. ALL CHANGES TO THE PLANS MUST BE IN WRITING AND MUST BE APPROVED BY THE PREPARER OF THESE PLANS.

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PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34
DESIGNED BV
DRAWN BW
CHECKED CS
APPROVED CS

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

COVER SHEET

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.0

ISSUE FOR CONSTRUCTION

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P:\220583-M2234413_ACADDWG\SHEETS\GENERAL\G0.0 COVER SHEET.DWG, 6/17/2024

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P:\220583-M223413_ACADDWG\SHEETS\GENERAL\G0.1 PROCESS FLOW DIAGRAM.DWG, 6/17/2024

TURBIDITY PROBE
pH PROBE
SAMPLE TAP
FLOW METER
CHECK VALVE
CONTROL VALVE
PUMP TO WASTE
TO STORM DRAINAGE SYSTEM
EXISTING WELL
CONTROL VALVE
KMnO4 FEED PUMPS
KMnO4
FLOW METER
TREATED WATER
850 GALLON FRP TANK
TRI-MITE COAGULANT
COAGULANT FEED PUMPS
STATIC MIXER
NaClO
NaClO FEED PUMPS
TREATED WATER TO WASTE
TO LOWER KELLY DISTRIBUTION SYSTEM
NC VALVE
LOWER KELLY BOOSTER PUMP
SURGE ANTICIPATOR VALVE
MAPLE TANK BOOSTER PUMPS
BOOSTER PUMP SKID
TO MAPLE TANK CONNECT TO EXISTING PIPING
TRI-MITE POLYMER
POLYMER FEED PUMP
TRI-MITE BLOWER #1
TRI-MITE UNIT 1
TRI-MITE SKID - 1
EFFLUENT WASTE
TREATED EFFLUENT
OVERFLOW WASTE
FUTURE CONNECTION TO GREENSAND FILTER
FUTURE RETURN FROM GREENSAND FILTER
CHLORINE
FLOW METER
STATIC MIXER
SAMPLE TAP
TRI-MITE BLOWER #2
TRI-MITE UNIT 2
TRI-MITE SKID - 2
EFFLUENT WASTE
TREATED EFFLUENT
OVERFLOW WASTE
TRI-MITE SYSTEM BYPASS
TO SEWER

NOTES

EFFLUENT AND BACKWASH PUMPS HAVE BEEN REMOVED FROM EACH TRI-MITE UNIT, AND THE WESTECH SCOPE OF SUPPLY.

PROFESSIONAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34
DESIGNED BV
DRAWN BW
CHECKED CS
APPROVED CS

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

PROCESS FLOW DIAGRAM

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.1

ISSUE FOR CONSTRUCTION

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GENERAL NOTES:

1. ALL WORK ASSOCIATED WITH THIS PROJECT SHALL BE PERFORMED AND COMPLETED IN CONFORMANCE WITH THE CONTRACT DOCUMENTS, THE CONSTRUCTION DRAWINGS PERTAINING TO THIS PROJECT, AND SPECIFICATIONS AS DIRECTED BY THE ENGINEER, AND ANY APPLICABLE FEDERAL, STATE AND LOCAL REQUIREMENTS.
2. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH OSHA REGULATIONS.
3. MATERIALS REMOVED FROM THE SITE SHALL BE DISPOSED PER LOCAL, STATE AND FEDERAL REGULATIONS.
4. CONTRACTOR TO COORDINATE PARKING, MATERIAL STORAGE, EQUIPMENT STORAGE AND STAGING AREA WITH OWNER.
5. CONTRACTOR TO COORDINATE WITH UTILITY COMPANIES & PROVIDE ANY APPLICATIONS, SUBMITTALS, INSPECTION REPORTS ETC. AS REQUIRED. ALL CONSTRUCTION SHALL COMPLY WITH RESPECTIVE UTILITY COMPANY REQUIREMENTS.
6. ENTRANCE AND EXIT ROUTES TO THE PROJECT SHALL BE COORDINATED WITH OWNER. EMPLOYEES AND MATERIAL DELIVERIES SHALL BE NOTIFIED OF ENTRANCE AND EXIT ROUTES.
7. ALL SITE CONSTRUCTION AND UTILITY RELOCATION ACTIVITIES SHALL BE DONE WITHOUT DISRUPTION TO THE DAILY OPERATION OF THE WATER TREATMENT PLANT. INDIVIDUAL UNIT PROCESSES MAY BE TAKEN OFF-LINE FOR A LIMITED PERIOD OF TIME TO PERFORM CONSTRUCTION ACTIVITIES AS SPECIFIED IN THE CONTRACT DOCUMENTS. ANY UNIT PROCESS TAKEN OFF-LINE WILL BE COORDINATED THROUGH THE OWNER. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY DAMAGED UTILITIES.
8. CONTRACTOR SHALL PREPARE DEWATERING PLAN IF APPLICABLE AND SUBMIT TO OWNER FOR APPROVAL.
9. MISCELLANEOUS SMALL STRUCTURES SUCH AS SIGNS, IRRIGATION AND DRAINAGE FACILITIES, AND UTILITY POLES, LINES AND APPURTANCES, WHEN NECESSARY TO REMOVE OR DISTURB, SHALL BE REPLACED OR RECONSTRUCTED TO EQUAL TO OR BETTER THEIR CONDITION PRIOR TO DISTURBANCE.
10. CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL BUILDING PERMITS. CONTRACTOR SHALL FILE A SWPPP OR EROSION AND SEDIMENT CONTROL (ESC) PLAN PRIOR TO CONSTRUCTION. SAID PERMIT SHALL BE PRESENTED TO THE ENGINEER AT LEAST 48 HOURS PRIOR TO THE BEGINNING OF CONSTRUCTION. CONTRACTOR SHALL FILE NOTICE OF INTENT FOR PROJECT.
11. RETAIN AND PROTECT ALL FEATURES NOT DESIGNATED TO BE REMOVED OR MODIFIED.
12. APPROXIMATE LOCATIONS OF SOME KNOWN UTILITIES ARE SHOWN. THE CONTRACTOR SHALL, AT ITS OWN EXPENSE, REQUEST A LOCATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF ANY PHASE OF CONSTRUCTION. ADDITIONAL LOCATIONS IN THE SAME AREA FOR A SPECIFIC UTILITY SHOULD BE ARRANGED WITH THE INDIVIDUAL UTILITY AT THE TIME OF THE SCHEDULED "LOCATE". THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A RECORD OF THESE LOCATIONS FOR USE DURING CONSTRUCTION, AND PROVIDE RECORDS TO OWNER AFTER OWNER'S ACCEPTANCE OF THE WORK.
13. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION AND COORDINATION WITH ALL UTILITY OWNERS.
14. SIZE OF FITTINGS SHOWN ON DRAWINGS SHALL CORRESPOND TO ADJACENT STRAIGHT RUN ON PIPE, UNLESS OTHERWISE INDICATED. TYPE OF JOINT AND FITTING MATERIAL SHALL BE THE SAME AS SHOWN FOR ADJACENT STRAIGHT RUN OF PIPE.
15. THE CONTRACTOR FOR THIS CONTRACT IS RESPONSIBLE FOR COORDINATING AND PERFORMING THE CONNECTION OF THE PIPING AND ASSOCIATED APPURTANCES INSTALLED UNDER THIS CONTRACT TO BOTH THE EXISTING PIPING AND FACILITIES.
16. PRIOR TO SUBMITTING PIPING DRAWINGS FOR ANY NEW PIPE THAT IS TO CONNECT TO OR CROSS AN EXISTING PIPE OR STRUCTURE, THE CONTRACTOR SHALL EXPOSE THE EXISTING PIPE OR STRUCTURE TO VERIFY ITS EXACT LOCATION, SIZE, MATERIALS AND INVERT ELEVATIONS.
17. FOR PRESSURE GAUGES, PRESSURE SWITCHES, MAGNETIC METERS, MASS FLOWMETERS, LEVEL SENSOR, ANALYZERS, ELECTRIC MOTOR VALVE OPERATORS SHOWN ON THE MECHANICAL DRAWINGS, SEE ELECTRICAL AND INSTRUMENTATION FOR DETAILS. INSTRUMENTATION TO BE MECHANICALLY INSTALLED BY MECHANICAL CONTRACTOR. ELECTRICAL CONNECTION BY OTHERS.
18. LOCATION AND NUMBER OF PIPE HANGERS AND PIPE SUPPORTS SHOWN IS ONLY APPROXIMATE. FINAL SUPPORT REQUIREMENTS SHALL BE DETERMINED IN THE FIELD AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION. MAXIMUM SPACING SHALL NOT EXCEED PIPE MFR. RECOMMENDATIONS.
19. APPROPRIATE STANDARD WALL PIPE DETAIL SHALL BE USED WHEREVER PIPING PASSES FROM A STRUCTURE TO BACKFILL.
20. ALL FLEXIBLE CONNECTORS OR FLANGED COUPLING ADAPTERS SHALL BE PROVIDED WITH THRUST TIES, BLOCKS OR ANCHORS UNLESS OTHERWISE NOTED. THRUST PROTECTION SHALL BE ADEQUATE FOR TEST PRESSURES SPECIFIED. ALL FLEXIBLE COUPLINGS SHALL BE RESTRAINED UNLESS OTHERWISE NOTED.
21. SYMBOLS LEGENDS AND PIPE USE IDENTIFICATIONS SHOWN SHALL BE FOLLOWED THROUGHOUT THE DRAWINGS WHEREVER APPLICABLE. ALL OF THE VARIOUS APPLICATIONS ARE NOT NECESSARILY USED IN THE PROJECT.
22. ALL PIPING SPECIFIED TO BE PRESSURE TESTED (EXCEPT FLANGED, WELDED, GROOVED END OR SCREWED PIPING) SHALL BE PROVIDED WITH THRUST BLOCK PROTECTION AT ALL DIRECTION CHANGES UNLESS OTHERWISE NOTED. PRESSURE TESTING TO BE DONE AT EXPENSE OF CONTRACTOR
23. GENERAL MECHANICAL NOTES APPLY TO ALL CIVIL AND MECHANICAL DRAWINGS AND PIPING.
24. SUCTION AND DISCHARGE PIPING OF PUMPS SHALL BE INSTALLED AND SUPPORTED IN SUCH A MANNER SO THAT THEY SHALL NOT IMPART STRAIN ON PUMPS.
25. IN CASE OF A CONFLICT BETWEEN THE DRAWINGS AND TYPICAL DETAILS, THE MOST STRINGENT REQUIREMENTS SHALL GOVERN UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE ENGINEER.
26. WARNING SIGNS SHALL BE PROVIDED ON FRONT AND BACK OF ALL REMOTELY CONTROLLED EQUIPMENT.
27. CONTRACTOR IS RESPONSIBLE FOR NOTIFICATION AND COORDINATION WITH ALL UTILITY & ADJACENT PROPERTY OWNERS.
28. ALL PIPING JOINTS SHALL BE PER THE DRAWINGS, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
29. FIELD VERIFY LOCATIONS, SIZES AND CONNECTION MATERIALS OF ALL EXISTING PIPING AND EQUIPMENT BEFORE FABRICATING NEW PIPE OR RETRO FIT FOR NEW EQUIPMENT.
30. FOR DRAINAGE PLANNING REQUIREMENTS SEE OGDEN AND HUNTSVILLE STANDARD SPECIFICATIONS.
31. FOR PROCESS PIPING WHERE PIPE MATERIAL IS STAINLESS STEEL, STRAP, BRACKET, "U"-BOLT, LOCK WASHERS AND ANCHORS FOR PIPE SUPPORT TO BE STAINLESS STEEL TYPE 316. FOR CHEMICAL PIPING WHERE PIPE MATERIAL IS STAINLESS STEEL SUPPORT SYSTEM TO BE FRP WITH NONMETALLIC APPURTENANCES, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
32. ALL PIPE PENETRATIONS THROUGH FIRE RATED WALLS OR FLOORS SHALL REQUIRE FIRE STOPPING.
33. ACTUATORS SHOWN ON DRAWINGS ARE ONLY FOR EXAMPLE. REFER TO VALVE SCHEDULE FOR ACTUAL ACTUATOR.
34. PIPING IS SHOWN DIAGRAMMATICALLY ON THE DRAWINGS, NOT EVERY OFFSET, FITTING OR STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED HAS BEEN SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL MAKE MODIFICATIONS TO PIPING ALIGNMENT WHERE NECESSARY. MODIFICATIONS SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER AND SHALL BE DONE AFTER OWNER APPROVAL.
35. ALL ASPHALT AND CONCRETE SECTIONS DISTURBED DURING TRENCHING AND INSTALLATION SHALL BE REPAIRED TO EXISTING CONDITION. DETAILS INCLUDED ON DESIGN SHEETS.
36. CLEAR AND GRUB OF SITE BY CONTRACTOR.
37. ALL VALVES & INSTRUMENTS TO BE TAGGED VIA PERMANENT METALLIC RAISED LETTER TAGS ATTACHED OR VIA HANGING PLACARDS.
38. GEOTEXTILE TO BE LP12 NON-WOVEN GEOTEXTILE.
39. ANY CONNECTION TO EXISTING UTILITIES SHALL BE IN ACCORDANCE WITH RESPECTIVE REGULATIONS AND CONTRACTOR SHALL OBTAIN NECESSARY PERMITS.
40. ALL FIBERGLASS GRATING SHALL CONFORM TO GREEN HILLS WATER & SEWER DISTRICT STANDARDS
41. ALL ACCESS STAIR AND PLATFORM COMPONENTS INCLUDING TREADS, RISERS, KICK PLATES, HAND RAILS, GUARD RAILS, MIDRAILS, PLATFORMS, LANDINGS, AND OTHER APPURTENANCES SHALL COMPLY WITH OSHA STANDARDS INCLUDING BUT NOT LIMITED TO STANDARD 1926.1052, 1910.28, 1910.29, AND 1910.23. CONTRACTOR TO INFORM ENGINEER IMMEDIATELY IN WRITING OF ANY CONFLICT BETWEEN CODE AND CONSTRUCTION DRAWINGS.

CIVIL NOTES

1. RECORDED COMPACTION TESTING WILL BE PERFORMED BY CONTRACTOR'S GEOTECHNICAL REPRESENTATIVE AND PAID FOR BY THE CONTRACTOR. RESULTS OF COMPACTION TESTING WILL BE PROVIDED TO ENGINEER PRIOR TO INSTALLING STRUCTURES.
2. THE GENERAL FILL SHALL BE PLACED IN HORIZONTAL LIFTS NOT TO EXCEED 12" UNCOMPACTED THICKNESS, AND UNIFORMLY COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DRY DENSITY PER ASTM D698(SPD).
3. SUBGRADE SHALL BE PROOF ROLLED USING A FULLY LOADED DUMP TRUCK TO CONFIRM THE STABILITY OF THE EXPOSED SUBGRADE IN THE PRESENCE OF THE ENGINEER. REFER TO GEOTECHNICAL ENGINEERING REPORT FOR DETAILS.
4. NON-NATIVE FILL MATERIAL IS NOT ALLOWED WITHOUT OWNER APPROVAL.
5. STRUCTURAL FILL MATERIAL SHALL BE PLACED IN HORIZONTAL LIFTS NOT TO EXCEED 8" UNCOMPACTED THICKNESS, AND UNIFORMLY COMPACTED TO A MINIMUM OF 100% OF THE MAXIMUM DRY DENSITY PER ASTM D698(SPD).
6. SUITABILITY OF ONSITE SUBSURFACE SOILS SHALL BE CONFIRMED WITH OWNER'S GEOTECHNICAL REPRESENTATIVE.
7. PIPE TRENCHES SHALL BE EXCAVATED IN CONFORMANCE WITH THE REQUIREMENTS OF OSHA 29 CFR 1926.651 AND 1926.652 OR COMPARABLE OSHA APPROVED STATE PLAN REQUIREMENT.
8. PIPES SHALL BE BEDDED PER ASTM D 2321 AND AS SHOWN ON CIVIL DETAILS.
9. BACKFILL SHALL BE WITH NATIVE MATERIAL CONFORMING TO ASTM D 2321.
10. BACKFILL COMPACTION SHALL BE 95% OF MAXIMUM DRY DENSITY PER ASTM D698(SPD) IN LOWER ZONE.
11. ALL TEES, PLUGS, BENDS AND CAPS SHALL BE PROVIDED WITH THRUST RESTRAINT CONCRETE THRUST BLOCKING OR ENGINEER APPROVED MECHANICAL THRUST RESTRAINT.
12. DEFLECT PIPE AT JOINTS AS REQUIRED TO RAISE PIPE TO ELEVATIONS AS SHOWN AND TO MAINTAIN ALIGNMENTS. DO NOT EXCEED MAXIMUM PIPE DEFLECTIONS PER MANUFACTURER RECOMMENDATION.
13. INSTALL TRACER WIRE FOR ALL BURIED PLASTIC PIPES TO BE 14 GAUGE AND SECURELY FASTENED AT EACH END.
14. SEPARATION DISTANCES AND CROSSINGS OF POTABLE WATER AND NON-POTABLE MAINS SHALL COMPLY WITH LOCAL REVIEW AUTHORITY STANDARDS.

CONSTRUCTION STAKING NOTES:

1. CONTRACTOR TO SUPPLY ALL NECESSARY CONSTRUCTION STAKING.

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34
DESIGNED BV
DRAWN BW
CHECKED CS
APPROVED CS

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

GENERAL NOTES

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.2

ISSUE FOR CONSTRUCTION

P:\220583-M223443_ACADDWG\SHEETS\GENERAL\G0.2 GENERAL NOTES.DWG, 5/20/2024

A

AA	-AQUA AMMONIA
A/C	-AIR CONDITIONING
AFF	-ABOVE FINISHED FLOOR
AP	-AIR PROCESS
AR	-AUTO AIR RELEASE VALVE
ASME	-AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASTM	-AMERICAN SOCIETY OF TESTING MATERIALS
ATM	-ATMOSPHERE
AVAR	-AIR VACUUM AND AIR RELEASE

B

BF	-BLIND FLANGE
BFP	-BLACKFLOW PREVENTER
BLDG	-BUILDING
BOD	-BIOCHEMICAL OXYGEN DEMAND
BFV	-BUTTERFLY VALVE

C

C	-CELSIUS
CB	-CATCH BASIN
CF	-CUBIC FOOT
CFS	-CUBIC FEET PER SECOND
CI	-CAST IRON
CJ	-CONSTRUCTION JOINT
	-CONTROL JOINT
CL	-CHLORINE LIQUID
	-CHAIN LINK
	-CLEARANCE
	-CENTERLINE
CLR	-CLEAR
CMP	-CORRUGATED METAL PIPE
CMU	-CONCRETE MASONRY UNIT
CO	-CLEANOUT
CONC	-CONCRETE
CT	-CONTACT TIME
COTG	-CLEANOUT TO GRADE
CPLG	-COUPLING
CPVC	-CHLORINATED POLYVINYL CHLORIDE
CLS	-CHLORINE SOLUTION
CU	-CUBIC
CV	-CHECK VALVE
CWR	-COOLING WATER RETURN
CWS	-COOLING WATER SUPPLY
CY	-CUBIC YARD

D

DET	-DETAIL
DI	-DUCTILE IRON
DIA	-DIAMETER
DIM	-DIMENSION
DIP	-DUCTILE IRON PIPE
DO	-DISSOLVED OXYGEN
DR	-DRAIN
DS	-DRUM SCREEN
DWG	-DRAWING
DWN	-DOWN

E

(E)	-EXISTING
E	-EPOXY
ECC	-ECCENTRIC
EF	-EACH FACE
	-EXHAUST FAN
EL	-ELEVATION
EP	-EDGE OF PAVEMENT
EW	-EACH WAY
EWS	-EYE WASH STATION
EJ	-EXPANSION JOINT

F

F	-FAHRENHEIT
FCO	-FLOOR CLEAN OUT
FCV	-FLOW CONTROL VALVE
FD	-FLOOR DRAIN
FE	-FIRE EXTINGUISHER
	-FLOW ELEMENT
	-FINAL EFFLUENT
FF	-FINISH FLOOR
FG	-FINISH GATE
FH	-FIRE HYDRANT
FIN	-FINISH
FL	-FLANGE
	-FLOORING
FLG	-FLOORING
F.O.B.	-FLAT ON BOTTOM
F.O.T.	-FLAT ON TOP
FRP	-FIBERGLASS REINFORCED PLASTIC
FT	-FEET
	-FOOT
FUT	-FUTURE

G

GA	-GAGE
	-GAUGE
GAL	-GALLON
GALV	-GALVANIZED
GCO	-GROUND CLEAN OUT
GFD	-FLUX UNITS
GI	-GALVANIZED IRON
GL	-GLASS
	-GLASS LINED
GPM	-GALLONS PER MINUTE
GRV	-FINISH GRADE OF GRAVEL
GTS	-GRAVITY THICKENER SUPERNATANT
GYP	-GYPSUM

H

H/B	-HOSE BIBB
HDPE	-HIGH DENSITY POLYETHYLENE
HM	-HOLLOW METAL
HP	-HORSEPOWER
	-HIGH PRESSURE
HV	-HAND VALVE
HVAC	-HEATING AND AIR CONDITIONING
HWL	-HIGH WATER LEVEL
HWP	-HOT WATER PUMP
HWR	-HOT WATER RETURN
HWS	-HOT WATER SUPPLY

I

ID	-INSIDE DIAMETER
IE	-INVERT ELEVATION
IN	-INCH
INS	-INSERT
IS	-INERT SOLIDS

J

JT	-JOINT

K

KW	-KILOWATT
KWH	-KILOWATT HOUR

L

LB	-POUND
LBS/DAY	-POUNDS PER DAY
LF	-LINEAL FOOT
LIT	-LEVEL INDICATOR TRANSDUCER
LSH	-LEVEL SWITCH HIGH
LSL	-LEVEL SWITCH LOW
LSLL	-LEVEL SWITCH LOW LOW
LWL	-LOW WATER LEVEL

M

M	-METER
	-MALE (PIPE THREAD)
	-MOTOR
MAG	-MAGNETIC
MCC	-MOTOR CONTROL CENTER
MFR	-MANUFACTURER
MGD	-MILLION GALLONS PER DAY
MGL	-MILLIGRAM PER LITTER
MH	-MANHOLE
MISC	-MISCELLANEOUS
MJ	-MECHANICAL JOINT
ML	-MIXED LIQUOR
MM	-MILLIMETER
MTR	-MOTOR
MX	-MIXER

N

(N)	-NEW
N	-NORTH
NC	-NORMALLY CLOSED
NEMA	-NATIONAL ELECTRICAL MANUFACTURERS
NG	-NATURAL GAS
NO	-NORMALLY OPEN
NPS	-NOMINAL PIPE SIZE
NPT	-NATION PIPE THREAD
NTS	-NOT TO SCALE
NTU	-NEPHELMETRIC TURBIDITY UNITS

O

OA	-ODOROUS AIR
OC	-ON CENTER
OD	-OUTSIDE DIAMETER
	-OVERALL DIAMETER
OF	-OVERFLOW

P

P	-PHOSPHOROUS
	-PUMP
PA	-PROCESS AIR
PDR	-POND DRAIN
PE	-PRIMARY EFFLUENT
	-PLANT EFFLUENT
	-POLYELECTROLYTE
	-POLYMER
PG	-PRESSURE GAUGE
PH	-HYDROGEN ION CONCENTRATION
PI	-PLANT INFLUENT
	-POINT OF INTERSECTION
	-PRESSURE INDICATOR
PPD	-POUND PER DAY
PRE	-PRIMARY EFFLUENT
PRMT	-PERMEATE
PRV	-PRESSURE REGULATING
	-PRESSURE RELIEF
	-PRESSURE REDUCING VALVE
PS	-PRESSURE SWITCH
	-PRESSURE SEWER
PSH	-PRESSURE SENSORS
PSI	-POUNDS PER SQUARE INCH
PSIG	-POUNDS PER SQUARE INCH GAUGE
PVC	-POLYVINYL CHLORIDE

Q

QTY	-QUANTITY

R

RB	-RUBBER WALL BASE
RAS	-RETURN ACTIVATED SLUDGE
RCP	-REINFORCED CONCRETE PIPE
RED	-REDUCER
	-REDUCING
RI	-RAPID INFILTRATION
RO	-ROUGH OPENING
RM	-ROOM
RS	-RECIRCULATED SLUDGE
RSD	-RECIRCULATED SEPARATOR DRAIN

S

S	-SOUTH
	-SCUM
	-SINK
	-SECOND
	-SLOPE
SA	-SAMPLE
SCFM	-STANDARD CUBIC FEET PER MINUTE
SDR	-STORM DRAIN
SE	-SECONDARY EFFLUENT
SHT	-SHEET
SIM	-SIMILAR
SPECS	-SPECIFICATIONS
SRE	-STRUVITE REACTOR EFFLUENT
SS	-SANITARY SEWER
	-STAINLESS STEEL
	-SERVICE TANK
SST	-STAINLESS STEEL TUBING
STD	-STANDARD
STA	-STATION
STH	-STRUVITE HARVEST
STL	-STEEL

T

T	-THERMOSTAT
	-TREAD OF STAIR
	-TANGENT
	-TOP
TC	-TOP OF CURB
TE	-TERTIARY EFFLUENT
TEMP	-TEMPERATURE
	-TEMPORARY
T&G	-TONGUE AND GROOVE
TK	-TANK
TOC	-TOP OF CONCRETE
TOF	-TOP OF FOUNDATION
TOG	-TOP OF GROUT
TOW	-TOP OF WALL
TRANS	-TRANSMITTANCE
TSS	-TOTAL SUSPENDED SOLIDS
TYP	-TYPICAL

U

UH	-UNIT HEATER
UL	-UNDERWRITERS LABORATORIES
UV	-ULTRA VIOLET
UW	-UTILITY WATER (NONPOTABLE)

V

VCT	-VINYL COMPOSITE TILE
VERT	-VERTICAL
VIF	-VERIFY IN FIELD
VOL	-VOLUME
VSS	-VOLATILE SUSPENDED SOLIDS
VTC	-VENT TO CEILING
VTR	-VENT THRU ROOF

W

W	-POTABLE WATER
	-WEST
W/	-WITH
WAS	-WASTE ACTIVATED SLUDGE
WCO	-WALL CLEAN OUT
W/O	-WITHOUT
WOG	-WATER/OIL/GAS WORKING PRESSURE
WPR	-WASHER COMPACTOR
WSE	-WATER SURFACE ELEVATION
WSP	-WELDED STEEL PIPE
WWP	-WATER WORKING PRESSURE

Y

YD	-YARD
YR	-YEAR

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PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34
DESIGNED BV
DRAWN BW
CHECKED CS
APPROVED CS

REVISIONS

NO.	DATE

ARDURRA
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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

GENERAL ABBREVIATIONS

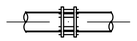
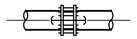
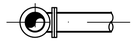
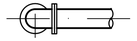
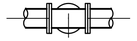
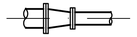
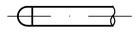
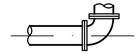
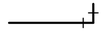
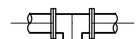
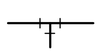
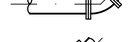
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.3

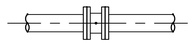
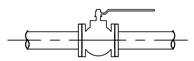
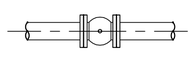
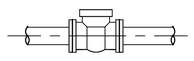
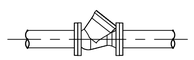
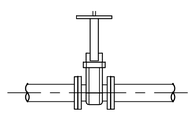
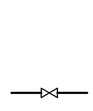
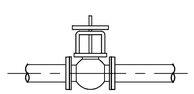
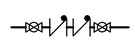
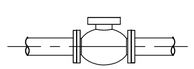
ISSUE FOR CONSTRUCTION

GENERAL LEGEND AND NOTES

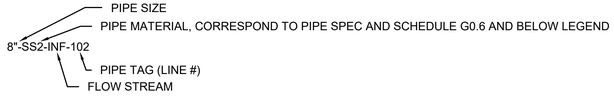
PIPE AND FITTING SYMBOLS

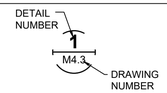
DOUBLE LINE	SINGLE LINE	
		FLEXIBLE COUPLING
		FLEXIBLE COUPLING WITH THRUST TIES
		STEEL BELLOWS EXP JOINT
		ELASTOMER BELLOWS EXP JOINT
		ELBOW UP
		ELBOW DOWN
		TEE UP
		TEE DOWN
		LATERAL UP
		LATERAL DOWN
		CONCENTRIC REDUCER
		CAP
		ELBOW, 90 DEGREE
		CROSS
		TEE
		ELBOW, 45 DEGREE
		LATERAL

VALVE SYMBOLS & NUMBERS

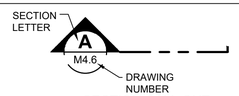
DOUBLE LINE SYMBOL	SINGLE LINE SYMBOL	TYPE	VALVE NUMBER
		BUTTERFLY	V-100 +
		BALL	V-200 +
		ECCENTRIC PLUG	V-300 +
		SWING CHECK	V-400 +
		BALL CHECK	V-400 +
		GATE	V-500 +
		KNIFE GATE	V-600 +
		GLOBE	V-700 +
		PRESSURE / VACUUM RELEASE	V-800 +
		AIR AND / OR VACUUM RELEASE	V-800 +
		BACKFLOW PREVENTOR	V-900 +
		HOSE BIBBS	V-1000 +
		REGULATED SIDE PRESSURE CONTROL	V-1100 +
		SAMPLE	

EXAMPLE FLOW TEXT

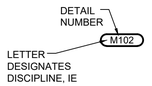




DETAIL CALL OUT

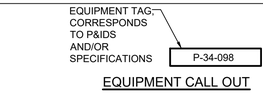


SECTION CALL OUT

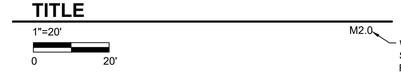


STANDARD DETAIL CALL OUT

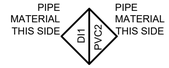
REFER TO DETAIL DRAWINGS



EQUIPMENT CALL OUT



PLAN/SECTION/DETAIL TITLE



PIPE MATERIAL TRANSITION

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P:\220583-M223443_ACADDWG\SHEETS\GENERAL\G0.4 GENERAL LEGEND.DWG, 5/20/2024

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	BV
DRAWN	BW
CHECKED	CS
APPROVED	CS

REVISIONS NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

GENERAL LEGEND

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.4

ISSUE FOR CONSTRUCTION

PIPE SCHEDULE

PIPE GROUP	NAME	WALL THICKNESS	REQUIREMENTS	JOINTS AND FITTINGS	REMARKS
DUCTILE IRON					
DI1	DUCTILE IRON PIPE		LINING: CEMENT LINED TO ANSI/AWWA C-104/A21.4 (PIPE AND FITTINGS)	FLANGED OR GROOVED AS SHOWN FOR EXPOSED SERVICE. MECHANICAL JOINT OR FLANGED AS SHOWN FOR BURIED SERVICE. ALL BURIED PIPE TO BE PROVIDED WITH RESTRAINED JOINTS AT EACH FITTING AND JOINT. COMPACT FITTINGS TO BE USED UNLESS SPECIFICALLY CALLED OUT OTHERWISE.	EXPOSED SERVICE: PAINTED WITH POLYAMINE EPOXY (COLOR TO MATCH CODED SERVICE OR AS SELECTED BY OWNER)
			BURIED SERVICE: DUCILE IRON PIPE CENTRIFUGALLY CAST TO ASNI/AWW C-151/A 21.51 AND 51.3 FO TYPE 4 TRENCH, 250 PSI MINIMUM WORKING PRESSURE. ALL BURIED JOINTS TO BE PROVIDED WITH RESTRAINED JOINTS UNLESS SPECIFICALLY CALLED OUT OTHERWISE.	RESTRAINED JOINTS: FOR PIPING 24 INCHES AND BELOW USE EITHER A PROPRIETARY RESTRAINED JOINT OR DUCTILE IRON MECHANICAL JOINT ANCHOR GLAND FOLLOWER. FOR PIPING SIZES GREAER THAN 24 INCHES, USE PROPRIETARY RESTRAINED JOINTS.	BURIED SERVICE, POLYETHYLENE WRAPPED
					GASKETS: FULL FACE 1/8" THICK, NEOPRENE RUBBER, 55-65 DUROMETER HARDNESS, OR EQUAL, WITH DIMENSIONS PER ANSI B16.21
				PUSH-ON: AWWA C110/A21.10 AND C111/A21.11 GRAY OR DUCTILE IRON, 250 PSI MIN WORKING PRESSURE.	TAPPED HOLES: NOMINAL HOLE SIZE SHALL BE NO LARGER THAN 1/6 THE NOMINAL SIZE OF PIPE. ALL TAPPED HOLES SHALL BE SHOP MADE, EXCEPT WITH THE PERMISSION OF THE ENGINEER.
				MECHANICAL: AWWA C110/A21.1, C111/A21.11 AND C153/A21.53 GRAY OR DUCTILE IRON, 250 PSI MIN WORKING PRESSURE.	
				PROPRIETARY RESTRAINED: AWWA C111/A21.11 AND C153/A21.53 DUCTILE IRON, 250 PS MIN WORKING PRESSURE.	
			EXPOSED SERVICE: DUCTILE IRON PIPE CENTRIFUGALLY CAST TO ANSI/AWWA C-151/A21.21 STANDARDS CLASS 53 MINIMUM CONFORMING TO TABLE 51.7, 250 PSI MINIMUM WORKING PRESSURE.	GROOVED END: AWWA C606 (RIGID TYPE RADIUS CUT) AND C110/A21.10, DUCTILE IRON, 250 PSI MIN WORKING PRESSURE.	
				FLANGED: AWWA C110/A21.10, ANSI B16.1, DUCTILE IRON, FACED AND DRILLED, 125-POUND FLAT FACE OR ANSI B16.1 250-POUND RAISED FACE. GRAY CAST IRON WILL NOT BE ALLOWED.	
PLASTIC					
PVC2	SCH 80 PVC	SCH 80	PVC CLASS 12454-B, ASTM D-1785, SCHEDULE 80 PLAIN ENDS 1/2" THROUGH 4"	FITTINGS: PVC CLASS 12454-B, ASTM 1785 SCHEDULE 80, PLAN ENDS 1/2" THROUGH 8" TO BE ESLON, SPEARS, HARVEL OR EQUAL.	WHEN INSTALLING PIPE WITH A FLANGE TO A BUTTERFLY VALVE, THE CONTRACTOR SHALL VERIFY CLEARANCES BETWEEN THE INSIDE OF THE PIPE AND THE VALVE DISC. WHEN NECESSARY, CONTRACTOR MUST GRIND THE INSIDE RADIUS OF THE PIPE TO ENSURE PROPER VALVE OPERATION.
				UNIONS: PVC CLASS 12454-B, ASTM D2467, SCHEDULE 80, SOCKET ENDS, 3" AND SMALLER.	FOR ALL THREADED CONNECTIONS, CONTRACTOR MUST APPLY LEAK LOCK TO THE THREADS PRIOR TO ASSEMBLY. LEAK LOCK IS MANUFACTURED BY HIGHSIDE CHEMICAL INC. THE USE OF TEFLON TAPE IS NOT ALLOWED.
				FLANGES: 150 LB. ANSI B.5 PVC CLASS 12454-B SOCKEYE TYPE, 1/2" THROUGH 3"; VANSTONE TYPE 4" AND ABOVE.	PAINTING: FOR OUTDOOR APPLICATIONS, PVC PIPING SYSTEM TO BE PAINTED AFTER INSTALLATION AND TESTING WITH AN APPROVED PAINT SYSTEM FOR UV PROTECTION.
				BOLTING: STANDARD HEXAGON HEAD FULL OR PARTIAL THREADED BOLTS, AS ASSEMBLY REQUIRES, CARBON STEEL, ANSI B18.2 ASTM A307, GRADE B, WITH ONE HEAVY SEMI-FINISHED HEX NUT AND TWO PLAIN TYPE A WASHER, ANSI B27.2 PER BOLT. CADMIUM OR ZINC PLATED SUBMERGED.	
PVC6	C900	SDR14	ASTM F477 ASTM D3139	INTEGRAL BELLS SHALL INCORPORATE LOCKED IN ELASTOMERIC GASKETS MEETING THE REQUIREMENTS OF ASTM D3212 AND F477	STANDARD LAYING LENGTHS SHALL BE 14' AND/OR 20' FOR ALL SIZES. PIPE AND FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321 AND MANUFACTURER'S RECOMMENDATIONS (MORE STRICT GOVERNS).

PIPE NOTES

DIAPHRAGM SEAL
ASHCROFT TYPE 100 CAPSULE WITH 1-INCH THREADED FEMALE CONNECTION TO PROCESS LINE WITH FLUSHING CONNECTION. 316 SST DIAPHRAGM AND BOTTOM HOUSING AND ½-INCH INSTRUMENT CONNECTION. GLYCERIN FILL

EXPANSION JOINTS - GENERAL PURPOSE
ALL PUMPS AND BLOWERS SHALL BE PROVIDED WITH EXPANSION JOINTS ON BOTH THE SUCTION AND DISCHARGE PIPING AS SHOWN ON THE DRAWINGS (EXCEPT THE BLOWER DISCHARGE). CONTRACTOR TO PROVIDE POLYURETHANE EXPANSION JOINTS WITH THE FOLLOWING PRESSURE RATINGS: JOINT SIZES 1 INCH TO 4 INCH MAXIMUM WORKING PRESSURE OF 140 PSI AND TEST PRESSURE OF 248 PSI, SIZES 5 INCH TO 12 INCH MAXIMUM WORKING PRESSURE 140 PSI AND TEST PRESSURE OF 210 PSI, SIZE 14 INCH MAXIMUM WORKING PRESSURE 85 PSI AND TEST PRESSURE OF 128 PSI, SIZES 16 INCHES TO 24 INCHES MAXIMUM WORKING PRESSURE 65 PSI AND TEST PRESSURE OF 98 PSI, SIZES 28 INCH AND UP MAXIMUM WORKING PRESSURE 55 PSI AND TEST PRESSURE OF 83 PSI. ALL JOINTS TO HAVE WORKING TEMPERATURE UP TO 300 °F. ALL JOINTS INSTALLED WITH MANUFACTURER RECCOMENDED MINIMUM NUMBER OF CONTROL RODS. JOINT SHALL BE DESIGNED TO THE FLUID SEALING ASSOCIATION (FSA) DESIGN STANDARD AND FLANGES SHALL BE DESIGNED TO MEET ANSI CLASS 125. MATERIAL OF CONSTRUCTION SHALL BE POLYURETHANE WITH 316 STAINLESS STEEL RETAINING RINGS AND CONTROL RODS. EXPANSION JOINTS SHALL BE MODEL J-1 AND REDUCING EXPANSION JOINTS SHALL BE MODEL J-10 MANUFACTURED BY RED VALVE.

EYEWASH AND OVERHEAD SHOWER
EMERGENCY EYE/FACE WASH AND SHOWER SHALL BE HAWS MODEL 8200 SERIES, SHOWER HEAD 8127FC WITH SHOWER VALVE SP260, 28" PULL ROD SP200, EYE/FACE WASH ASSEMBLY SP70 WITH DUST COVER 9090, AND UNIVERSAL SIGN MODEL SP178.

IDENTIFICATION OF PIPING
EXCEPT AS INDICATED FOR VERY SHORT PIPE LENGTHS,IDENTIFY EXPOSED PIPING LARGER THAN 2-INCHES NOMINAL SIZE FOR THE PIPE CONTENTS AND DIRECTION OF FLOW. PIPE INDENTIFICATION SHALL BE AS MANUFACTURED BY BRADY, SETON, OR OWNER APPROVED EQUAL. MARKER TYPE: ADHESIVE - VINYL OR POLYESTER SHEET WITH UV-RESISTANT INK, SHAPED SIMILAR TO PIPE CURVATURE AND COATED WITH PRESSURE SENSITIVE ADHESIVE. MARKER AREA: SIZED PER PIPE SIZE ACCORDING TO ANSI A13.1; COLOR FROM THE PIPE SCHEDULE. LETTERING: SIZED PER PIPE SIZE ACCORDING TO ANSI A13.1; COLOR FROM THE PIPE SCHEDULE. ARROWS: AT LEAST 2 ARROWS AT EACH MARKER AREA, SHOWING DIRECTION OF FLOW. PIPE 2-INCHES AND SMALLER SHALL BE IDENTIFIED BY PLASTIC PLATES MADE FROM LAMINATED 3 LAYER PLASTIC WITH ENGRAVED BLACK LETTERS ON WHITE BACKGROUND.

PRESSURE GAUGES
HIGH ACCURACY PRESSURE GAUGES WITH 6" ADJUSTABLE DIAL 100PSI-PRESSURE RANGE PER ENGINEER'S SPECIFICATIONS (SEE P&ID'S).

PVC
ALL PVC PIPE SHALL BE MADE IN ACCORDANCE WITH ASTM D1785 FROM A PVC COMPOUND CONFORMING TO A CELL CLASSIFICATION OF 12454 AS DEFINED BY ASTM D1784.
BELLED END SOLVENT WELD PIPE SHALL MEET THE REQUIREMENTS OF ASTM D2672 WHEN INSTALLED IN ACCORDANCE WITH ASTM D2855
ELASTOMERIC SEAL (GASKET) SHALL BE IN ACCORDANCE WITH ASTM F477

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P:\220583-M2234413_ACADDWG\SHEETS\GENERAL\G0.5 PIPE SCHEDULE AND NOTES.DWG, 5/20/2024

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	BV
DRAWN	BW
CHECKED	CS
APPROVED	CS

NO.	REVISIONS	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

PIPE SCHEDULE AND NOTES

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.5

ISSUE FOR CONSTRUCTION

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P:\220583-M223413_ACADDW\SHEETS\GENERAL\G0.7 VALVE SCHEDULE AND NOTES.DWG, 5/20/2024

VALVE SCHEDULE

TAG ID	VALVE TYPE	SERVICE	SIZE (IN)	OPERATOR	SCOPE OF SUPPLY
V-101	BUTTERFLY	INFLUENT	3	ELECTRIC - MODULATING	WES-TECH
LCV-102	BUTTERFLY	TRI-MITE EFFLUENT	3	ELECTRIC - MODULATING	WES-TECH
V-103	BUTTERFLY	BACKWASH INLET	3	ELECTRIC - OPEN/CLOSE	WES-TECH
V-104	BUTTERFLY	WASTE	6	ELECTRIC - OPEN/CLOSE	WES-TECH
V-105	BUTTERFLY	AC AIR SCOUR	2	ELECTRIC - OPEN/CLOSE	WES-TECH
V-106	BUTTERFLY	FILTER AIR SCOUR	2	ELECTRIC - OPEN/CLOSE	WES-TECH
LCV-108	BUTTERFLY	FILTER TO WASTE	3	ELECTRIC - MODULATING	WES-TECH
HCV-009	BUTTERFLY	BACKWASH RATE CONTROL	3	MANUAL, HANDWHEEL	WES-TECH
V-107	SWING CHECK	AC AIR CHECK	2	NONE	WES-TECH
V-108	SWING CHECK	FILTER AIR CHECK	2	NONE	WES-TECH
V-109	SWING CHECK	INFLUENT CHECK	3	NONE	WES-TECH
SV-102	SOLENOID VALVE	EFFLUENT PUMP TO WASTE	3	NONE	WES-TECH
SV-110	SOLENOID VALVE	AIR SCOUR	2	NONE	WES-TECH
V-201	BUTTERFLY	INFLUENT	3	ELECTRIC - MODULATING	WES-TECH
LCV-202	BUTTERFLY	TRI-MITE EFFLUENT	3	ELECTRIC - MODULATING	WES-TECH
V-203	BUTTERFLY	BACKWASH INLET	3	ELECTRIC - OPEN/CLOSE	WES-TECH
V-204	BUTTERFLY	WASTE	6	ELECTRIC - OPEN/CLOSE	WES-TECH
V-205	BUTTERFLY	AC AIR SCOUR	2	ELECTRIC - OPEN/CLOSE	WES-TECH
V-206	BUTTERFLY	FILTER AIR SCOUR	2	ELECTRIC - OPEN/CLOSE	WES-TECH
LCV-208	BUTTERFLY	FILTER TO WASTE	3	ELECTRIC - MODULATING	WES-TECH
HCV-010	BUTTERFLY	BACKWASH RATE CONTROL	3	MANUAL, HANDWHEEL	WES-TECH
V-207	SWING CHECK	AC AIR CHECK	2	NONE	WES-TECH
V-208	SWING CHECK	FILTER AIR CHECK	2	NONE	WES-TECH
V-209	SWING CHECK	INFLUENT CHECK	3	NONE	WES-TECH
SV-202	SOLENOID VALVE	EFFLUENT PUMP TO WASTE	3	NONE	WES-TECH
SV-210	SOLENOID VALVE	AIR SCOUR	2	NONE	WES-TECH
V-300	PRESSURE RELIEF	GROUNDWATER	2	HANDLE	CONTRACTOR
V-301	SWING CHECK	GROUNDWATER	3	HANDLE	CONTRACTOR
V-302	ELECTRIC BUTTERFLY CONTROL VALVE	GROUNDWATER	3	ELECTRIC - OPEN/CLOSE	CONTRACTOR
V-303	BALL, 1/4"-4"	GROUNDWATER	1/2	HANDLE	CONTRACTOR
V-304	ELECTRIC BUTTERFLY CONTROL VALVE	GROUNDWATER	3	V	CONTRACTOR
V-305	BALL, 1/4"-4"	POTASSIUM PERMANGANATE	3/4	HANDLE	CONTRACTOR
V-306	BALL, 1/4"-4"	POTASSIUM PERMANGANATE	1/2	MANUAL, HANDWHEEL	WES-TECH
V-307	SWING CHECK	POTASSIUM PERMANGANATE	3/4	HANDLE	CONTRACTOR
V-308	BALL, 1/4"-4"	POTASSIUM PERMANGANATE	3/4	HANDLE	CONTRACTOR
V-309	BALL, 1/4"-4"	FUTURE CHEM ADJ	3/4	HANDLE	CONTRACTOR
V-310	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-311	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-312	PRESSURE RELIEF	INFLUENT GROUNDWATER	3	HANDLE	CONTRACTOR
V-313	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-314	PRESSURE RELIEF	INFLUENT GROUNDWATER	1	HANDLE	CONTRACTOR
V-315	BALL, 1/4"-4"	FERRIC CHLORIDE (COAGG)	1/2	HANDLE	WES-TECH
V-316	BALL, 1/4"-4"	FERRIC CHLORIDE (COAGG)	1/2	MANUAL, HANDWHEEL	CONTRACTOR
V-317	SWING CHECK	FERRIC CHLORIDE (COAGG)	3/4	HANDLE	CONTRACTOR
V-318	BALL, 1/4"-4"	FERRIC CHLORIDE (COAGG)	3/4	HANDLE	CONTRACTOR
V-319	BALL, 1/4"-4"	FUTURE CHEM ADJ	3/4	HANDLE	CONTRACTOR
V-320	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-321	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-322	BUTTERFLY	INFLUENT GROUNDWATER	3	HAND LEVER	CONTRACTOR
V-323	BALL, 1/4"-4"	POLYMER	3/4	HANDLE	CONTRACTOR
V-324	BALL, 1/4"-4"	POLYMER	3/4	HANDLE	CONTRACTOR
V-325	BALL, 1/4"-4"	POLYMER	3/4	HANDLE	CONTRACTOR
V-326	BALL, 1/4"-4"	POLYMER	3/4	HANDLE	CONTRACTOR
V-327	BUTTERFLY	BACKWASHWATER	4	HAND LEVER	CONTRACTOR
V-328	BALL, 1/4"-4"	TRI-MITE INFLUENT	1	HAND LEVER	CONTRACTOR
V-329	BUTTERFLY	BACKWASHWATER	4	HAND LEVER	CONTRACTOR
V-330	GATE	BACKWASHWATER	4	HAND LEVER	CONTRACTOR
V-331	RPZ BACKFLOW	POTABLE WATER FROM CITY	4	HANDLE	CONTRACTOR
V-332	SWING CHECK	POTASSIUM PERMANGANATE	1/2	HANDLE	CONTRACTOR
V-333	SWING CHECK	POLYMER	1/2	HANDLE	CONTRACTOR
V-334	BUTTERFLY	POTABLE WATER FROM CITY	4	HAND LEVER	CONTRACTOR
V-335	BUTTERFLY	POTABLE WATER FROM CITY	4	HAND LEVER	CONTRACTOR
V-336	BALL, 1/4"-4"	SHOWER WATER	3/4	HAND LEVER	CONTRACTOR
V-337	BALL, 1/4"-4"	TRI-MITE EFFLUENT	1	HAND LEVER	CONTRACTOR
V-338	BUTTERFLY	TR-MITE EFFLUENT	3	HAND LEVER	CONTRACTOR
V-339	BUTTERFLY	TR-MITE EFFLUENT	3	HAND LEVER	CONTRACTOR
V-340	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-341	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	1/2	HANDLE	CONTRACTOR
V-342	SWING CHECK	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-343	PRESSURE RELIEF	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-344	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-345	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-346	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	1/2	HANDLE	CONTRACTOR
V-347	SWING CHECK	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-348	PRESSURE RELIEF	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-349	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-350	VENTED BALL VALVE, 1/2"-3/4"	SODIUM HYPOCHLORITE	3/4	HANDLE	CONTRACTOR
V-351	BALL, 1/4"-4"	FUTURE CHEM ADJ	3/4	HANDLE	CONTRACTOR
V-352	BUTTERFLY	POTABLE WATER	4	HANDLE	CONTRACTOR
V-353	GATE	POTABLE WATER	4	HANDLE	CONTRACTOR
V-354	BUTTERFLY	POTABLE WATER	4	HANDLE	CONTRACTOR
V-355	GATE	POTABLE WATER	4	HANDLE	CONTRACTOR
V-356	SURGE ANTICIPATOR	POTABLE WATER	4	NONE	TIGERFLOW PUMP SKID
V-357	GATE	POTABLE WATER	4	HANDLE	CONTRACTOR
V-501	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-502	SWING CHECK	POTABLE WATER	2 1/2	NONE	TIGERFLOW PUMP SKID
V-503	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-504	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-505	SWING CHECK	POTABLE WATER	2 1/2	NONE	TIGERFLOW PUMP SKID
V-506	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-507	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-508	SWING CHECK	POTABLE WATER	2 1/2	NONE	TIGERFLOW PUMP SKID
V-509	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-510	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID
V-511	SWING CHECK	POTABLE WATER	2 1/2	NONE	TIGERFLOW PUMP SKID
V-512	BUTTERFLY	POTABLE WATER	2 1/2	HANDLE	TIGERFLOW PUMP SKID

NOTES: ADDITIONALLY, VALVES THAT ARE SUPPLIED INTEGRAL TO ANOTHER PIECE OF EQUIPMENT ARE NOT LISTED HERE.

VALVE SPECIFICATIONS

VALVE TYPE	REQUIREMENTS
BUTTERFLY	VALVES 6-INCH AND SMALLER ARE RESILIENT SEATED, LEVER-OPERATED. VALVES SHALL BE WAFER STYLE. SIZED FOR ANSI 150 OR PN10 FLANGE PATTERNS. PRESSURE RATING SHALL BE 150 PSI WOG. MINIMUM. THE BODIES SHALL BE PVC WITH PVC DISC. THE SEAT/LINER SHALL BE EPDM AND SHALL PREVENT PROCESS FLUID FROM COMING IN CONTACT WITH THE BODY. STEM SHALL BE 316 STAINLESS STEEL. OPERATOR SHALL BE 19-POSITION LEVER. ACCEPTABLE PRODUCTS INCLUDE HAYWARD BYV SERIES, OR APPROVED EQUAL.
GATE VALVE	GATE VALVES SHALL HAVE PVC BODY WITH FLANGED END CONNECTION. THE SEAT/LINER SHALL BE EPDM. ACCEPTABLE PRODUCTS INCLUDE SPEARS 2023-030 OR APPROVED EQUAL.
BALL VALVE, 1/4"-4"	1/4" - 4" SIZES STANDARD PVC FULL PORT BALL VALVE WITH SOCKET ENDS FOR USE ON PVC PIPE. ACCEPTIBLE PRODUCTS INCLUDE SPEARS TRUE UNION 2000 PVC, HAYWARD TBH SERIES TRUE UNION BALL VALVE, OR APPROVED EQUAL.
VENTED BALL VALVE, 1/2"-3/4"	1/2" - 3/4" SIZES STANDARD PVC FULL PORT BALL VALVE WITH FLANGED ENDS FOR USE ON PVC PIPE. ACCEPTIBLE PRODUCTS INCLUDE HAYWARD TBH SERIES WITH Z BALL TRUE UNION BALL VALVE, OR APPROVED EQUAL.
ECCENTRIC PLUG VALVE	END CONNECTIONS SHALL BE FLANGED. PRESSURE RATING SHALL BE 150 PSI MINIMUM. THE BODIES SHALL BE 316 STAINLESS STEEL AND THE LINER SHALL BE EPDM. ACCEPTIBLE PRODUCTS INCLUDE DEZURIK PEC ECCENTRIC PLUGE VALVES, OR APPROVED EQUAL.
SWING CHECK	VALVES ARE PVC BODY ASTM D1784 AND COVER WITH EPDM. END CONNECTIONS SHALL BE FLANGED. PRESSURE RATING SHALL BE 150 PSI MINIMUM. ACCEPTABLE PRODUCTS INCLUDE HAYWARD SW SERIES OR EQUAL.
PRESSURE RELIEF VALVE	VALVES ARE PVC BODY ASTM D1784 AND COVER WITH EPDM. END CONNECTIONS SHALL BE THREADED. PRESSURE RATING SHALL BE 150 PSI MINIMUM. ACCEPTABLE PRODUCTS INCLUDE HAYWARD RV SERIES OR EQUAL.
PRESSURE REDUCING VALVE	THE PRESSURE REDUCING VALVE AUTOMATICALLY REDUCES A HIGHER INLET PRESSURE TO A STEADY LOWER DOWNSTREAM PRESSURE. VALVES ARE PVC BODY AND COVER WITH EPDM. PRESSURE RATING SHALL BE 150 PSI MINIMUM. ACCEPTABLE PRODUCTS INCLUDE WATTS LF127W OR EQUAL.
RPZ BACKFLOW	REDUCED PRESSURE ZONE ASSEMBLY BACKFLOW PREVENTERS ARE DESIGNED TO PREVENT THE REVERSE FLOW OF POLLUTED WATER FROM ENTERING INTO THE POTABLE WATER SUPPLY DUE TO BACKSIPHONAGE AND OR BACKPRESSURE. PRESSURE RATING SHALL BE 150 PSI MINIMUM. THE BODIES SHALL BE 304 STAINLESS STEEL COVER WITH EPDM. END CONNECTIONS SHALL BE FLANGED. ACCEPTABLE PRODUCTS INCLUDE AMES MAXIM SERIES M400 OR EQUAL

NOTES:
1. ALL VALVES MORE THAN 6' ABOVE FINISHED GRADE SHALL BE PROVIDED WITH A CHAIN WHEEL.
2. BURIED VALVES SHALL INCLUDE SLIDING TYPE CAST IRON VALVE BOX. ETENSION ROAD WITH 2" OPERATING NUT LOCATED 1' BELOW FINISHED GRADE. LID SHALL BE CAST IRON AND PROVIDE 1'-6" SQUARE x 4" THICK, CONCRETE PAD AROUND LID.
3. ALL FLANGES SHALL BE ANSI 125/150 LB CLASS FLAT FLANGES.
4. ALL VALVES SHOULD BE NSF CERTIFIED FOR PORTABLE WATER USE, UNLESS OTHERWISE SPECIFIED.

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	BV
DRAWN	BW
CHECKED	CS
APPROVED	CS

NO.	DATE	REVISIONS

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

VALVE SCHEDULE AND NOTES

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: G0.6

ISSUE FOR CONSTRUCTION

MAJOR EQUIPMENT LIST

EQUIPMENT NAME	DESCRIPTION	PART NUMBER	MANUFACTURER	P&ID TAG	QUANTITY	MATERIAL OF CONSTRUCTION	MAX FLOW	MAX PRESSURE	DIMENSIONS	PROCESS FLUID	HP	VOLTAGE	SCOPE OF SUPPLY	CRITERIA
TRI-MITE PACKAGE TREATMENT UNIT	TRI-MITE UNIT	2TM-100A	WESTECH	TRI-MITE UNIT #1	1	CARBON STEEL	100 GPM		8'-10" L x 4'-8" W x 7'-6" H	WATER	5	230/460V	WESTECH	185 GPM @ 52' TDH
TRI-MITE PACKAGE TREATMENT UNIT	TRI-MITE UNIT	2TM-100A	WESTECH	TRI-MITE UNIT #2	1	CARBON STEEL	100 GPM		8'-10" L x 4'-8" W x 7'-6" H	WATER	5	230/460V	WESTECH	185 GPM @ 52' TDH
850 GALLON POLYCORE FRP PRESSURE TANK	TANK	CH32678	PENTAIR	TK100-01	1	POLYETHYLENE INNER SHELL	N/A	900 PSI	7' H x 4'-3" D	WATER AND PPM			CONTRACTOR	
100 GALLON OXIDANT STORAGE TANK	TANK	RETAIN	10	ME-110A	1	HDPE							WESTECH	480VAC/3PH
200 GALLON COAG STORAGE TANK	TANK	RETAIN	10	ME-110B	1	HDPE							WESTECH	
100 GALLON POLYMER STORAGE TANK	TANK	RETAIN	10	F-150	1	HDPE							WESTECH	
SODIUM HYPOCHLORITE STORAGE DRUM	BARREL	RETAIN	10	EF-151	1								CONTRACTOR	
TIGERFLOW BOOSTER SYSTEM PUMPING STATION	MAPLE TANK BOOSTER PUMP SKID	TF-00-006	TIGERFLOW	P-501	1	SS304	140GPM	267 PSI	4" SUCTION X 4" DISCHARGE	WATER	30	460V	CONTRACTOR	
CR 32-2-1 A-G-A-E-HQQE	LOWER KELLY BOOSTER PUMP	96419549	GRUNDFOS	P-502	1	CAST IRON	130 GPM	232 PSI	2 1/2" SUCTION X 2 1/2" DISCHARGE	WATER	7.5	460V	CONTRACTOR	
MAGNETIC FLOWMETER	FLOWMETER	PROLINE PROMAG W 10	ENDRESS+HAUSER	FIT-110	1		800 GPM		3" D	WATER			CONTRACTOR	
STATIC MIXER	STATIC MIXER FOR COAG		KOFLO	MX-001	1	CLEAR PVC			3" DIA x 12" L SHAFT	WATER			CONTRACTOR	
OXIDANT FEED PUMP	POTASSIUM PERMANGANATE FEED PUMP			CP-001	1+1		38.4 GPD			POTASSIUM PERMANGANATE			WESTECH	
COAGULANT FEED PUMP	COAGULANT FEED PUMP			CP-002	1+1		168 GPD			FERRIC CHLORIDE			WESTECH	
POLYMER FEED PUMP	POLYMER FEED PUMP			CP-003	1+1		31.2 GPD			POLYMER			WESTECH	
DISINFECTION FEED PUMP	SODIUM HYPO FEED PUMP		BLUE-WHITE	CP-004	1+1	FLEX PRO SERIES M2 WITH FLEX-A-PRENE TUBE MATERIAL AND NGG TUBE SIZE	17GPH	110 PSI		12.5% SODIUM HYPOCHLORITE	1/8	240V	CONTRACTOR	
PRESSURE GAUGE	HIGH ACCURACY PRESSURE GAUGES WITH ADJUSTABLE DIAL	PGT-60B-100	OMEGA	PG-001	1			100 PSI	6" DIAL, 0 TO 100PSI	WATER			CONTRACTOR	
PRESSURE GAUGE	HIGH ACCURACY PRESSURE GAUGES WITH ADJUSTABLE DIAL	PGT-60B-100	OMEGA	PG-002	1			100 PSI	6" DIAL, 0 TO 100PSI	WATER			CONTRACTOR	
PRESSURE TRANSDUCERS	GENERAL PURPOSE, STAINLESS STEEL PRESSURE TRANSDUCERS WITH CABLE	PX309-100GI	OMEGA	PT-001	1	STAINLESS STEEL		100 PSI		WATER			CONTRACTOR	
SHOWER/EYEWASH STATION	SHOWER WITH EYEWASH	H-6697	ULINE		1	PLASTIC	20 GPH		94 3/4" H	WATER				
POLYMER TANK MIXER	CHEMICAL TANK MIXER				1	STAINLESS STEEL					1/4	115/260V	WESTECH	
COAGULANT TANK MIXER	CHEMICAL TANK MIXER				1	STAINLESS STEEL					1/4	115/260V	WESTECH	
OXIDANT TANK MIXER	CHEMICAL TANK MIXER				1	STAINLESS STEEL					1/4	115/260V	WESTECH	
BLOWER	AIR SCOUR BLOWER		FPZ		2		44 SCFM	3.2 PSI		AIR	2	230?460V	WESTECH	
FILTER MEDIA	FILTER SAND MEDIA					ANTHRACITE, SILICA SAND, GARNET			31, 16, AND 6 (FT^3/UNIT) RESPECTFULLY	WATER			WESTECH	
ADSORPTION CLARIFIER MEDIA	BOUYANT BEAD MEDIA					50/50 R&S. NSF Std. 61							WESTECH	

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P:\220583-M223443_ACADDWG\SHEETS\GENERAL\G0.7 EQUIPMENT AND INSTURMENTATION LIST.DWG, 5/20/2024

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

NO.	DATE	REVISIONS

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

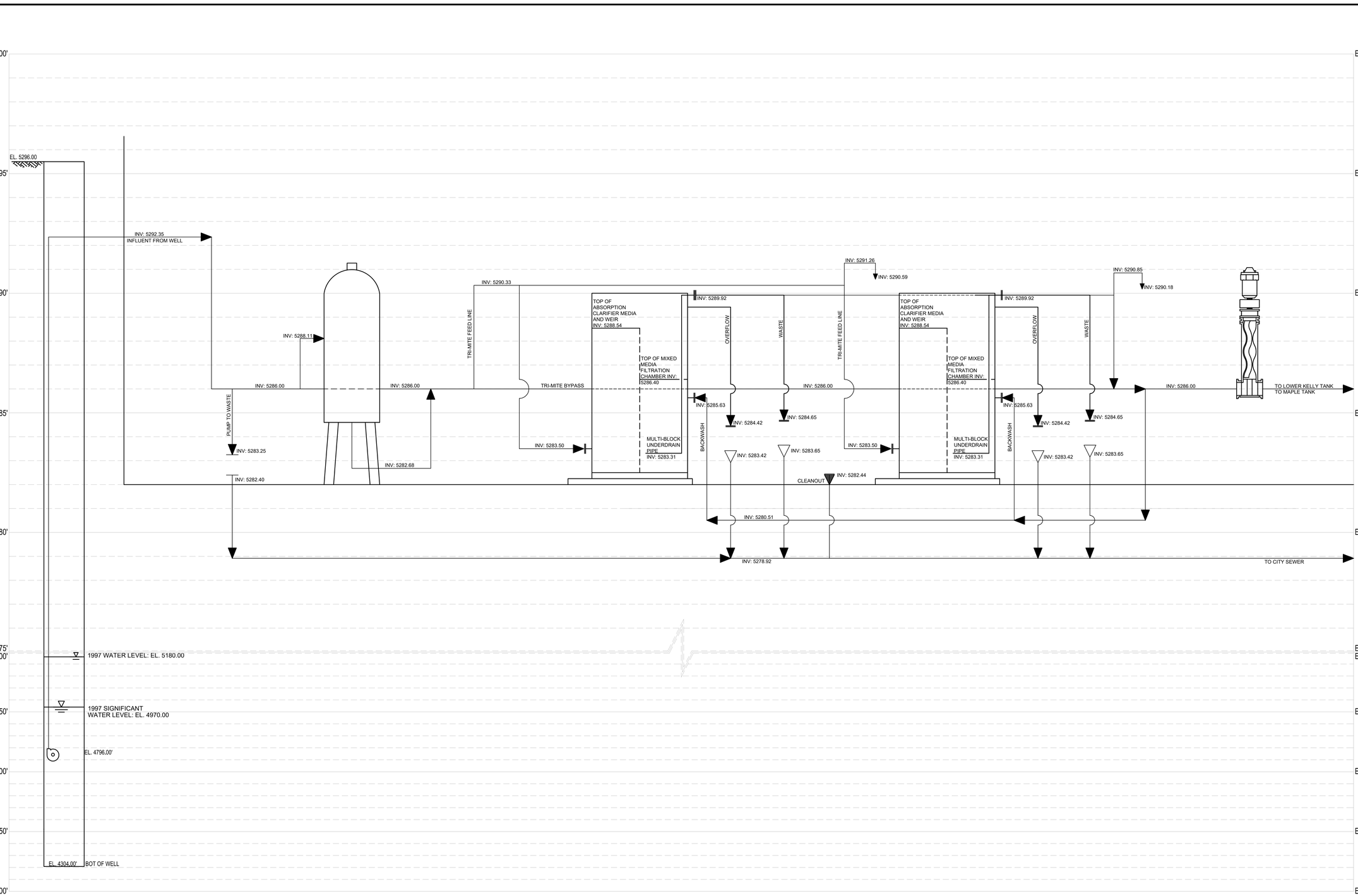
EQUIPMENT AND INSTURMENTATION LIST

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: G0.7

ISSUE FOR CONSTRUCTION

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PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	DESIGNED	DRAWN	CHECKED	APPROVED
22X34	CS/JB/JC	JC	JB	CS

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

HYDRAULIC PROFILE

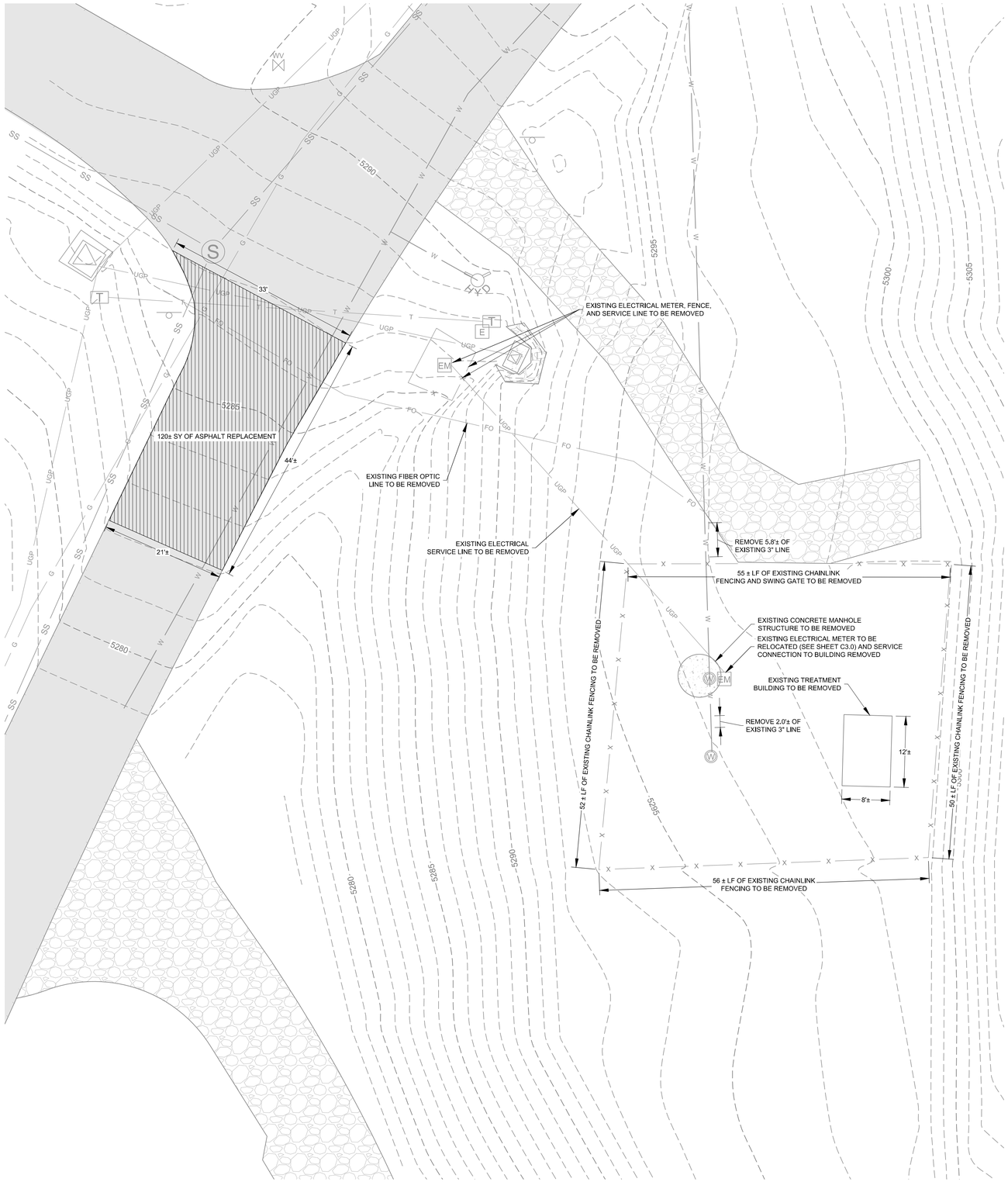
ATTENTION:
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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: G0.8

ISSUE FOR CONSTRUCTION

P:\220583-M2234413_ACADDWG\SHEETS\GENERAL\G0.8 HYDRAULIC PROFILE.DWG, 6/17/2024

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BUILDING & FENCING TO BE REMOVED



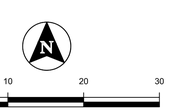
FENCING & CONCRETE MANHOLE STRUCTURE TO BE REMOVED

LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING GAS LINE — G
- EXISTING UNDERGROUND POWER — UGP
- EXISTING TELEPHONE LINE — T
- EXISTING FIBER OPTICS LINE — FO
- EXISTING SANITARY SEWER LINE — SS
- EXISTING WATER LINE — W
- EXISTING CONTOUR — 2582
- EXISTING SIGN
- EXISTING ELECTRICAL METER — EM
- EXISTING TELEPHONE JUNCT. BOX — T
- EXISTING WELL — W
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL

GENERAL NOTES

1. REMOVAL OF EXISTING INFRASTRUCTURE MATERIALS AND STRUCTURES SHALL BE LAWFULLY DISPOSED OF AND BECOME THE PROPERTY OF THE CONTRACTOR UNLESS OTHERWISE NOTED.
2. SAWCUTS SHALL BE REQUIRED TO REMOVE EXISTING PAVEMENT.
3. EXISTING CONCRETE/ASPHALT TO REMAIN AND SHALL BE PROTECTED FROM DAMAGE DURING CONSTRUCTION.
4. LOCATIONS OF SERVICES SHOWN ARE FOR REFERENCE ONLY.
5. CONTRACTOR SHALL COORDINATE UTILITY DISCONNECTS TO EXISTING BUILDINGS PRIOR TO DEMOLITION.
6. REMOVAL AND/OR MODIFICATION OF EXISTING UTILITIES SHALL BE COORDINATED WITH THE UTILITY OWNER.
7. ANY ASBESTOS ENCOUNTERED SHALL BE DISPOSED OF USING STANDARD PRACTICE AND IN ACCORDANCE WITH ALL FEDERAL, STATE, AND LOCAL REGULATIONS.
8. THE REMOVAL ITEMS AND LIMITS ON THESE DEMOLITION PLANS ARE APPROXIMATE ONLY. ADDITIONAL REMOVALS MAY BE REQUIRED TO COMPLETE THE WORK.
9. STOCKPILE LOCATION FOR EXCESS MATERIAL TO BE GRADED AND SODDED.



PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BORDER SIZE	22"x34"
DESIGNED	LS
DRAWN	KS
CHECKED	RT
APPROVED	CS

REVISIONS NO.	DESCRIPTION	DATE

ARDURRA
COLLABORATE. INNOVATE. CREATE.
2175 W. 3000 S., SUITE 200
HEBER CITY, UTAH 84032
435-315-3168 | WWW.ARDURRA.COM

CONSTRUCTION DRAWING FOR:

MAPLE WELL TREATMENT FACILITY PROJECT

DEMOLITION PLAN

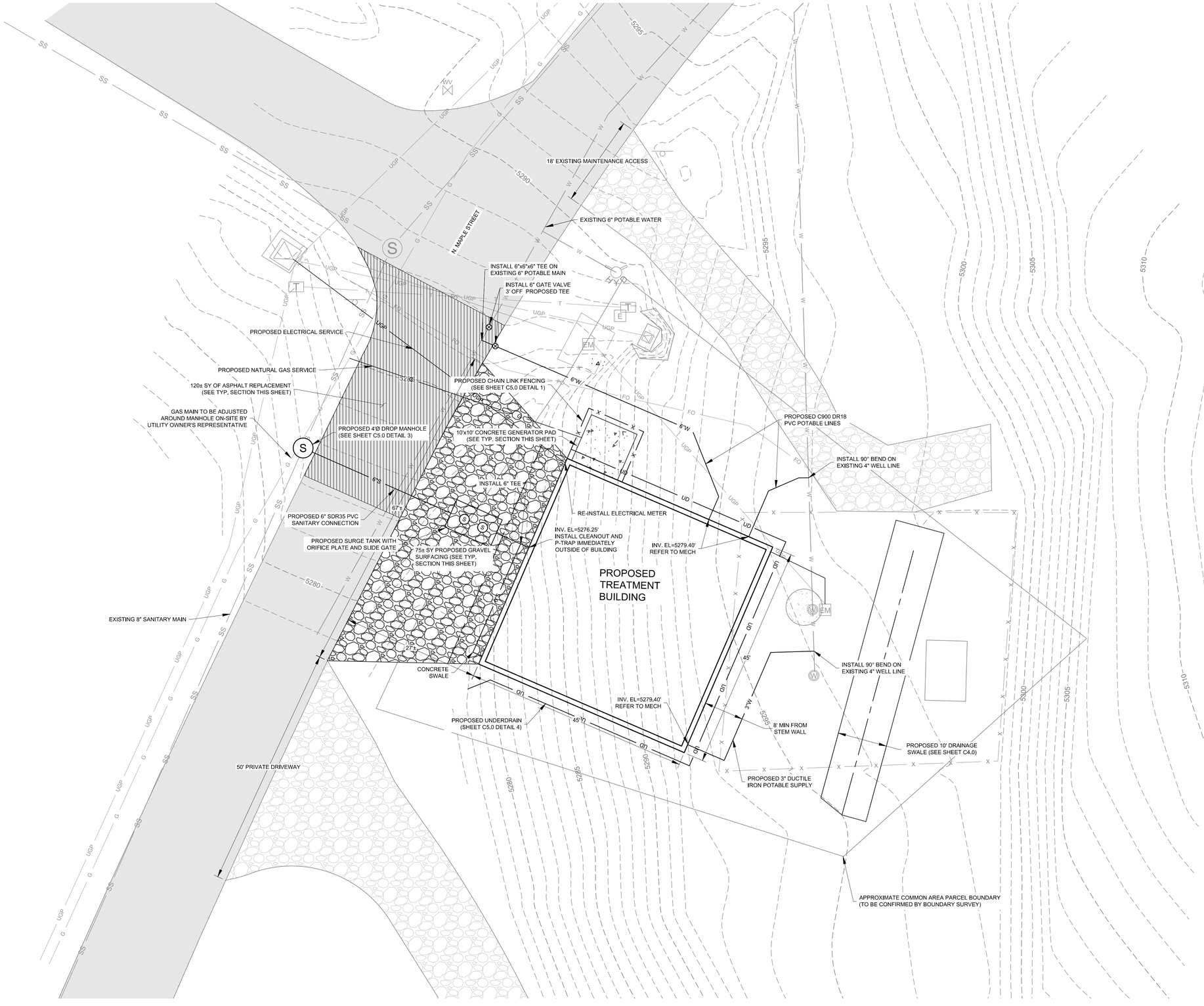
ISSUE FOR CONSTRUCTION

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	MAY, 2024
PROJECT:	220583
SHEET:	C1.0

P:\220583\4023443_ACAD\DWG\SHEETS\CIVIL\C1.0 DEMOLITION PLAN.DWG, 5/20/2024

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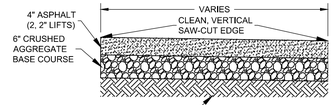
LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING GAS LINE — G
- EXISTING UNDERGROUND POWER — UGP
- EXISTING TELEPHONE LINE — T
- EXISTING FIBER OPTICS LINE — FO
- EXISTING SANITARY SEWER LINE — SS
- EXISTING WATER LINE — W
- EXISTING CONTOUR — 2582
- EXISTING SIGN
- EXISTING ELECTRICAL METER — EM
- EXISTING TELEPHONE JUNCT. BOX — T
- EXISTING WELL — W
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL
- PROPOSED UNDERGROUND POWER — UGP
- PROPOSED FENCE LINE — X X X
- PROPOSED 6" WATER LINE — 6"W
- PROPOSED 4" WATER LINE — 4"W
- PROPOSED 6" SANITARY SEWER LINE — 6"S
- PROPOSED PUMP TO WASTE — SD
- PROPOSED CONTOUR — 2582
- PROPOSED ASPHALT REPLACEMENT
- PROPOSED GRAVEL SURFACING
- PROPOSED CONCRETE
- PROPOSED SEWER MANHOLE — S

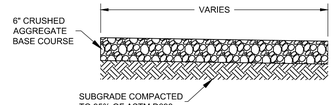
GENERAL NOTES

1. ALL MATERIALS USED FOR SURFACING, WET UTILITY INSTALLATION, AND BACKFILL MUST CONFORM TO THE MOST CURRENT VERSION OF UTAH ADOPTED APWA SPECIFICATIONS UNLESS SHOWN OTHERWISE WITHIN THESE PLANS.
2. THE CONTRACTOR SHALL VERIFY LOCATION, ELEVATION, AND SIZE OF ALL UNDERGROUND UTILITIES AT PROPOSED CONNECTION LOCATIONS AND CROSSINGS PRIOR TO STARTING WORK. ANY DISCREPANCY WITH THESE PLANS MUST BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING WITH THE WORK.
3. ALL MATERIALS TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE LAWFULLY DISPOSED OF. ALL UTILITY CONNECTIONS TO THE EXISTING BUILDING SHALL BE DISCONNECTED AND CLEARED BY EACH UTILITY PROVIDER PRIOR TO REMOVAL.
4. REMOVAL AND/OR MODIFICATION OF EXISTING UTILITIES SHALL BE COORDINATED WITH THE UTILITY OWNER.

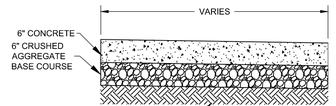
TYPICAL SECTIONS



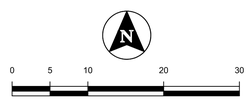
ASPHALT ROAD PATCH



GRAVEL SURFACING



GENERATOR PAD



PROFESSIONAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BORDER SIZE	22"x34"
DESIGNED	LS
DRAWN	KS
CHECKED	RT
APPROVED	CS

REVISIONS

NO.	DESCRIPTION	DATE

ARDURRA
COLLABORATE. INNOVATE. CREATE.
2175 W. 3000 S., SUITE 200
HEBER CITY, UTAH 84032
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CONSTRUCTION DRAWING FOR:

MAPLE WELL TREATMENT FACILITY PROJECT

SITE PLAN

ISSUE FOR CONSTRUCTION

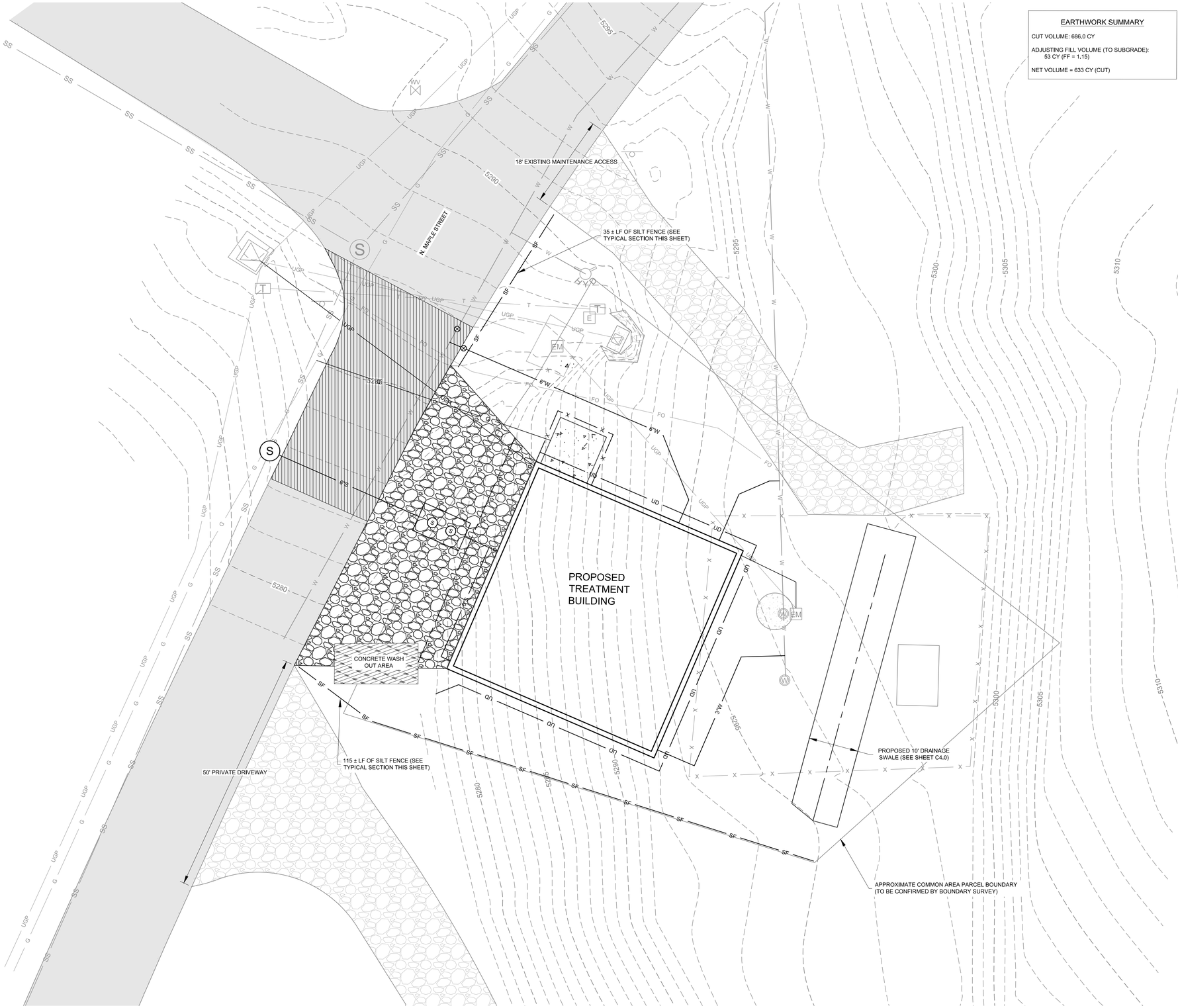
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	MAY, 2024
PROJECT:	220583
SHEET:	C2.0

P:\220583\4223143_ACAD\DWG\SHEETS\CIVIL\C2.0 SITE PLAN.DWG, 5/20/2024

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P:\220583\4223413_ACAD\WG\SHEETS\CIVIL\C3.0 EROSION AND SEDIMENT CONTROL PLAN.DWG, 5/20/2024



EARTHWORK SUMMARY

CUT VOLUME: 686.0 CY

ADJUSTING FILL VOLUME (TO SUBGRADE): 53 CY (FF = 1.15)

NET VOLUME = 633 CY (CUT)

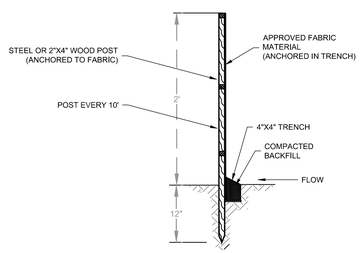
LEGEND

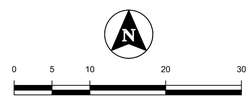
- EXISTING EDGE OF PAVEMENT
- EXISTING GAS LINE (G)
- EXISTING UNDERGROUND POWER (UGP)
- EXISTING TELEPHONE LINE (T)
- EXISTING FIBER OPTICS LINE (FO)
- EXISTING SANITARY SEWER LINE (SS)
- EXISTING WATER LINE (W)
- EXISTING CONTOUR (2582)
- EXISTING SIGN
- EXISTING ELECTRICAL METER (EM)
- EXISTING TELEPHONE JUNCT. BOX (T)
- EXISTING WELL (W)
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL
- PROPOSED UNDERGROUND POWER (UGP)
- PROPOSED FENCE LINE (X X X)
- PROPOSED 6" WATER LINE (6"W)
- PROPOSED 4" WATER LINE (4"W)
- PROPOSED 6" SANITARY SEWER LINE (6"S)
- PROPOSED PUMP TO WASTE (SD)
- PROPOSED CONTOUR (2582)
- PROPOSED ASPHALT REPLACEMENT
- PROPOSED GRAVEL SURFACING
- PROPOSED CONCRETE
- PROPOSED SEWER MANHOLE (S)

GENERAL NOTES

1. CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES/DEVICES SO THEY ARE OPERATING PROPERLY AND WILL REPLACE OR FIX ON AN AS NEEDED BASIS.
2. EROSION CONTROL LOCATIONS AND QUANTITIES SHOWN ARE ESTIMATES ONLY. THE CONTRACTOR MAY HAVE TO ADD OR ADJUST EROSION CONTROL FEATURES AS REQUIRED BY REGULATORY INSPECTORS, OWNERS REPRESENTATIVE, THE ENGINEER, AND/OR PER GRADING OPERATIONS.
3. ALL SEDIMENTS TRACKED ONTO PAVED ROADS MUST BE SWEPT BY CONTRACTORS IN A TIMELY MANNER OR AS DIRECTED BY THE ENGINEER OR THE OWNER'S REPRESENTATIVE.
4. AREAS WITH VEGETATION ESTABLISHED THAT ARE DISTURBED DURING CONSTRUCTION WILL BE REVEGETATED AT THE EXPENSE OF THE CONTRACTOR.
5. WASHOUT OR CONCRETE TRUCKS SHALL ONLY OCCUR AT THE LOCATION INDICATED. THE CONTRACTOR SHALL ENSURE THAT ALL CONCRETE WASTE OR WASHOUT WATER IS CONTAINED IN THIS AREA AND DISPOSED OF OFF-SITE PRIOR TO FINAL COMPLETION.
6. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL LOCAL, STATE, AND FEDERAL REGULATIONS. ALL REQUIRED PERMITS SHALL BE OBTAINED BY THE CONTRACTOR, AND NO SEPARATE PAYMENT WILL BE MADE FOR COMPLETION OF THESE ITEMS.

SILT FENCE SECTION





PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BORDER SIZE	22"x34"
DESIGNED	LS
DRAWN	KS
CHECKED	RT
APPROVED	CS

NO.	DESCRIPTION	DATE

ARDURRA
COLLABORATE. INNOVATE. CREATE.
2175 W. 3000 S., SUITE 200
HEBER CITY, UTAH 84032
435-315-3168 | WWW.ARDURRA.COM

CONSTRUCTION DRAWING FOR:

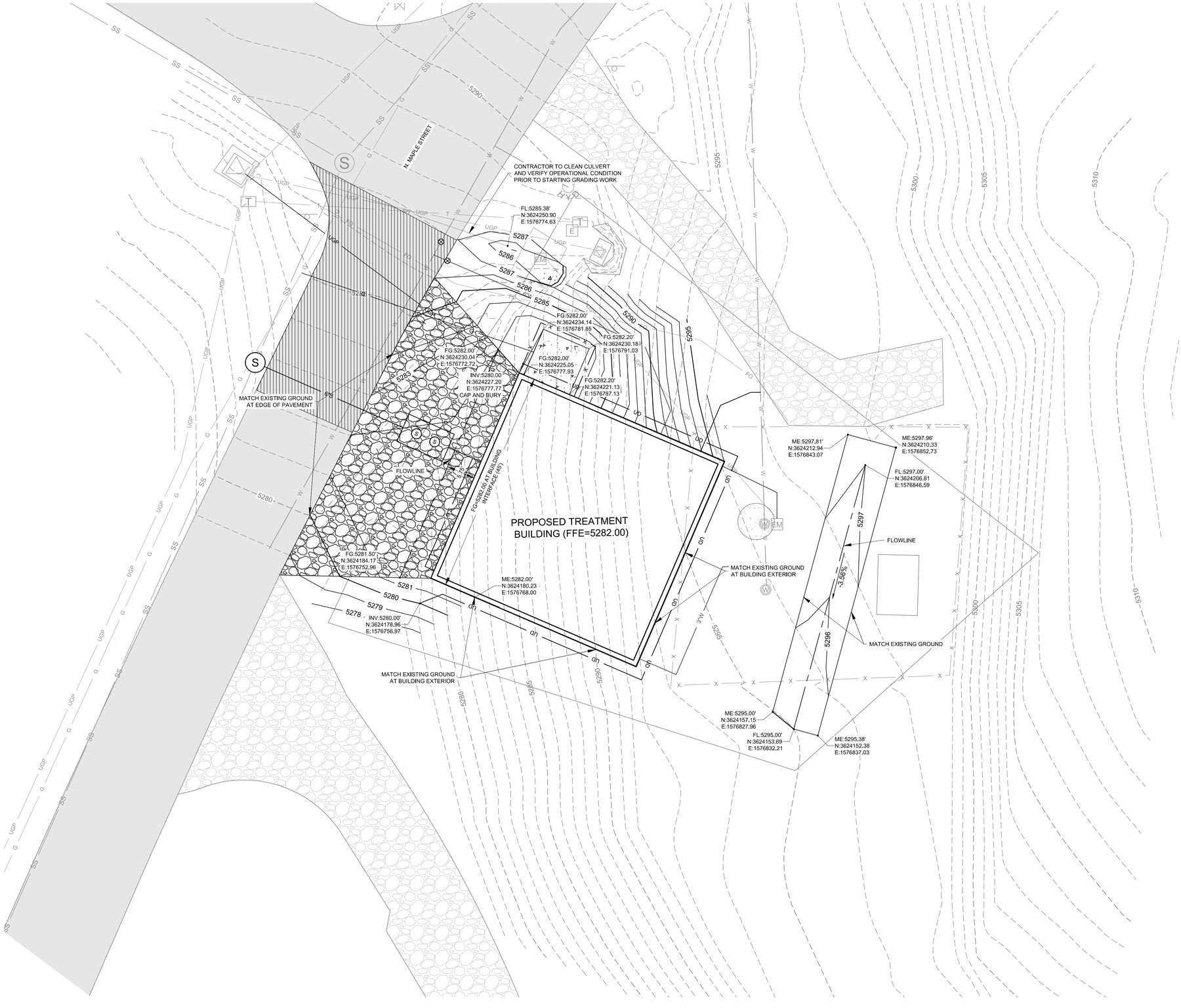
MAPLE WELL TREATMENT FACILITY PROJECT
EROSION AND SEDIMENT CONTROL PLAN

ISSUE FOR CONSTRUCTION

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	MAY, 2024
PROJECT:	220583
SHEET:	C3.0

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LEGEND

- EXISTING EDGE OF PAVEMENT
- EXISTING GAS LINE — G
- EXISTING UNDERGROUND POWER — UGP
- EXISTING TELEPHONE LINE — T
- EXISTING FIBER OPTICS LINE — FO
- EXISTING SANITARY SEWER LINE — SS
- EXISTING WATER LINE — W
- EXISTING CONTOUR — 2582
- EXISTING SIGN
- EXISTING ELECTRICAL METER — EM
- EXISTING TELEPHONE JUNCT. BOX — T
- EXISTING WELL — W
- EXISTING CONCRETE
- EXISTING ASPHALT PAVEMENT
- EXISTING GRAVEL
- PROPOSED UNDERGROUND POWER — UGP
- PROPOSED FENCE LINE — X X X
- PROPOSED 6" WATER LINE — 6"W
- PROPOSED 4" WATER LINE — 4"W
- PROPOSED 6" SANITARY SEWER LINE — 6"S
- PROPOSED PUMP TO WASTE — SD
- PROPOSED CONTOUR — 2582
- PROPOSED ASPHALT REPLACEMENT
- PROPOSED GRAVEL SURFACING
- PROPOSED CONCRETE
- PROPOSED SEWER MANHOLE — S

GENERAL NOTES

1. ALL MATERIALS USED FOR SURFACING AND BACKFILL MUST CONFORM TO THE MOST CURRENT VERSION OF UTAH ADOPTED APWA SPECIFICATIONS.
2. EXISTING ELEVATIONS SHOWN ARE FROM A RECENT SURVEY AND SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. IF GRADING CONFLICTS OCCUR, THE CONTRACTOR IS TO NOTIFY THE ENGINEER, FINISHED GRADE CAN BE ADJUSTED WITH REVIEW AND WRITTEN APPROVAL FROM THE ENGINEER
3. GRADE ALL WORK AREAS TO MAINTAIN POSITIVE SURFACE DRAINAGE DURING THE WORK.
4. ALL REMOVED MATERIALS (UNSUITABLE SOIL, EXCESS MATERIAL, ROCK MATERIAL, STRUCTURES, PIPE, ETC.) SHALL BE PROPERLY DISPOSED OF OFFSITE AT THE CONTRACTOR'S EXPENSE UNLESS DESIGNATED OTHERWISE ON THESE PLANS OR BY THE OWNER.
5. THERE SHALL BE NO EARTH DISTURBING ACTIVITIES OUTSIDE WHAT IS REQUIRED TO COMPLETE THE PROJECT.
6. TOP SOIL SHALL BE RE-DISTRIBUTED TO MEET PROPOSED GRADE.
7. ALL ELEVATIONS SHOWN ARE TO FINISHED GRADE.
8. THE FOLLOWING ABBREVIATIONS ARE USED ON THIS SHEET TO DESIGNATE FINISHED GRADE ELEVATIONS:
   - 8.1. FG = FINISHED GRADE
   - 8.2. ME = MATCH EXISTING SITE ELEVATION
   - 8.3. FL = FLOWLINE ELEVATION (DENOTE START, END, & GRADE CHANGE ON FLOWLINE)
9. CONTRACTOR SHALL TAKE EXTREME CAUTION WHEN EXCAVATING NEAR THE EXISTING WATER LINE AND WELL. ANY DAMAGE CAUSED DIRECTLY OR INDIRECTLY SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RECTIFY TO ORIGINAL OR BETTER CONDITION. TEMPORARY SHORING MAY BE REQUIRED TO ENSURE SLOPE STABILITY.
10. TOPSOIL SHALL BE STRIPPED AND STOCKPILED PRIOR TO THE START OF CONSTRUCTION. ALL DISTURBED GROUND OUTSIDE OF BUILDING AND PAVEMENT AREAS SHALL BE RE-VEGETATED BY THE REPLACEMENT OF TOPSOIL AND SPREAD OF A USDA APPROVED NATIVE SEED MIX. REFER TO USDA NRCS PUBLICATION NO. EB0242 FOR RE-VEGETATION GUIDELINES.

0 5 10 20 30

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BORDER SIZE	22"x34"
DESIGNED	LS
DRAWN	KS
CHECKED	RT
APPROVED	CS

NO.	DESCRIPTION	DATE
REVISIONS		

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HEBER CITY, UTAH 84032
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CONSTRUCTION DRAWING FOR:

MAPLE WELL TREATMENT FACILITY PROJECT
GRADING PLAN

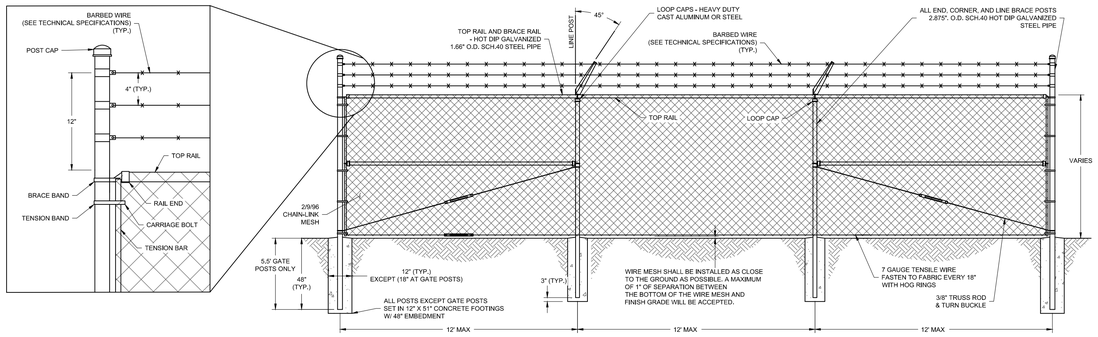
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	MAY, 2024
PROJECT:	220583
SHEET:	C4.0

ISSUE FOR CONSTRUCTION

P:\220583-M222443_ACAD\NVG\SHEETS\CIVIL\C4.0 GRADING PLAN.DWG, 5/20/2024

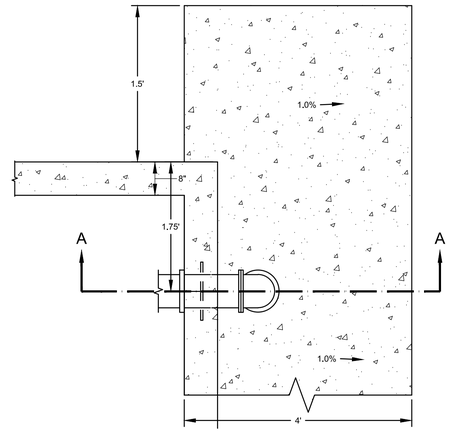
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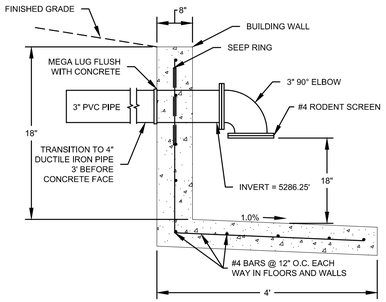
NOTES:

1. ANGLE CHANGE IN FENCE ALIGNMENT GREATER THAN 20° REQUIRES A CORNER POST.
2. BRACE PANEL INCLUDING BRACE POST AND TRUSS ROD TO BE INSTALLED ON BOTH SIDES OF CORNER POSTS, ON BOTH SIDES OF GATES, ON BOTH SIDES OF LINE BRACE POSTS, AND AT FENCE TERMINATIONS. LINE BRACE POSTS SHALL BE INSTALLED AT 400' INTERVALS AND AT GRADE CHANGES AS APPROVED BY THE ENGINEER.
3. LINE POSTS (NOT SHOWN) 2.375" O.D. SCH. 40 HOT DIP GALVANIZED STEEL PIPE.
4. GATE POSTS (NOT SHOWN) 6.625" O.D. SCH. 40 HOT DIP GALVANIZED HIGH TENSILE STEEL PIPE FOR GATES OVER 4' WIDE. GATE POSTS (NOT SHOWN) 4.0" O.D. SCH. 40 HOT DIP GALVANIZED STEEL PIPE FOR 4' GATES.

CHAIN LINK FENCE DETAIL N.T.S. 1

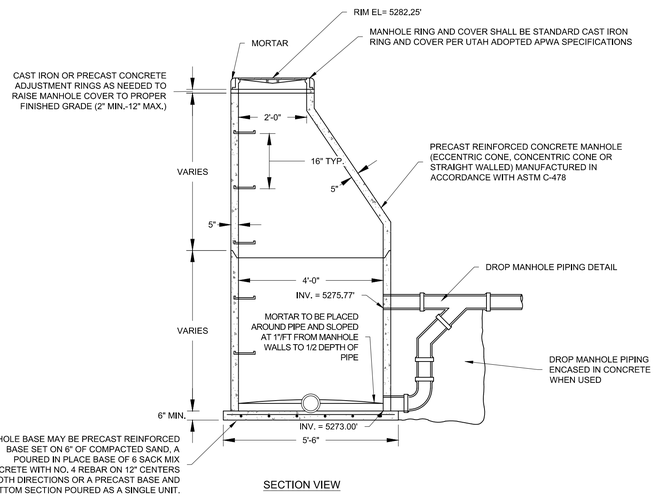


CONCRETE AIR GAP STRUCTURE - PLAN VIEW



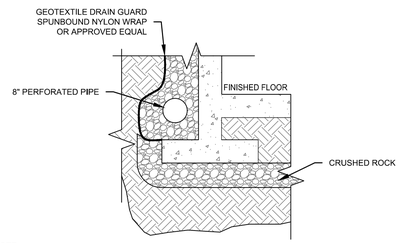
SECTION VIEW A-A

AIR GAP DISCHARGE DETAIL N.T.S. 2



SECTION VIEW

DROP MANHOLE DETAIL N.T.S. 3



NOTE:

1. ALL COLLECTION PIPING UNDER TREATMENT PLANT SHALL BE 8" PERFORATED WITH DRAIN GUARD WRAP OR OTHER APPROVED GEOMEMBRANE MATERIAL, BEDDED IN 1" MINUS DIAMETER CRUSHED ROCK OR OTHER MATERIAL APPROVED BY ENGINEER.

UNDERDRAIN DETAIL N.T.S. 4

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BORDER SIZE	22"x34"
DESIGNED	LS
DRAWN	KS
CHECKED	RT
APPROVED	CS

REVISIONS

NO.	DESCRIPTION	DATE

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HEBER CITY, UTAH 84032
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CONSTRUCTION DRAWING FOR:

MAPLE WELL TREATMENT FACILITY PROJECT

DETAIL SHEET

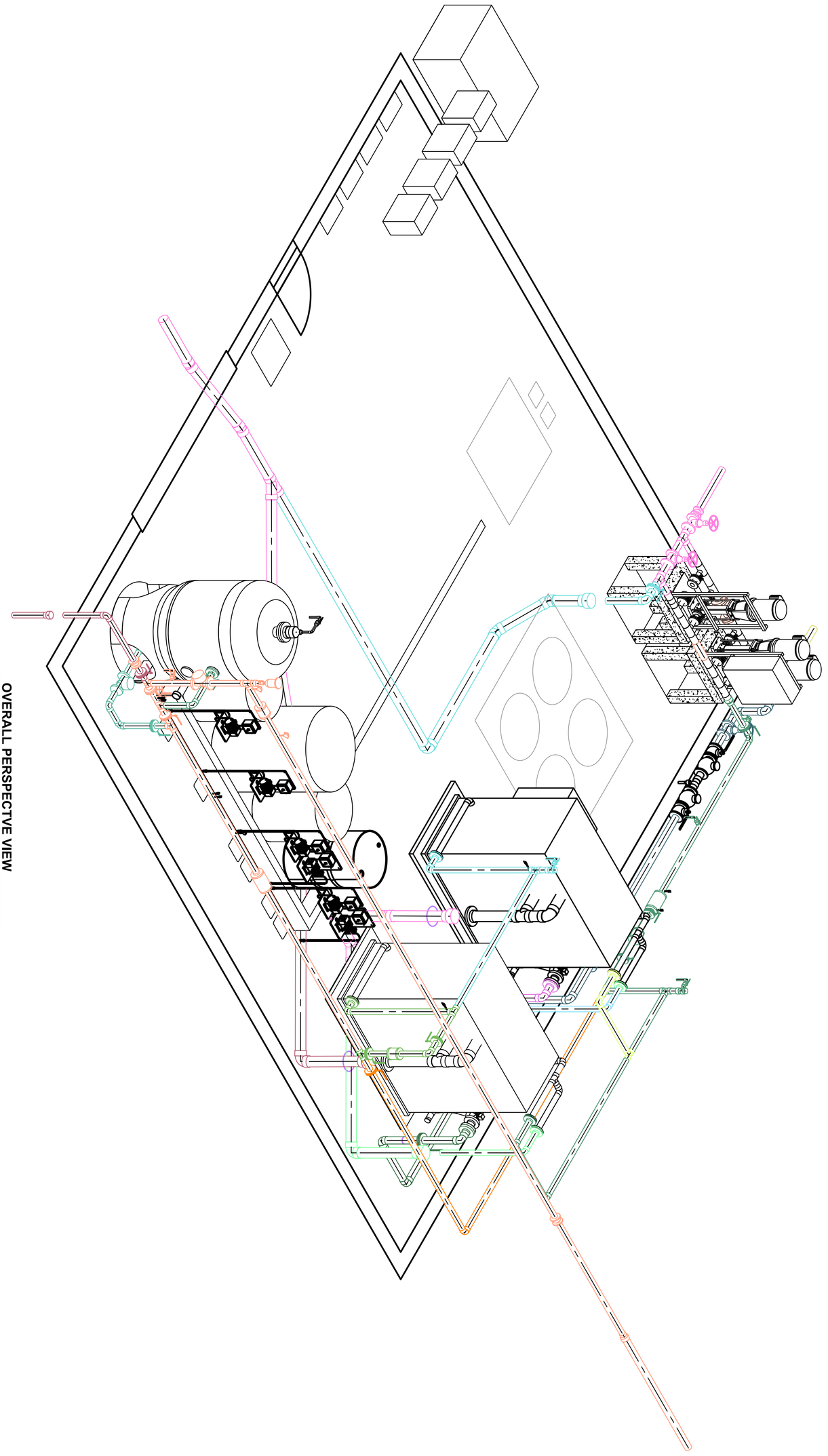
ISSUE FOR CONSTRUCTION

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: MAY, 2024
PROJECT: 230583
SHEET: C5.0

P:\220583-M22\443_ACAD\DWG\SHEETS\CIVIL\C5.0 DETAIL SHEET.DWG, 5/20/2024

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OVERALL PERSPECTVE VIEW
N.T.S.

SHEET: M0.0
REV: ---
PROJECT: 220583
DATE: JUNE, 2024

IF THIS BAR DOES NOT MEASURE 1" ON 22X34 SHEET or 1/2" ON 11X17 SHEET, THEN DRAWING IS NOT TO SCALE

0 ATTENTION: 1/2 1

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM

WEBER COUNTY, UTAH

OVERALL PERSPECTIVE VIEW

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REVISIONS			BOARDER SIZE
NO.		DATE	22X34
			DESIGNED
			##
			DRAWN
			##
			CHECKED
			##
			APPROVED
			##

PROFESSIONAL ENGINEER
NO. 6880008
G. Ryan Taylor
STATE OF IDAHO
06/17/24

ISSUE FOR CONSTRUCTION

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P:\220583-M2234413_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M0.1 OVERALL PLAN VIEW.DWG, 6/17/2024

GENERATOR
45'-0"
1'-0"
CONTROL / ELECTRICAL PANELS
CONNECT TO LOWER KELLY DISTRIBUTION SYSTEM LINE. SEE CIVIL PLANS FOR MORE INFORMATION.
CONNECT TO MAPLE TANK DISTRIBUTION SYSTEM. SEE CIVIL PLANS FOR MORE INFORMATION.
EJ-101
V-355
V-353
V-354
V-356
V-357
MAPLE TANK BOOSTER PUMP SKID
RESIDUAL CHLORINE ANALYZER
3'-8"
LOWER KELLY DISTRIBUTION SYSTEM PUMP
5'-5"
FUTURE HMO DOSING
5'-5"
10'-9 1/2"
0'-6"
FUTURE GREEN SAND FILTERS
9'-3 3/4"
FLOOR DRAIN
MAN DOOR
3'-0"
CONNECT TO SEWER LINE. SEE CIVIL PLANS FOR MORE INFORMATION.
EYE WASH STATION
6"-PVC2-WASTE-514
6"-PVC2-WASTE-351
FUTURE CHEM ADJUSTMENT
V-334
SODIUM HYPO DOSING POINT
V-339
FLOW METERS
V-338
V-335
V-337
45'-0"
9'-7"
TRI-MITE UNIT #2
5'-4"
POLYMER DOSING POINT
3"-PVC2-INF-201
V-329
6"-PVC2-WASTE-351
27'-1 3/4"
SEWER CLEANOUT
17'-2 1/4"
9'-7"
TRI-MITE UNIT #1
5'-4"
V-327
22'-0"
12'-0"
ROLL UP DOOR
R2'-8 1/4"
V-313
1000 GAL FRP REACTION TANK
PPM STORAGE TANK
COAG STORAGE TANK
POLY STORAGE TANK
SODIUM HYPO STORAGE DRUM
5'-1 1/2"
1'-0"
PPM CHEM PUMP
COAG CHEM PUMP
POLY CHEM PUMPS
SODIUM HYPO CHEM PUMPS
40'-4 1/2"
STATIC MIXER
POLYMER DOSING POINT
V-310
V-312
V-301
V-321
16'-7"
3"-PVC2-INF-101
V-322
EJ-101
EJ-101
V-304
pH PROBE
TURBIDITY PROBE
FLOW METER
1'-0"
CONNECT TO EXISTING WELL PUMP

N

OVERALL PLAN VIEW

3/8"=1'-0"
0 1' 3'

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34
DESIGNED JB
DRAWN RK
CHECKED CH
APPROVED CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

OVERALL PLAN VIEW

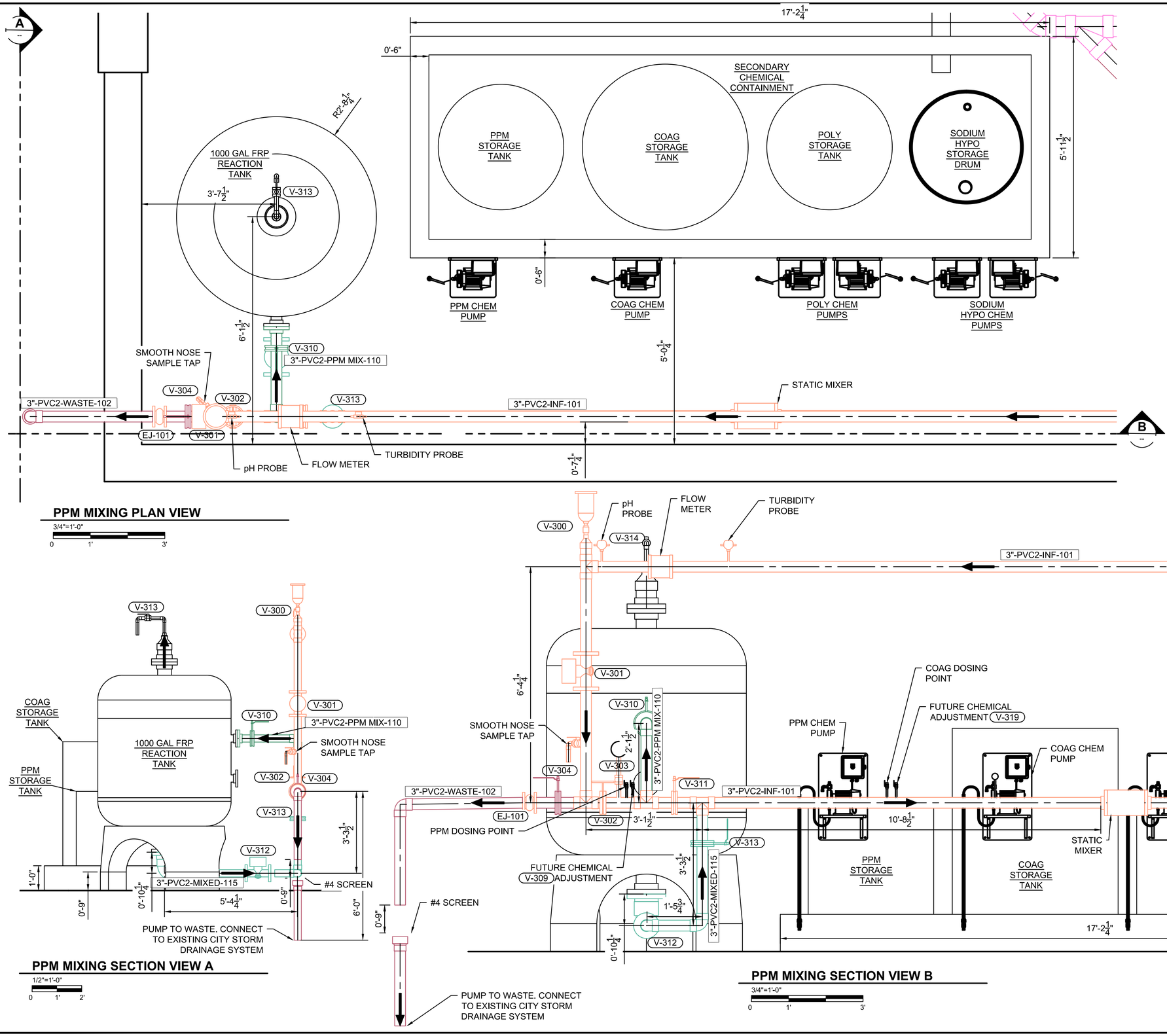
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M0.1

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P:\220583-M2234\3_ACADDWG\220583-GREEN HILLS WTP\ORTHOSIDWGS\M1.0 PPM MIXING PLAN AND SECTION VIEWS.DWG, 6/17/2024



PPM MIXING PLAN VIEW

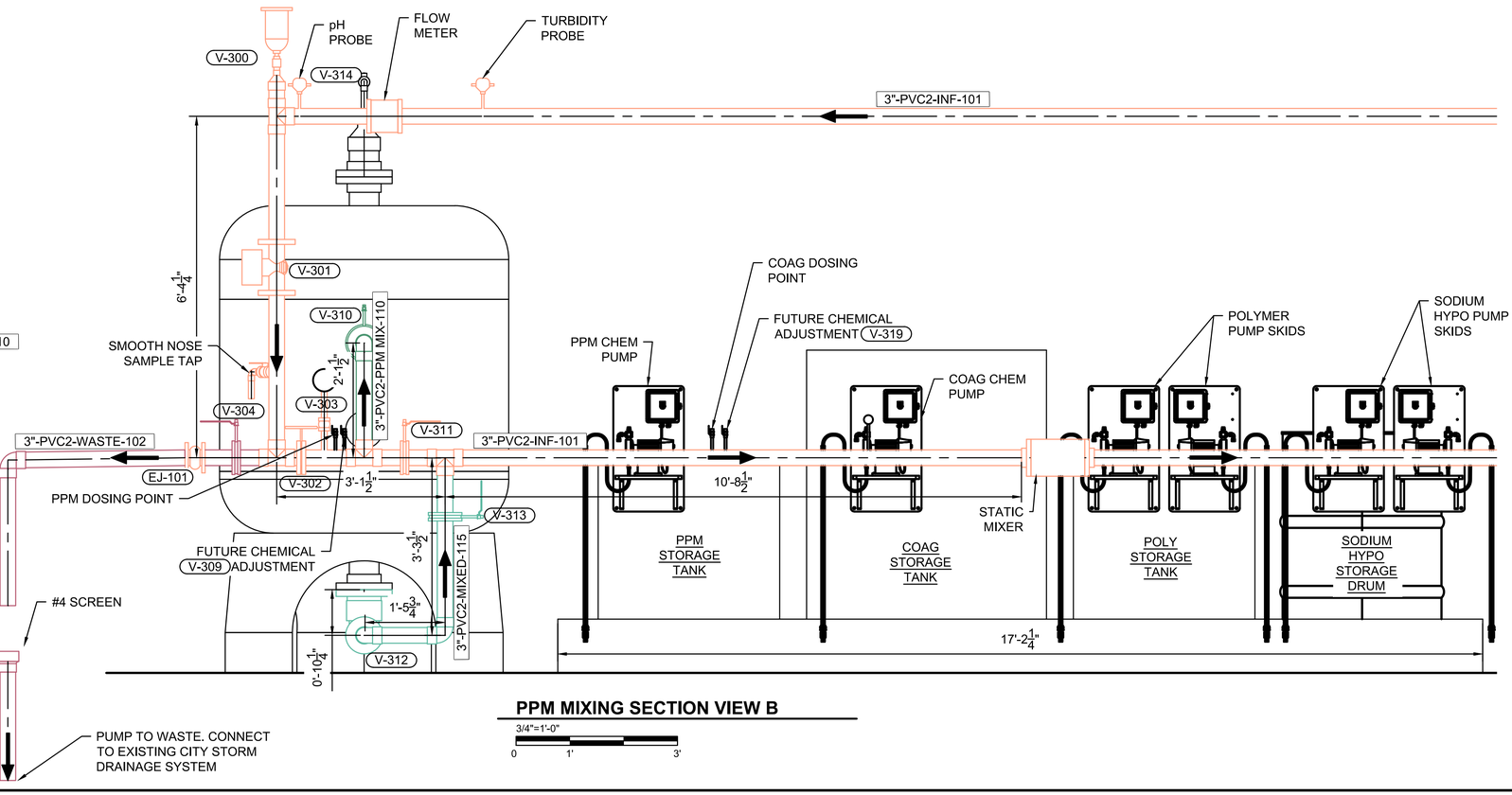
3/4"=1'-0"

0 1' 3'

PPM MIXING SECTION VIEW A

1/2"=1'-0"

0 1' 2'



PPM MIXING SECTION VIEW B

3/4"=1'-0"

0 1' 3'

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

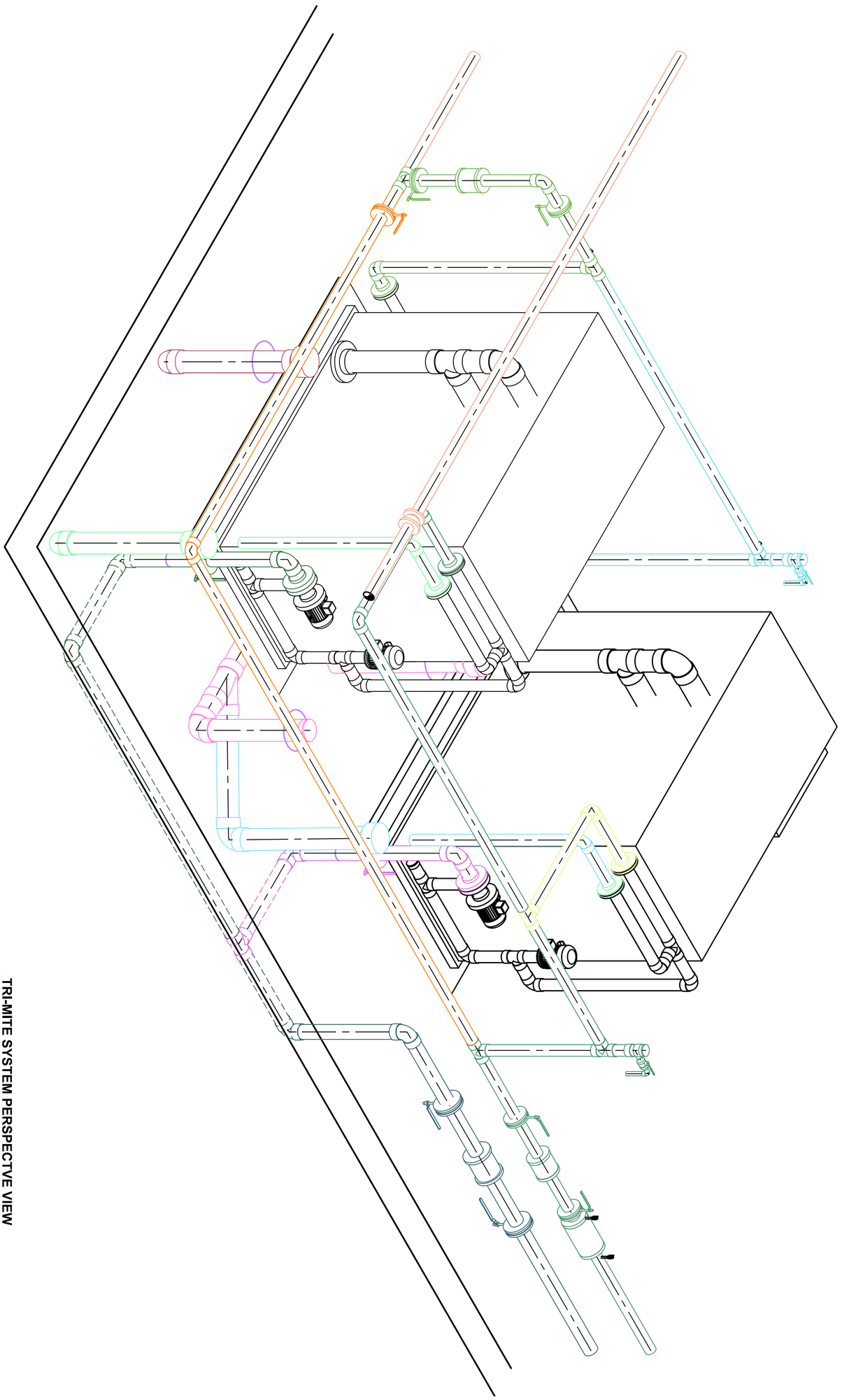
PPM MIXING PLAN AND SECTION VIEWS

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M1.0

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TRI-MITE SYSTEM PERSPECTVE VIEW

N.T.S.

SHEET: M2.0

REV: —

PROJECT: 220583

DATE: JUNE, 2024

IF THIS DRAWING IS NOT FULL SIZE 1"=ON 22X34 SHEET or 1/2"=ON 11X17 SHEET, THEN DRAWING IS NOT TO SCALE

0 ATTENUATION 1/2 1

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM

WEBER COUNTY, UTAH

TRI-MITE SYSTEM PERSPECTIVE VIEW

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REVISIONS			BOARDER SIZE
NO.		DATE	22X34
			DESIGNED JB
			DRAWN RK
			CHECKED CH
			APPROVED CH

PROFESSIONAL ENGINEER
STATE OF IDAHO
NO. 6800008
G. Ryan Taylor
06/17/24

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P:\220583-M2234413_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M2.1 TRI-MITE SYSTEM PLAN VIEW.DWG, 6/17/2024

FUTURE GREENSAND FILTERS

FUTURE CHEMICAL ADJUSTMENT

SODIUM HYPO DOSING POINT

FLOW METER

V-334

V-339

V-338

V-335

V-337

V-329

V-328

V-327

V-321

V-322

V-320

C M2.3

D M2.3

B M2.2

A M2.2

FLOOR DRAIN. SEE STRUCTURAL SHEETS FOR MORE INFORMATION

CONNECT TO SEWER LINE. SEE CIVIL SHEETS FOR MORE INFORMATION

TRI-MITE UNIT #2

TRI-MITE UNIT #1

BAKCWASH PUMP REMOVED FROM WESTECH SCOPE OF SUPPLY

BACKWASH PUMP REMOVED FROM WESTECH SCOPE OF SUPPLY

POLY DOSING POINT

POLY DOSING POINT

SEWER CLEANOUT

4'-6"

6"-PVC2-WASTE-351

3'-4 1/4"

3"-PVC2-INF-201

3'-5 1/2"

6"-PVC2-WASTE-351

3'-5 3/4"

6"-PVC2-WASTE-402

0'-3"

0'-9 1/2"

0'-11 3/4"

6"-PVC2-WASTE-302

10'-4 3/4"

10'-7 1/2"

9'-10 1/4"

17'-9 1/4"

3'-3"

3"-PVC2-EFF-301

4"-PVC2-BACKWASH-502

1'-11 3/4"

1'-8"

3'-11"

3"-PVC2-EFF-401

3'-1 3/4"

6"-PVC2-WASTE-402

3'-3"

4"-PVC2-BACKWASH-501

1'-10 3/4"

1'-6 3/4"

3"-PVC2-EFF-301

3'-11"

3'-1"

3"-PVC2-INF-200

3"-PVC2-INF-101

3"-PVC2-BYPASS-202

0'-9 1/4"

13'-2"

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

TRI-MITE SYSTEM PLAN VIEW

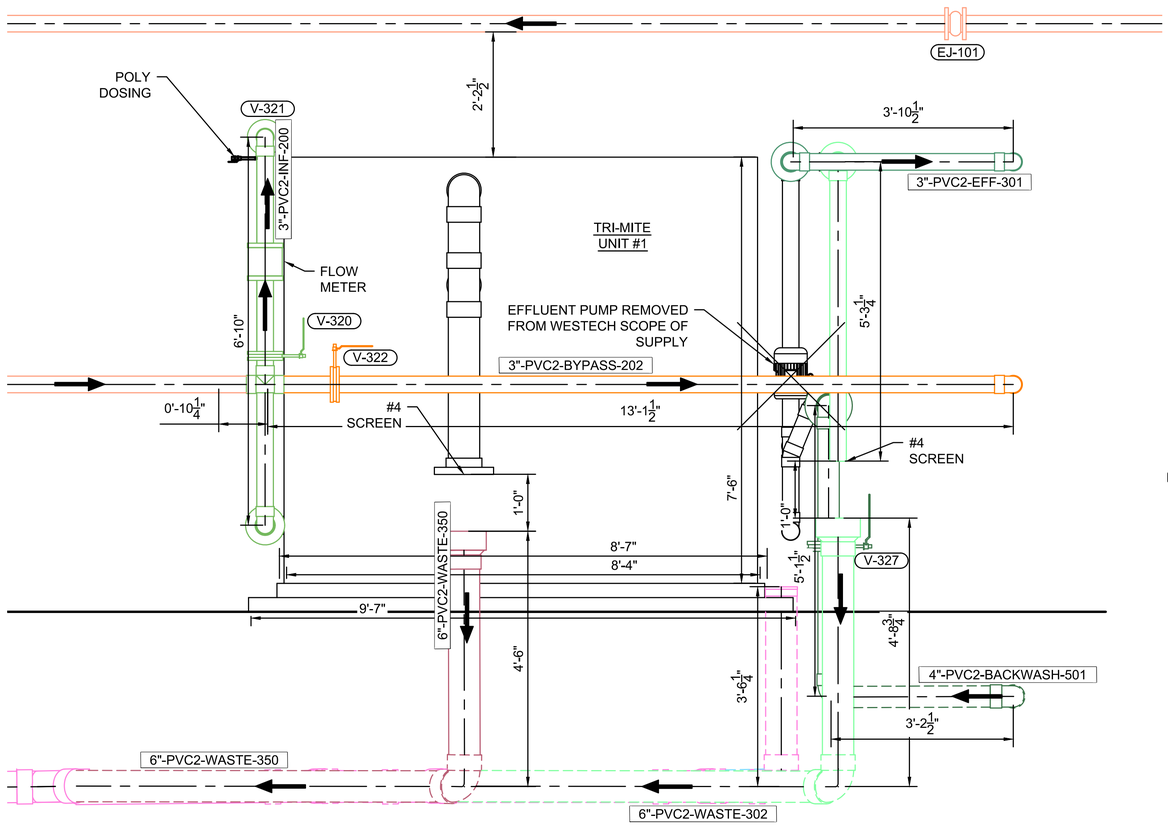
ATTENTION:
0 1/2 1
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M2.1

ISSUE FOR CONSTRUCTION

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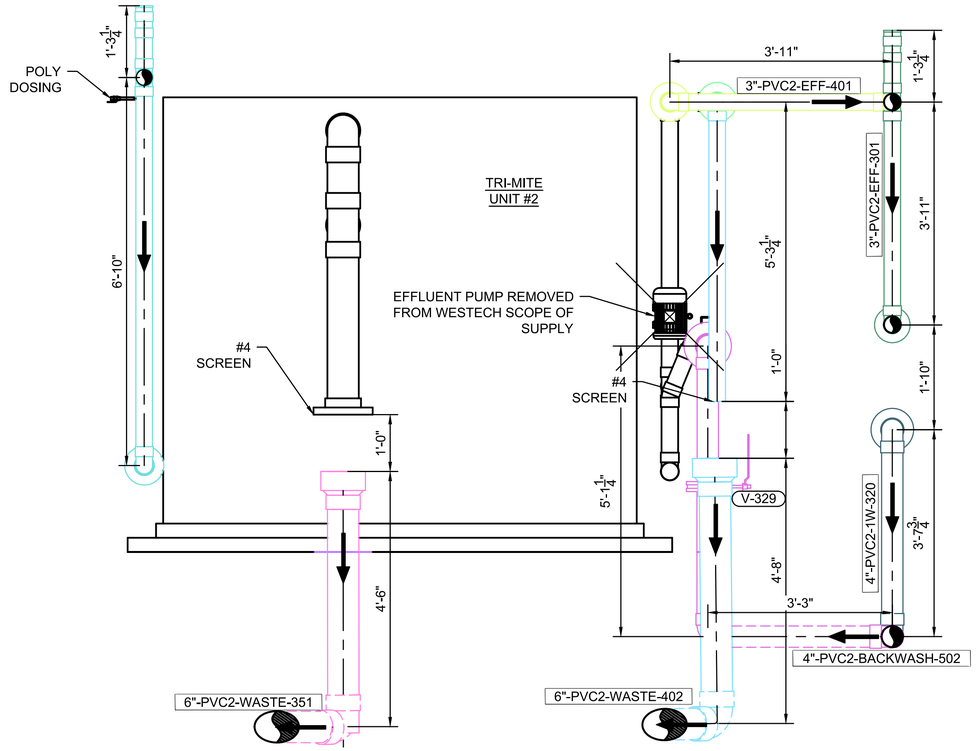
P:\220583-M223443\3_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M2.2 TRI-MITE SYSTEM SECTION VIEWS I.DWG, 6/17/2024



TRI-MITE SYSTEM SECTION VIEW A

3/4"=1'-0"

0 1' 3'



TRI-MITE SYSTEM SECTION VIEW B

3/4"=1'-0"

0 1' 3'

NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

TRI-MITE SYSTEM SECTION VIEWS I

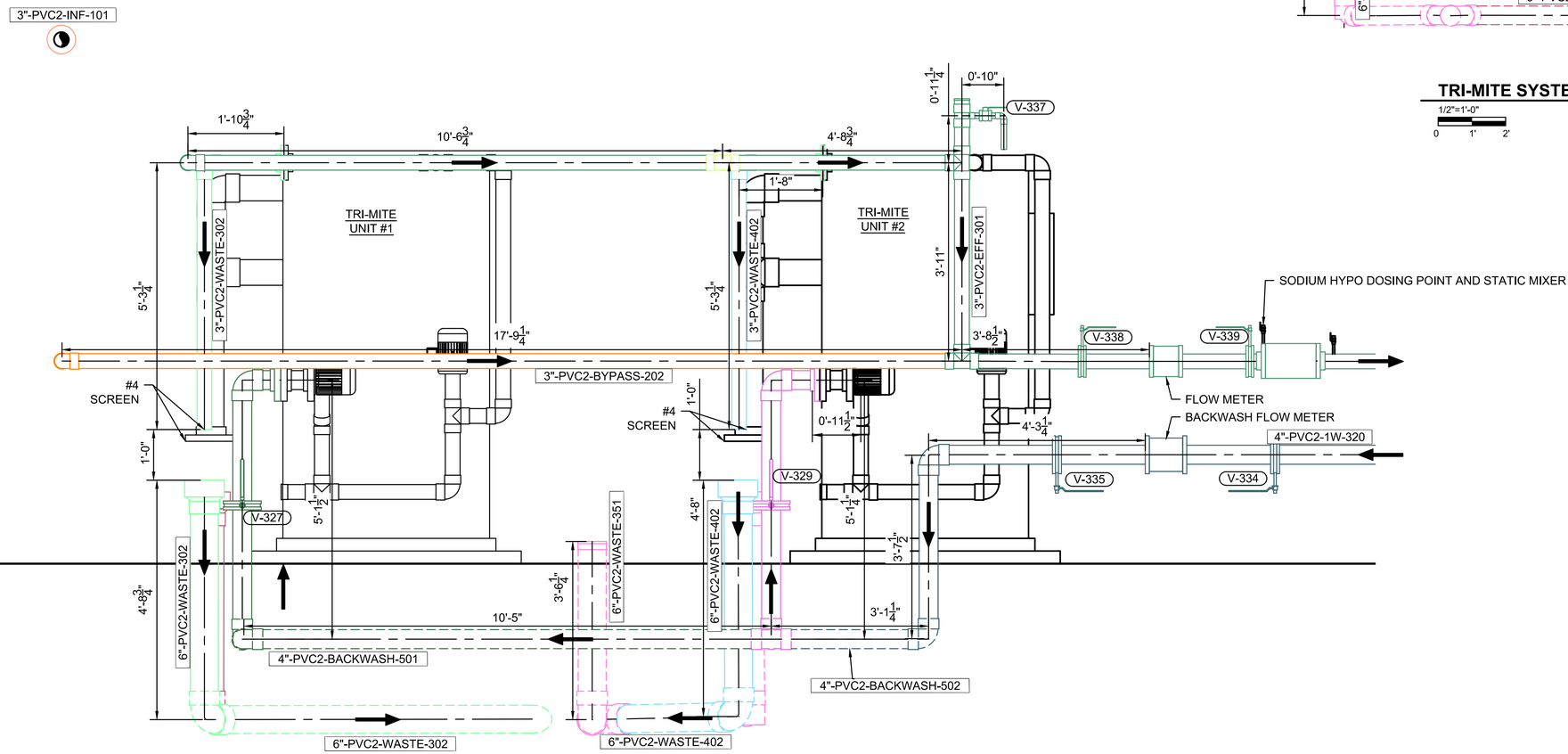
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M2.2

ISSUE FOR CONSTRUCTION

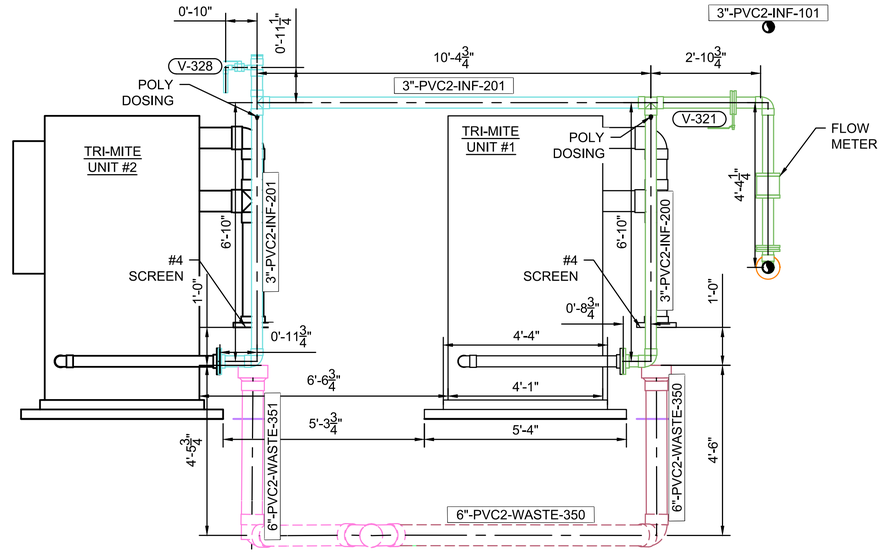
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P:\220583-M223443\3_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M2.3 TRI-MITE SYSTEM SECTION VIEWS II.DWG, 6/17/2024



TRI-MITE SYSTEM SECTION VIEW D

3/4"=1'-0"
0 1' 3'



TRI-MITE SYSTEM SECTION VIEW C

1/2"=1'-0"
0 1' 2'

NO. 6880006
G. Ryan Taylor
STATE OF UTAH
PROFESSIONAL STRUCTURAL ENGINEER
06/17/24

BOARDER SIZE 22X34
DESIGNED JB
DRAWN RK
CHECKED CH
APPROVED CH

REVISIONS
NO. DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

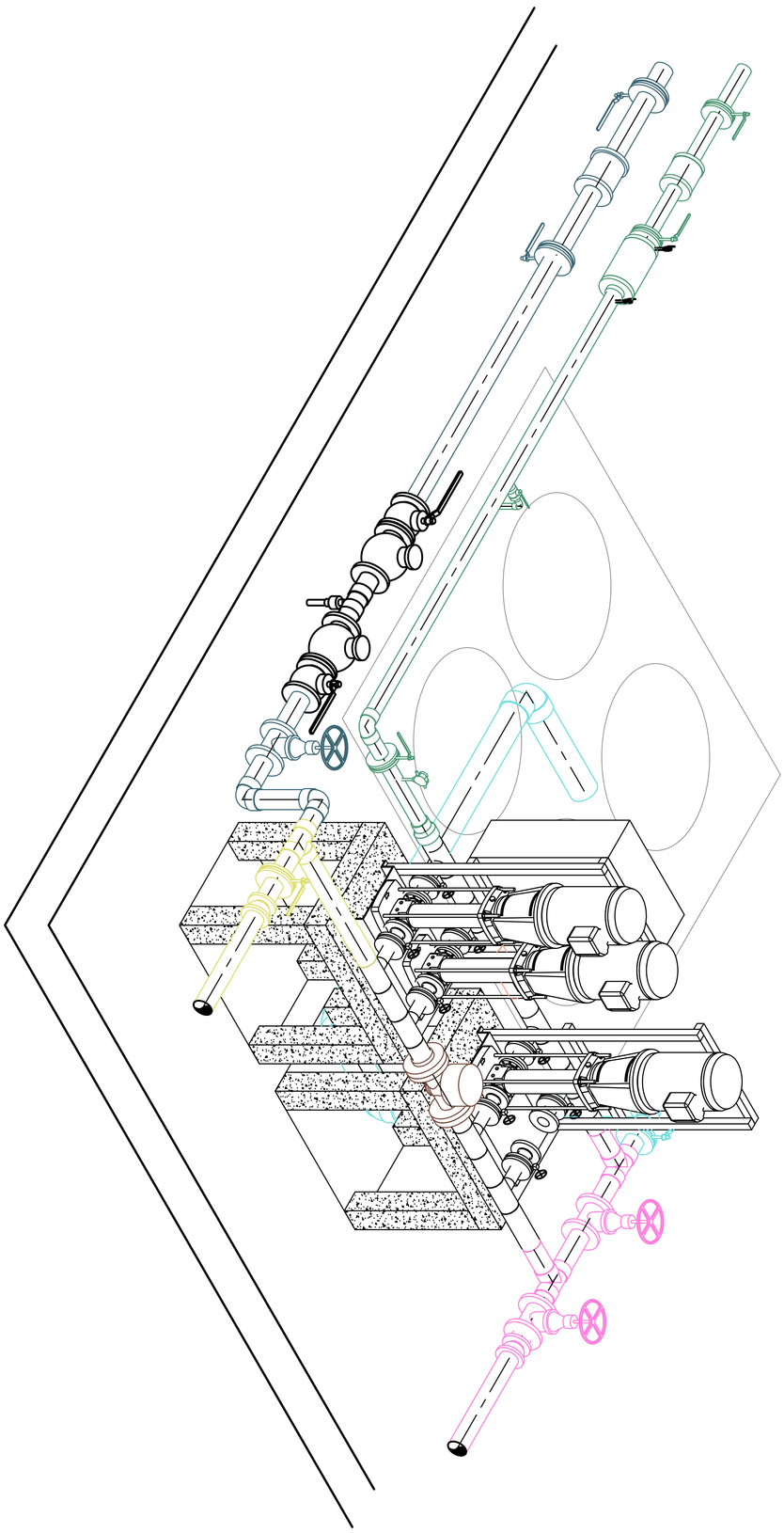
TRI-MITE SYSTEM SECTION VIEWS II

ATTENTION:
0 1/2 1
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M2.3

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BOOSTER PUMPS PERSPECTIVE VIEW
N.T.S.

SHEET: M3.0
REV: ---
PROJECT: 220583
DATE: JUNE, 2024

IF THIS BAR DOES NOT MEASURE 1" ON 22X34 SHEET or 1/2" ON 11X17 SHEET, THEN DRAWING IS NOT TO SCALE
0 ATTENUTION: 1/2 1

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM

WEBER COUNTY, UTAH

BOOSTER PUMPS PERSPECTIVE VIEW

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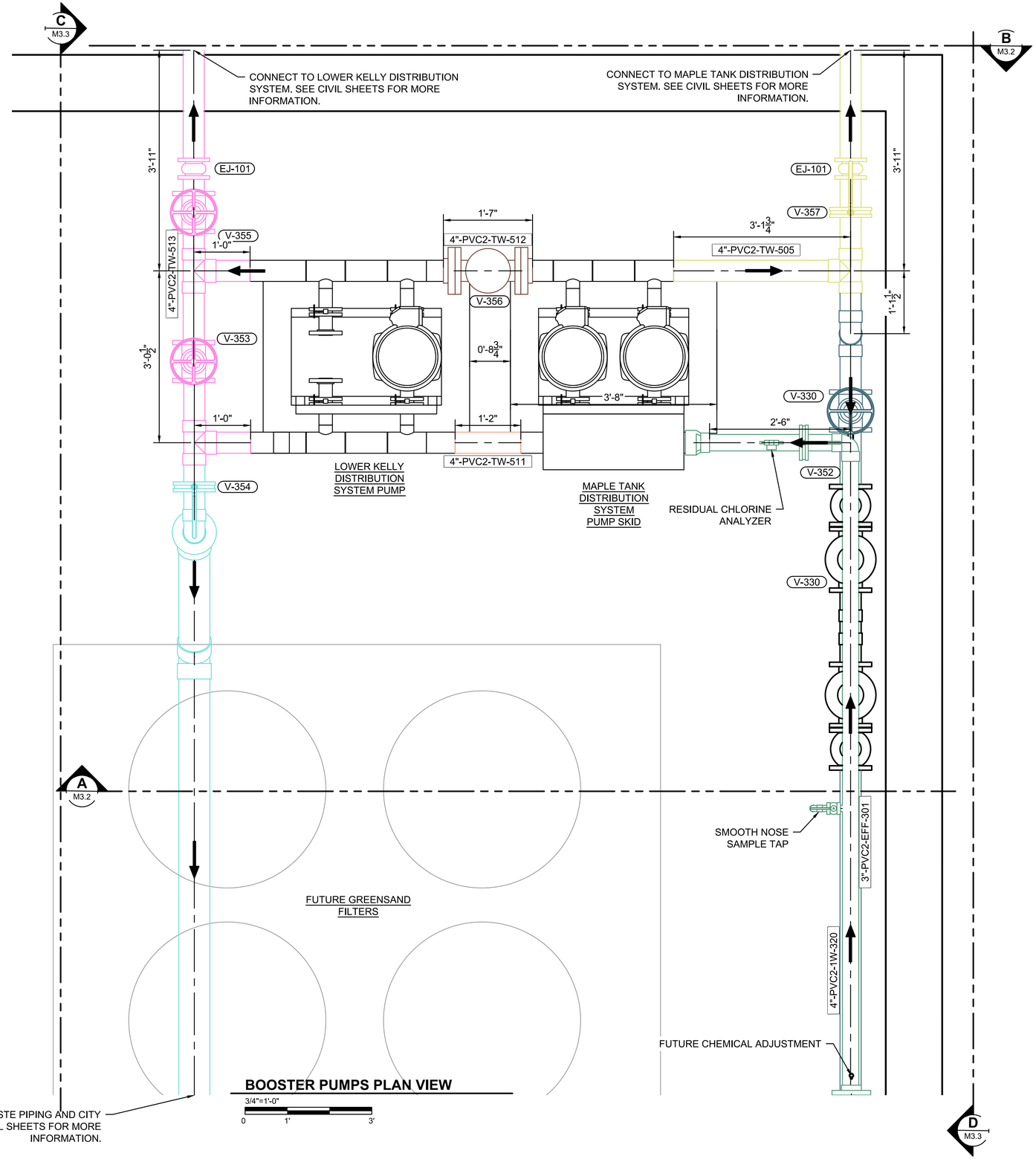
REVISIONS			BOARDER SIZE
NO.		DATE	22X34
			DESIGNED
			JB
			DRAWN
			RK
			CHECKED
			CH
			APPROVED
			CH

PROFESSIONAL ENGINEER
NO. 6800008
G. Ryan Taylor
STATE OF IDAHO
06/17/24

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P:\220583-M2234413_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M3.1 BOOSTER PUMPS PLAN VIEW.DWG, 6/17/2024



PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

BOOSTER PUMPS PLAN VIEW

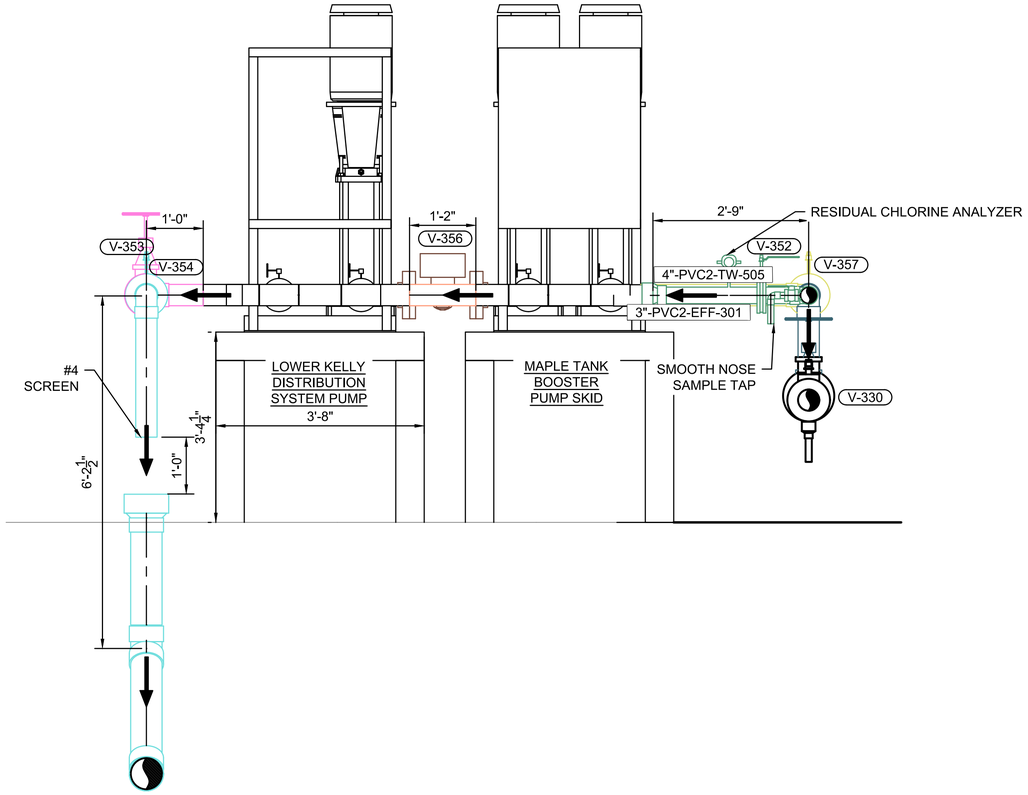
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M3.1

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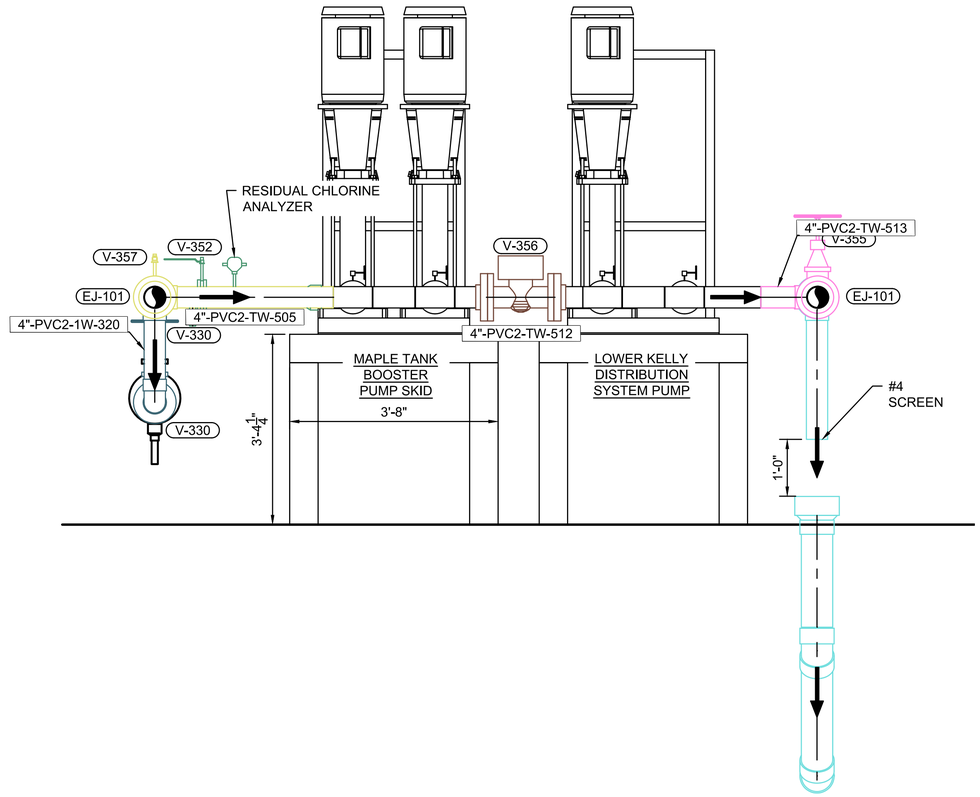
P:\220583-M223443_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M3.2 BOOSTER PUMPS SECTION VIEWS I.DWG, 6/17/2024



BOOSTER PUMPS SECTION VIEW A

3/4"=1'-0"

0 1' 3'



BOOSTER PUMPS SECTION VIEW B

3/4"=1'-0"

0 1' 3'

NO. 6880006
G. Ryan Taylor
STATE OF IDAHO
PROFESSIONAL STRUCTURAL ENGINEER
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

BOOSTER PUMPS SECTION VIEWS I

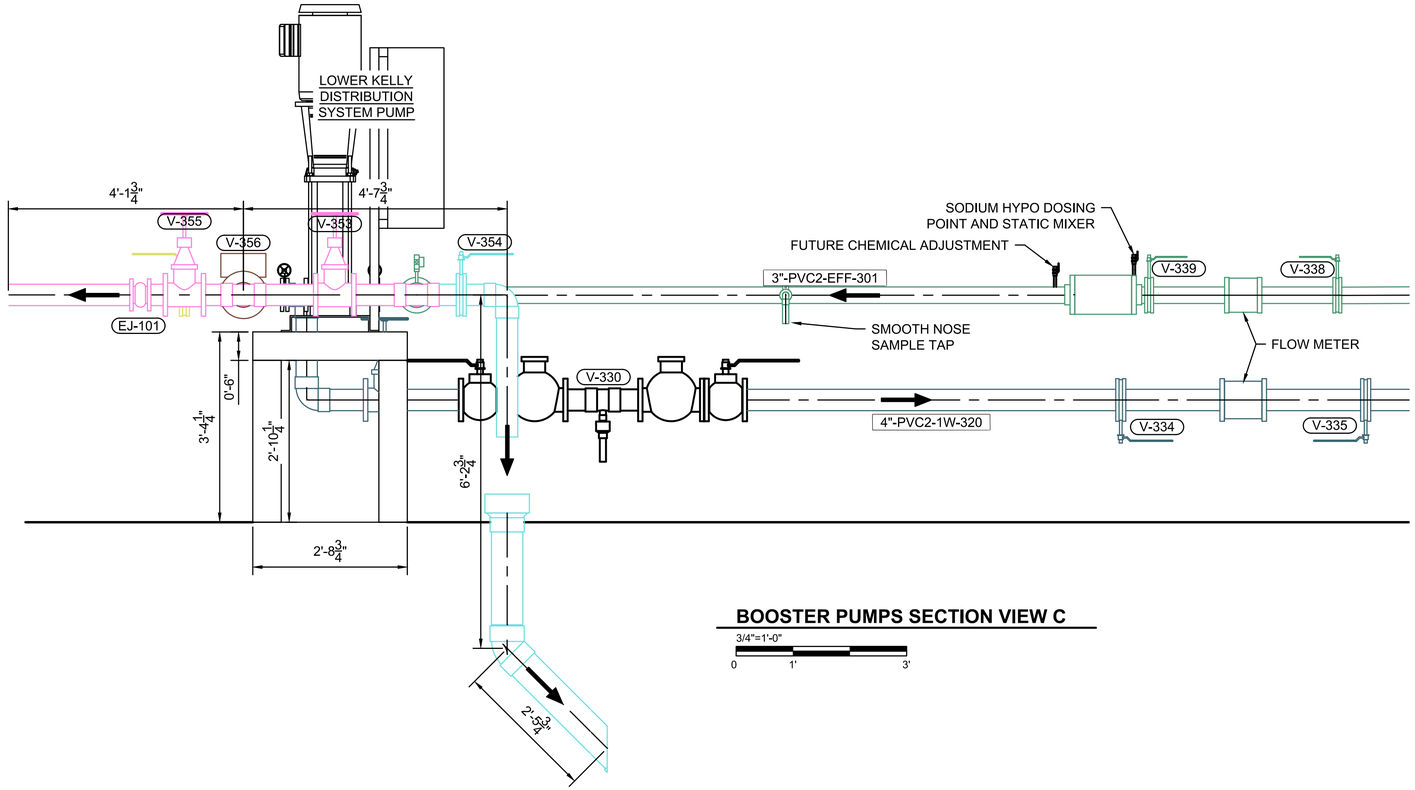
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M3.2

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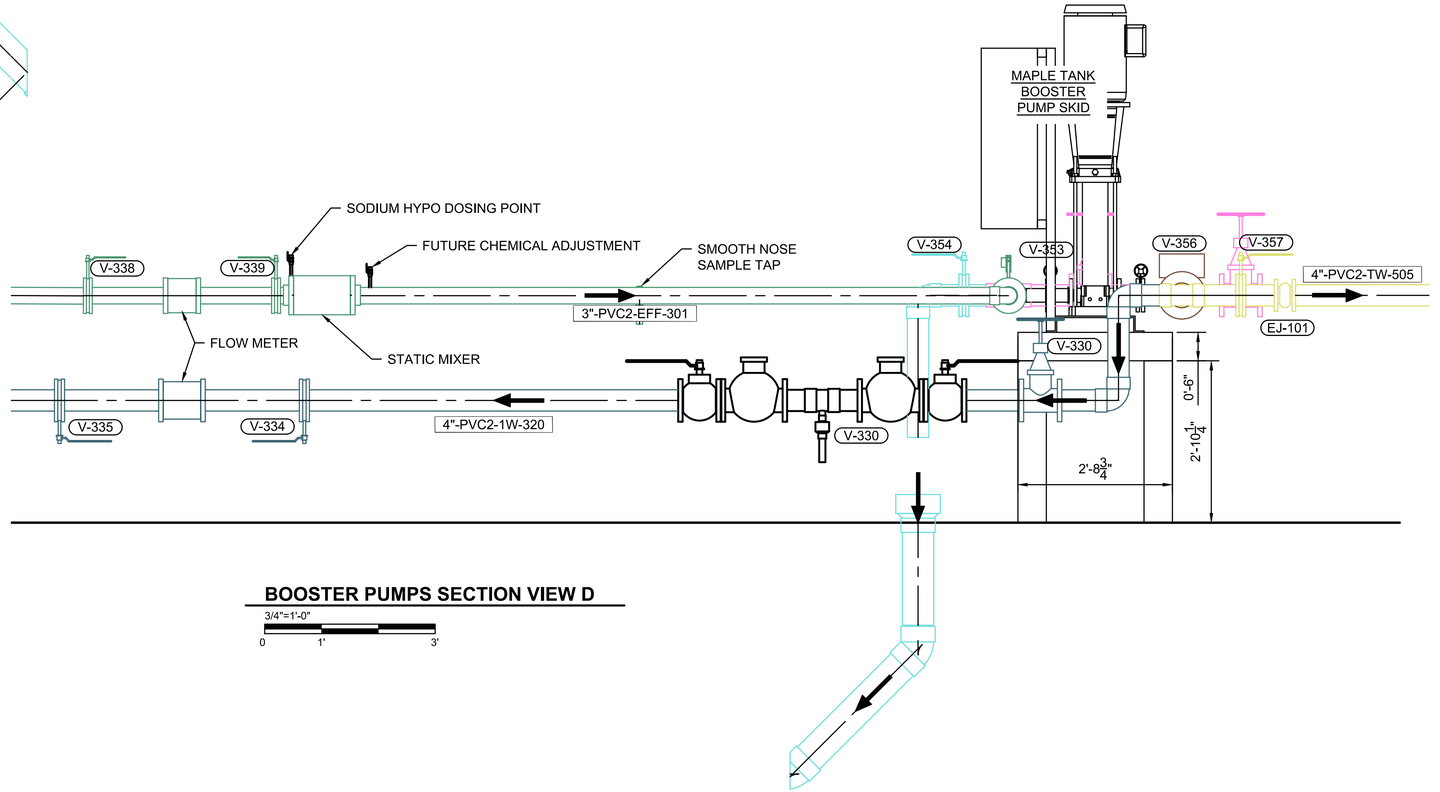
P:\220583-M223443_ACADDWG\220583-GREEN HILLS WTP\ORTHOS\DWGS\M3.3 BOOSTER PUMPS SECTION VIEWS II.DWG, 6/17/2024



BOOSTER PUMPS SECTION VIEW C

3/4"=1'-0"

0 1' 3'



BOOSTER PUMPS SECTION VIEW D

3/4"=1'-0"

0 1' 3'

NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

BOOSTER PUMPS SECTION VIEWS II

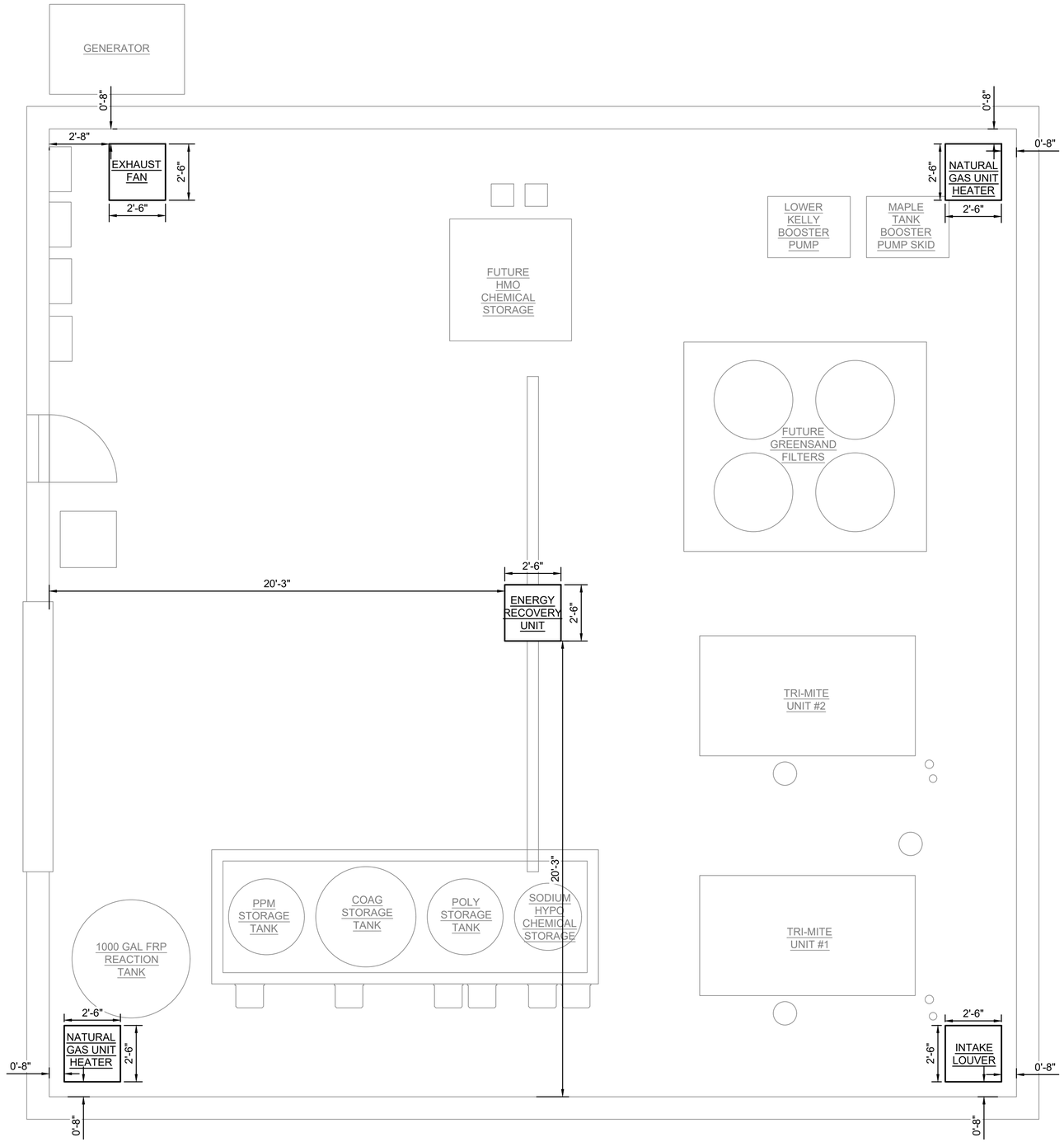
ISSUE FOR CONSTRUCTION

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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: M3.3

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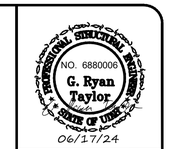
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H.V.A.C. LAYOUT

3/8"=1'-0"

0 1' 3'



BOARDER SIZE 22X34

NO.	REVISIONS	DATE

DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

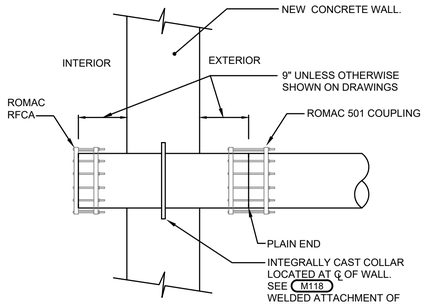
HVAC LAYOUT

ATTENTION:
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: H4.0

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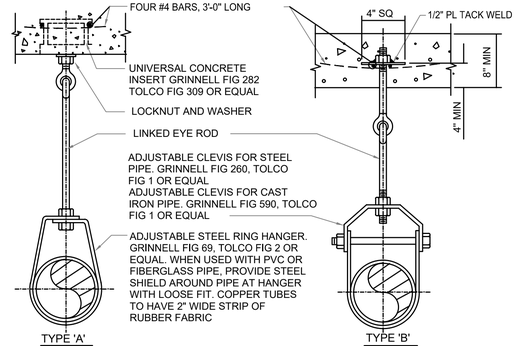
DUCTILE IRON WALL PIPE DETAIL — P 3

NTS

PIPE HANGER RODS AND SUPPORT SPACING					
PIPE DIA (INCHES)	ROD DIA (INCHES)	MAX SUPPORT SPACING (FEET)		WEIGHT LIMIT (LBS)	
		STEEL PIPE	C. I. PIPE	TYPE 'A'	TYPE 'B'
1 & SMALLER	3/8	6	5	610	1700
1 1/4 TO 2	3/8	9	5	610	1700
2 1/2 TO 3 1/2	1/2	12	5	1130	3200
4 TO 5	5/8	14	5	1430	3800
6, 8	3/4	16	5	1430	3800
10, 12	7/8	18	—	1430	3800
14, 16	1	20	—	1430	3800

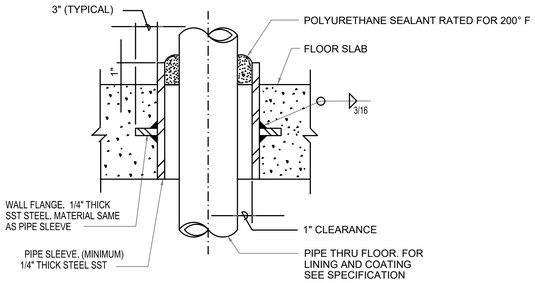
NOTES :

1. GALVANIZE ALL PARTS AFTER FABRICATION
2. FOR PIPES 2" DIA AND SMALLER, EYE BOLTS IN ADHESIVE FILLED HOLES MAY BE USED
3. TYPE A - FOR CONCRETE INSERT, ALLOW 1430 LB LOAD MAX
   TYPE B - FOR 4" SQ BEARING PLATE, ALLOW 3800 LB LOAD MAX
4. CONCRETE STRENGTH TO BE 3000 PSI OR MORE
5. DESIGN IS FOR STATIC LOAD ONLY
6. FOR ADDITIONAL REQUIREMENTS SEE SPECIFICATION SECTION 'PIPE SUPPORTS'



PIPE HANGER — M107

NTS

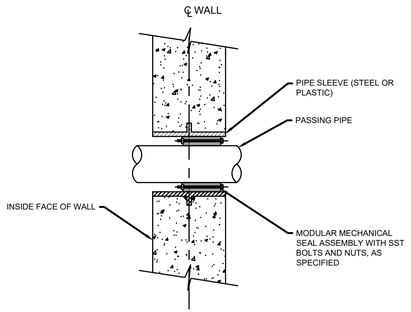


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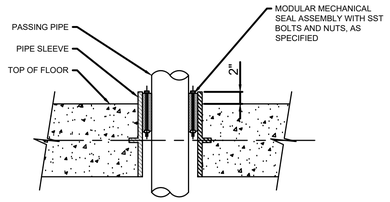
THIS SLEEVE IS TO BE USED BETEEN DRY SPACES ONLY

FLOOR PIPE SLEEVE — M149

NTS



WALL PENETRATION



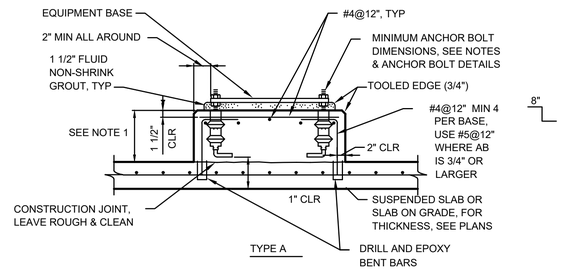
FLOOR PENETRATION

NOTE:

FOR EXISTING CORE DRILL THROUGH CONCRETE CLEAN CORED HOLE AND COAT WITH BITMUINOUS DAMPROOFING. VOIDS IN CONCRETE SHALL BE GROUTED PRIOR TO APPLYING DAMPROOFING

WALL/FLOOR PENTRATION SEAL DETAIL — M132D

NTS



NOTES:

1. SEE EQUIPMENT BASE NOTES.
2. CONTRACTOR SHALL INSTALL ALL PADS AND/OR OTHER APPURTENANCES SUPPLIED W/ EQUIPMENT

EQUIPMENT PAD DETAIL — M196

NTS

1. PAD SIZE SHALL BE MINIMUM INDICATED OR AS SHOWN ON THE PLANS OR AS INDICATED BY THE MANUFACTURER AND APPROVED BY THE ENGINEER.
2. THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE DETERMINED BY THE EQUIPMENT MANUFACTURER, AND SHALL BE AS APPROVED BY THE ENGINEER. ANCHOR BOLTS SHALL BE HELD IN POSITION WITH A ONE PIECE TEMPLATE, MATCHING THE BASE PLATE, WHILE PAD IS BEING POURED.
3. ANCHOR BOLT SLEEVES SHALL BE USED TO PROVIDE THE ANCHOR BOLT A MINIMUM MOVEMENT OF 1/2" IN ALL DIRECTIONS. THE MINIMUM SLEEVE LENGTH SHALL BE 8 TIMES THE BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
4. ANCHOR BOLT SLEEVES SHALL HAVE A MINIMUM INTERNAL DIAMETER 1" GREATER THAN BOLT DIAMETER AND A MAXIMUM INTERNAL DIAMETER 3" GREATER THAN ANCHOR BOLT DIAMETER. SLEEVES SHALL BE FILLED WITH NON-SHRINK GROUT.
5. EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS SPECIFIED OTHERWISE.
6. TYPE "D" DETAIL SHALL BE USED ONLY FOR SLABS ON GRADE AND AT GRADE. THE SURROUNDING FLOOR SLAB SHALL NOT BE PLACED UNTIL THE EXACT SIZE AND LOCATION OF THE PAD IS KNOWN.
7. WEDGES OR SHIMS SHALL BE USED TO SUPPORT THE BASE WHILE THE NON-SHRINK GROUT IS PLACED. TEMPORARY LEVELING NUTS SHALL BE BACKED OFF. IF LEFT IN, THE WEDGES OR SHIMS SHALL NOT BE EXPOSED TO VIEW.
8. HEIGHT OF PADS SHALL BE MINIMUM REQUIRED FOR ANCHOR BOLT CLEARANCE TO KEEP ANCHOR BOLT OUT OF SLAB (SEE TABLE BELOW). WHERE EQUIPMENT OR PIPING ELEVATION REQUIRE A PAD HEIGHT LESS THAN THE MINIMUM SHOWN, USE TYPE B WITH BLOCKOUT.
9. WHERE EQUIPMENT IS SUPPLIED WITH VIBRATION ISOLATION PADS. INSTALL PADS PER MANUFACTURER REQUIREMENTS.

AB DIA (IN.)	1/2	5/8	3/4	7/8	1	1 1/4	1 3/8	1 1/2	1 3/4	2
MIN PAD HT (IN.)	7	8 1/2	10	11	12 1/2	15	16 1/2	18	21	24

EQUIPMENT BASE NOTES — M198

NTS

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE 22X34 | DESIGNED JB | DRAWN RK | CHECKED CH | APPROVED CH

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

MECHANICAL DETAILS I

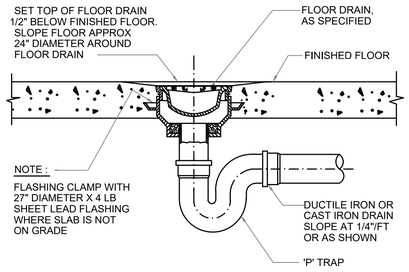
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET
MD1.0

ISSUE FOR CONSTRUCTION

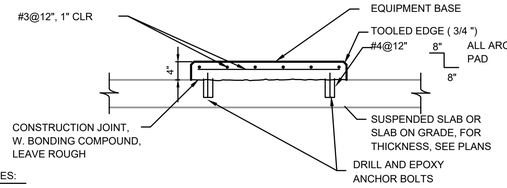
P:\220583-M223413_ACADDWG\SHEETS\MD1.0 MECHANICAL DETAILS I.DWG, 5/8/2024

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FLOOR DRAIN M203

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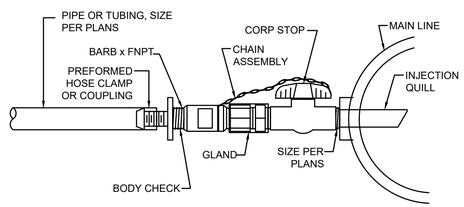


NOTES:

1. PAD SIZE SHALL BE EQUIPMENT DIMENSIONS PLUS 1½" IN EACH DIRECTION
2. THE SIZE, NUMBER, TYPE, LOCATION, AND THREAD PROJECTION OF THE ANCHOR BOLTS SHALL BE APPROVED BY THE ENGINEER.
3. WHEN ANCHORAGE OF EQUIPMENT TO SLAB IS REQUIRED, USE SST WEDGE ANCHORS SPECIFIED.
4. EQUIPMENT BASES SHALL BE INSTALLED LEVEL UNLESS SPECIFIED OTHERWISE.
5. EPOXY RESIN BONDING COMPOUNDS SHALL BE USED FOR WET AREAS AND SHALL BE ADHESIVE ENGINEERING, CONCRESIVE NOS. 1001, 1001-LPL OR 1180 AS APPLICABE; SIKA CHEMICAL CORP., SIKASTIX 350, 370, OR 390 AS APPLICABLE; BURKE COMPANY 881 LPL EPOXY; OR EQUAL. NONEPOXY BONDING COMPOUNDS SHALL BE USED FOR DRY AREAS AND SHALL BE BURKE COMPANY, ACRYLIC BONDCRETE; IMPERIAL CHEMICAL INDUSTRIAL, INC., THORO SYSTEM PRODUCTS, ACRYL 60; THOROBOND; OR EQUAL. BONDING COMPOUNDS SHALL BE APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

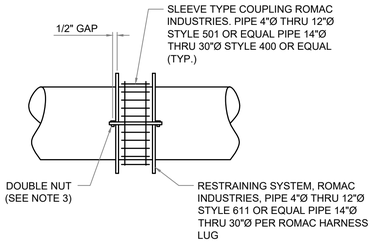
TYP. SERVICE PAD DETAIL M204

NTS



CHEMICAL INJECTOR WITH INJECTION QUILL DETAIL M229A

NTS

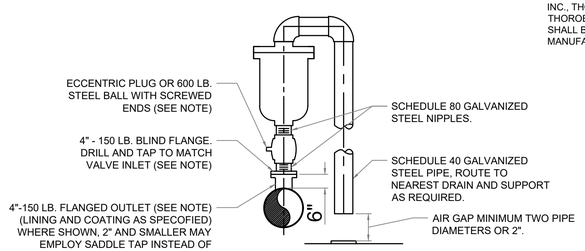


NOTES:

1. DIMENSIONS MAY VARY, SEE CIVIL YARD PIPING OR MECHANICAL SHEETS FOR DIMENSIONS.
2. ALL BURIED NUTS, BOLTS AND WASHERS SHALL BE STAINLESS STEEL.
3. PROVIDE TWO NUTS ON EACH END OF RESTRAINING ROD. LEAVE 1/2" GAP BETWEEN INSIDE NT AND RESTRAINING ROD.

HARNESSED JOINT (DUCTILE IRON PIPE) M246

NTS

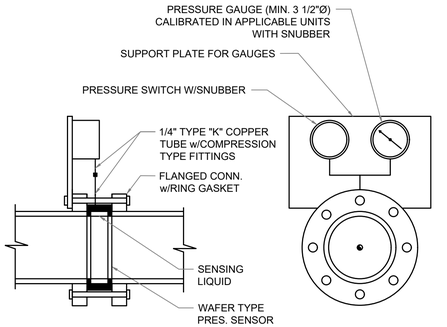


NOTES:

1. FOR MAIN PRESSURE OF MORE THAN 150 LBS, FLANGED OUTLET AND VALVES SHOULD SUIT HIGHER PRESSURE.

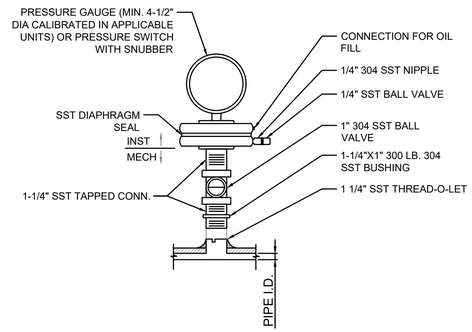
AIR VACUUM/RELEASE VALVE ASSEMBLY 3" AND SMALLER M254

NTS



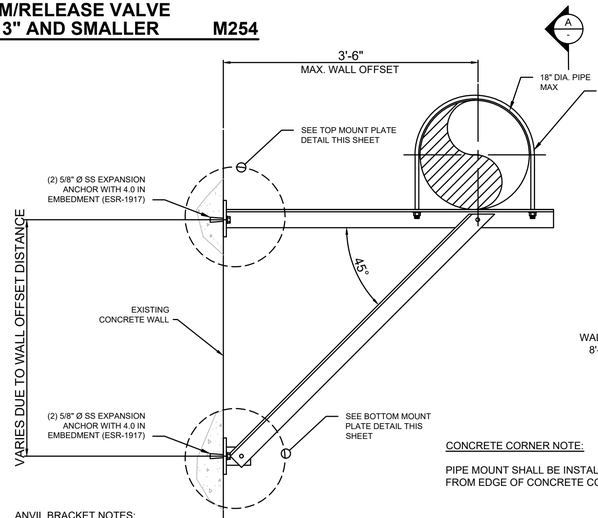
PRESSURE GAUGE AND PRESSURE SWITCH WITH ANNULAR SEAL M256

NTS

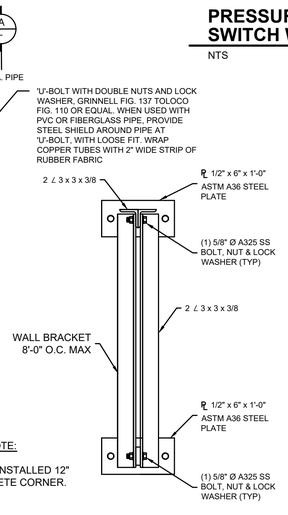


PRESSURE GAUGE OR PRESSURE SWITCH WITH DIAPHRAGM SEAL DETAIL M257

NTS



SIDE VIEW



SECTION A

CONCRETE CORNER NOTE:

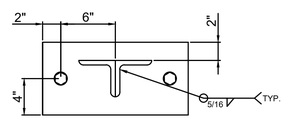
PIPE MOUNT SHALL BE INSTALLED 12" FROM EDGE OF CONCRETE CORNER.

ANVIL BRACKET NOTES:

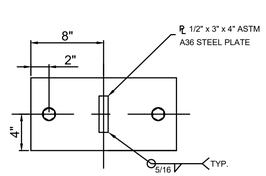
1. IF A WELDED STEEL BRACKET GRINNEL FIG. 195, ANVIL FIG. 199 TOLCO FIG. 30M, 30H, OR EQUAL IS USED FOR A PIPE SUPPORT A MOUNTING PLATE WILL BE REQUIRED.
2. GALVANIZE ALL PARTS AFTER FABRICATION. WHERE SUBMERGED, BRACKET, 'U'-BOLT, LOCK WASHERS, AND ANCHORS TO BE TYPE 316 STAINLESS STEEL

PIPE SUPPORT TYPE "C" M273

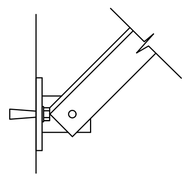
NTS



TOP MOUNT PLATE DETAIL



BOTTOM MOUNT PLATE



BOTTOM MOUNT PLATE SIDE

PROFESSIONAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

NO.	DATE	REVISIONS

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

MECHANICAL DETAILS II

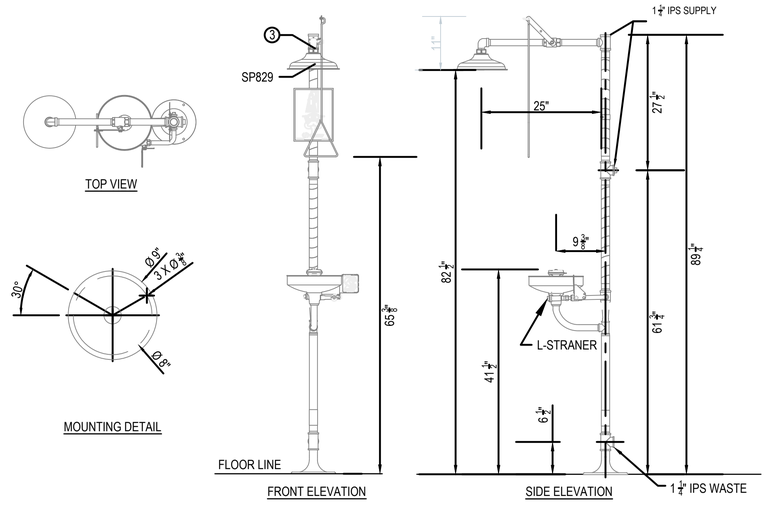
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: MD2.0

ISSUE FOR CONSTRUCTION

P:\220583-M2234\13_ACAD\DWG\SHEETS\MD2.0 MECHANICAL DETAILS II.DWG, 2/26/2024

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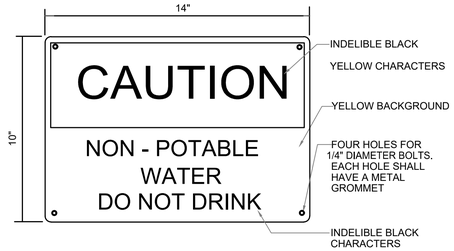


MANUFACTURER NOTES:

1. DIMENSIONS MAY VARY BY ± 1/2 INCH.
2. TO COMPLY WITH ANSI Z358.1-2004 FOR EMERGENCY EYEWASH OR EYE/FACE WASH AND SHOWER EQUIPMENT:
   - UNIT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND ACCEPTABLE PLUMBING PRACTICES.
   - EYEWASH OR EYE/FACE WASH SHALL BE POSITIONED WITH NOZZLES NOT LESS THEN 33" AND NO GREATER THAN
   - 45" FROM SURFACE ON WHICH USER STANDS AND 6" MINIMUM FROM WALL OR NEAREST OBSTRUCTION.
   - SHOWER SHALL BE POSITIONED SO THAT SHOWER HEAD IS NOT LESS THAN 82" NOR MORE THAN 96"
   - FROM SURFACE ON WHICH USER STANDS.
   - SHOWER SPRAY PATTERN SHALL HAVE A MINIMUM DIAMETER OF 20" AT 60" ABOVE SURFACE ON WHICH
   - USER STANDS, AND CENTER OF SPRAY PATTERN SHALL BE LOCATED AT LEAST 16" FROM ANY OBSTRUCTION.
3. DO NOT USE REGULAR PIPE SEALANT. IF NECESSARY USE DOW CORNING 832 SEALANT PLACING 5 SMALL BEADS ON THE MALE THREADS, JUST ABOVE THE FIRST THREAD
4. MINIMUM VOLUME OF SPRAY TO BE 20 GALLONS PER MINUTE FOR A MINIMUM TIME OF 15 MINUTES
5. TEMPERATURE TO BE TEPID (60-100°F). TEMPERING VALVE TO BE SPEC X OR ENGINEERING APPROVED EQUAL IF REQUIRED ANTI-SCALDING DEVICES (TEMPERATURE CONTROL VALVE OR THERMOSTATIC TEMPERING VALVE), CONSTANT FLOW METER, OR OTHER DEVICES TO BE INSTALLED TO MAINTAIN A CONSTANT TEMPERATURE AND FLOW RATE.
6. SHOWER AND EYEWASH TO BE HAWS MODEL 8300CRP OR ENGINEER APPROVED EQUAL.

EMERGENCY EYEWASH AND SHOWER DETAIL M690

NTS



NOTES :

1. MATERIAL TO BE SEMI-RIGID BUTYRATE OR EQUAL
2. COLORS AND LETTER SIZE TO BE PER OSHA STANDARDS FOR CAUTION SIGNS
3. PROVIDE THIS SIGN AT ALL HOSE BIBB LOCATIONS WHERE WATER IS NON-POTABLE

WARNING SIGN FOR NON-POTABLE WATER M912

NTS

NO. 6880006
G. Ryan Taylor
STATE OF UTAH
PROFESSIONAL ENGINEER
06/17/24

BOARDER SIZE 22X34
DESIGNED JB
DRAWN RK
CHECKED CH
APPROVED CH

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

MECHANICAL DETAILS III

ATTENTION:
0 1/2 1
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET
MD3.0

ISSUE FOR CONSTRUCTION

P:\220583-M2234#3_ACADDWG\SHEETS\MD3.0 MECHANICAL DETAILS III.DWG, 2/26/2024

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ELECTRICAL SYMBOLS

PLANVIEW SYMBOL	DESCRIPTION	DIAGRAM SYMBOL	DESCRIPTION
	CONCEALED CONDUIT OR UG CONDUIT	### 3P	CIRCUIT BREAKER - THERMAL MAGNETIC 3 POLE UNLESS INDICATED OTHERWISE CONTINUOUS AMP TRIP SETTING INDICATED
	EXPOSED CONDUIT		
	GROUND MAT		
	CONDUIT STUBBING UP	### 3P	DRAWOUT AIR CIRCUIT BREAKER LOW VOLTAGE, FRAME SIZE AND TRIP SETTING INDICATED
	CONDUIT STUBBING DOWN		
XXX	CABLE IDENTIFICATION TAG		
X	NOTES BY SYMBOL, NO. AS INDICATED	OL	MOTOR CIRCUIT PROTECTOR, FULL VOLTAGE NON-REVERSING
Y # X	24" X 48" LIGHT FIXTURE Y=SWITCH, #=CIRCUIT, X=TYPE	#	SWITCH - CURRENT RATING INDICATED. 3 POLE UNLESS INDICATED OTHERWISE
Y # X	DOWNLIGHT Y=SWITCH, #=CIRCUIT, X=TYPE	52 ###	DRAWOUT AIR OR VACUUM CIRCUIT BREAKER, (VCB) MEDIUM VOLTAGE, FRAME SIZE INDICATED
Y # X	STRIPLIGHT, Y=SWITCH, #=CIRCUIT, X=TYPE	### XX	DISCONNECT SWITCH, # = SIZE, X = FUSED OR NONFUSED
Y # X	WALL PACK LIGHT FIXTURE, Y=SWITCH, #=CIRCUIT, X=TYPE		
			FUSE
		##	CAPACITOR - KVAR INDICATED
# X	EMERGENCY LIGHT FIXTURE, X=TYPE, #=CIRCUIT		GROUND CONNECTION
		PRIM SECD	CONTROL POWER TRANSFORMER - VOLTAGES INDICATED
# X	EMERGENCY DOWNLIGHT FIXTURE, X=TYPE, #=CIRCUIT		
# X	EMERGENCY STRIPLIGHT FIXTURE, X=TYPE, #=CIRCUIT	YYY ### XXX/XXX-XXX ZZZ	POWER DISTRIBUTION TRANSFORMER, XXX=VOLTAGES, ###=KVA RATING Y=KVA, Z=PHASE,WIRE,HERTZ
#	CEILING MOUNTED EXIT SIGN, #=CIRCUIT 1. DIRECTION ARROWS AS SHOWN 2. SHADED QUADRANT INDICATES FACE(S) OF FIXTURE	#	CURRENT TRANSFORMER - NUMBER INDICATES QUANTITY
#	WALL MOUNTED EXIT SIGN #=CIRCUIT 1. DIRECTION ARROWS AS SHOWN 2. SHADED QUADRANT INDICATES FACE(S) OF FIXTURE	#	WINDOW CURRENT TRANSFORMER ENCLOSING ALL CONDUCTORS
#	WALL MOUNTED EMERGENCY LIGHT UNIT, #=CIRCUIT	### NF	AUTOMATIC TRANSFER SWITCH, RATING AS INDICATED
#	WALL MOUNTED EXIT/LIGHT COMBO UNIT, #=CIRCUIT	M	ELECTRICAL SERVICE METER
Y $ # X	LIGHT SWITCH Y = ZONE # = CIRCUIT X = TYPE 3 = THREE-WAY 4 = FOUR-WAY M = MOTOR RATED LV = LOW-VOLTAGE		CONTROL STATION
		SPD	SURGE PROTECTION DEVICE
			PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY OPEN
G	GENERATOR		PUSH-BUTTON SWITCH, MOMENTARY CONTACT, NORMALLY CLOSED
M	MOTOR	VFD	VARIABLE FREQUENCY DRIVE
# X	DUPLEX RECEPTACLE # = CIRCUIT X = TYPE EWC = WATER COOLER TL = TWIST LOCK WP = WEATHERPROOF GFCI = GROUND FAULT CIRCUIT INTERRUPTER		PANELBOARD
		XXX	
##	TRANSFORMER, NO. INDICATES kVA RATING	##	MOTOR, HP AS INDICATED
		### LOAD	GENERIC LOAD, FULL LOAD AMPACITY AS INDICATED
XX-#	PANELBOARD, NAME AS INDICATED		BATTERY
	NON FUSED DISCONNECT		BUS CONNECTION
	FUSED DISCONNECT		
T	THERMOSTAT		
	TELEPHONE/DATA OUTLET		
	INSTRUMENT		
	GROUNDING CONNECTION - EXOTHERMIC WELD		
	GROUND TEST WELL		
	GROUND ROD		
	GROUNDING CONNECTION - MECHANICAL LUG ATTACHMENT TO EQUIPMENT		

ELECTRICAL ABBREVIATIONS

SYMBOL	DESCRIPTION
A	AMPERAGE
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
BFM	BLOWER FILTER MOTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER CONTROL
CU	CONDENSING UNIT
DS	DISCONNECT SWITCH
EHU	ELECTRIC HEATER UNIT
ETM	TIME METER EACH WAY
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
FCV	FLOW CONTROL VALVE
FIT	FLOW INDICATING TRANSMITTER
FT	FLOW TRANSMITTER
FLA	FULL LOAD AMPERAGE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
G,GND	GROUND
GALV	GALVANIZED
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFR	GROUND FAULT RELAY
HD	HOT DIPPED GALVANIZED
HOA	HAND OFF AUTOMATIC
HPS	HIGH PRESSURE SODIUM
IC	INTERRUPTING CAPACITY
IGV	INLET GUIDE VANE
INCAND	INCANDESCENT
INST	INSTANTANEOUS
JB	JUNCTION BOX
K	KEY INTERLOCK
KS	KEY SWITCH
KVA	KILOVOLT-AMPERE
KW	KILOWATT
LC	LIGHTING CONTACTOR
LCP	LOCAL CONTROL PANEL
LE	LEVEL ELEMENT
LIT	LEVEL INDICATING TRANSMITTER
LLO	LOW LEVEL LOCKOUT
LPU	LOCAL PROCESSING UNIT
LR	LATCH RELAY
LRC	LOCKED ROTOR CURRENT
LS, LMS	LIMIT SWITCH
LS	LEVEL SWITCH
LSC	LIMIT SWITCH VALVE CLOSE
LSH	LEVEL HIGH SWITCH
LSL	LEVEL LOW SWITCH
LSO	LIMIT SWITCH VALVE OPEN
LTG	LIGHTING
LV	LOW VOLTAGE
M	MOTOR (ELECTRIC)
MCC	MOTOR CONTROL CENTER
MSC	MANUFACTURE SUPPLIED CABLE
MV	MEDIUM VOLTAGE
MLO	MAIN LUGS ONLY
MPC	MINI POWER CENTER
MRP	MOTOR RELAY PROTECTION
N	NEUTRAL GROUNDED CONDUCTOR
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NF	NON-FUSED
NO	NORMALLY OPEN
OC	OVERCURRENT
OCPD	OVERCURRENT PROTECTION DEVICE
OV	OVERVOLTAGE
PB	PUSHBUTTON
PBR	PUMP-BEARING RELAY
PH	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PMT	PAD MOUNTED TRANSFORMER
PMGR	PAD MOUNTED SWITCHGEAR
PP	POWER PANEL
PR	PRESETTING RELAY (TIMER)
PT	POTENTIAL TRANSFORMER
PTT	PUSH TO TEST
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RELAY
REV	REVERSE
REQD	REQUIRED
RGS	RIGID GALVANIZED STEEL
RLY	RELAY
RS	RIGID STEEL
RVNR	REDUCED VOLTAGE NON-REVERSING REDUCE VOLTAGE
RVR	REVERSING
RVSS	REDUCE VOLTAGE SOLID STATE RESISTANCE TEMP
RTD	DETECTORS
RTU	ROOF TOP UNIT
S, SV	SOLENOID VALVE
SCR	SECURITY CARD READER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SF	SUPPLY FAN
SPD	SURGE PROTECTIVE DEVICE
SS	STAINLESS STEEL
SWGR	SWITCHGEAR
SWT	SWITCH
T	THERMOSTAT
TB	TERMINAL BOX
TD	TIME DELAY
TP	TWISTED PAIR
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
UV	UNDERVOLTAGE
V	VOLT
VF	VARIABLE FREQUENCY
VFD	VARIABLE FREQUENCY DRIVE
W	WIRE
WP	WEATHER PROOF
XFMR	TRANSFORMER

GENERAL NOTES:

1. ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
   1.1. NFPA 70, NATIONAL ELECTRICAL CODE.
   1.2. NFPA 101 LIFE SAFETY CODE.
2. ALL ELECTRICAL CIRCUITS SHALL INCLUDE A GREEN GROUNDING CONDUCTOR SIZED PER NEC.
3. CONDUIT AND DEVICE LOCATIONS ARE SHOWN DIAGRAMMATICALLY ONLY, CONTRACTOR SHALL FIELD LOCATE OR ROUTE AS REQUIRED.
4. ALL CONDUIT SHALL BE INSTALLED PARALLEL AND PERPENDICULAR TO BUILDING STRUCTURE.
5. ALL PANEL SCHEDULES SHALL BE RETYPED AND LAMINATED TO REFLECT UP TO DATE CONDITIONS. TRACE EXISTING CIRCUITS. ALL PANEL LEGENDS SHALL INDICATE THE PANELS. SOURCE PANEL AND ITS LOCATION.
6. ELECTRICAL EQUIPMENT AND DEVICES SHALL BE PROVIDED WITH PHENOLIC NAMEPLATES. ALL NAMEPLATES SHALL BE MECHANICALLY FASTENED WITH S.S. SCREWS OR RIVETS. THE USE OF ADHESIVE NAMEPLATES SHALL NOT BE ALLOWED.
7. CONTRACTOR SHALL MAINTAIN A SET OF PRINTS AND MARK-UP DURING CONSTRUCTION TO REFLECT "AS-BUILT" CONDITIONS. PRINTS SHALL BE DELIVERED TO THE ENGINEER UPON COMPLETION OF THE PROJECT AS A COMPLETE SET OF RECORD DRAWINGS. IN ADDITION, THE CONTRACTOR SHALL PROVIDE ELECTRONIC COPIES OF ALL UPDATED "AS-BUILT" DRAWINGS IN AUTOCAD .DWG FORMAT.
8. THE CONTRACTOR SHALL PROVIDE PULL BOXES IN POWER CIRCUIT CONDUIT AS REQUIRED, SO AS TO LIMIT THE NUMBER OF BENDS TO A MAXIMUM OF 270 DEGREES OR THREE 90 DEGREE TURNS.
9. PROVIDE CONDUIT EXPANSION FITTINGS AS CONDUIT CROSSES BUILDING EXPANSION JOINTS.
10. ALL SUPPORTING AND FASTENING DEVICES SHALL BE 316 STAINLESS STEEL.
11. CONTRACTOR MAY COMBINE HOMERUNS TO 120V PANELBOARD CIRCUIT PER NEC. COMBINING MORE THAN THREE 120V CIRCUIT WILL NOT BE ALLOWED WITHOUT SUBMITTING NEC DERATING CALCULATIONS.
12. ALL RECEPTACLE BRANCH CIRCUITS OVER 75' IN LENGTH SHALL USE #10 AWG CONDUCTOR (FOR VOLTAGE DROP).
13. CONTRACTOR SHALL PROVIDE 2 SPARE FUSES FOR EACH FUSE INSTALLED INCLUDING ALL EQUIPMENT AND CONTROLS.
14. CONTROL AND POWER CONDUITS SHALL BE SEPARATED BY 12" MIN. AND SHALL BE IN SEPARATE JUNCTION BOXES AND DUCT BANKS. MAINTAIN 12" SEPARATION BETWEEN DUCT BANKS.
15. INSTALLATION OF THE NEW FACILITIES WILL REQUIRE FILED COORDINATION WITH PLANT OPERATIONS TO PERMIT MAINTENANCE OF OPERATION DURING CONSTRUCTION. DURATION OF POWER OUTAGES SHALL BE MINIMUM REQUIRED FOR SAFE INSTALLATION AND SHALL BE SCHEDULED WITH AND APPROVED BY THE OWNER.
16. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID EXISTING UNDERGROUND UTILITIES INCLUDING PROCESS PIPING, WATER LINES, CHEMICAL FEED PIPING, ELECTRICAL CONDUITS. HAND EXCAVATION SHALL BE REQUIRED IN CONGESTED AREAS WHERE THE EXACT LOCATION OF ALL UTILITIES IS UNKNOWN. LOCATIONS SHOWN FOR THE EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. NOT ALL OF THE EXISTING UNDERGROUND UTILITIES ARE SHOWN. FIELD ADJUST LOCATIONS OF THE NEW FACILITIES TO ACCOMMODATE THE EXISTING SITE CONDITIONS AND UNDERGROUND UTILITIES.
17. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO DETERMINE IF A LIGHTNING PROTECTION SYSTEM IS REQUIRED. IF IT IS DETERMINED THAT A LIGHTNING PROTECTION SYSTEM IS WITHIN THE SCOPE OF THIS PROJECT, PROVIDE A UL 96A MASTER LABEL LIGHTNING PROTECTION SYSTEM INCLUDING GROUND RODS AT EACH LIGHTNING PROTECTION SYSTEM DOWN CONDUCTOR. INTERCONNECT EACH SYSTEMS GROUND RODS WITH A CONTINUOUS #4/0 COPPER TINNED COUNTERPOISE LOOP.
18. CONTRACTOR SHALL PROVIDE A GROUNDING SYSTEM AS REQUIRED BY THE NEC AND IEEE GREEN BOOK. THE INSTALLED GROUNDING SYSTEM SHALL HAVE A RESISTANCE OF LESS THAN 5 OHMS TO GROUND. PROVIDE A CONTINUOUS #4/0 TINNED COPPER GROUNDING SYSTEM.
19. IF ITEM IS PROPOSED FROM OTHER THAN FIRST NAMED MANUFACTURER AND WILL REQUIRE ADDITIONAL ENGINEERING TO INCORPORATE INTO DRAWINGS, I.E., ADDITIONAL I/O, DIFFERENT OR ADDITIONAL BREAKERS, LARGER CONDUCTOR SIZE OR ADDITIONAL CONDUCTORS, LARGER OR ADDITIONAL CONDUIT(S). CONTRACTOR SHALL BE REQUIRED TO PAY FOR ALL ADDITIONAL ENGINEERING CHARGES AND ADDITIONAL EQUIPMENT, MATERIAL COST, ETC.
20. NAMEPLATES ON ELECTRICAL EQUIPMENT SHALL HAVE P&ID TAG NUMBER AS WELL AS DESCRIPTION OF LOAD BEING SERVED AND EQUIPMENT TAG NUMBER AS A MINIMUM. EQUIPMENT BEING SERVED SHALL HAVE IDENTICAL TAG AS ELECTRICAL GEAR AND BREAKER NOTATION WHICH IS SERVING EQUIPMENT.
21. REFER TO HVAC DRAWINGS FOR THE LOCATIONS OF 120 VOLT UNIT HEATER THERMOSTATS AND PROVIDE 3/4-IN C, 2#12 AND 1#12 GND BETWEEN EACH HEATER AND ITS RESPECTIVE CONTROL THERMOSTAT. INTERCONNECTION WIRING BETWEEN HVAC COMPONENTS SHALL BE BY THE HVAC CONTRACTOR.

PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY JONES
07/10/24
STATE OF UTAH

BOARDER SIZE 22X34
DESIGNED RC
DRAWN RC
CHECKED AAR
APPROVED ZJ

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

ELECTRICAL NOTES AND LEGEND

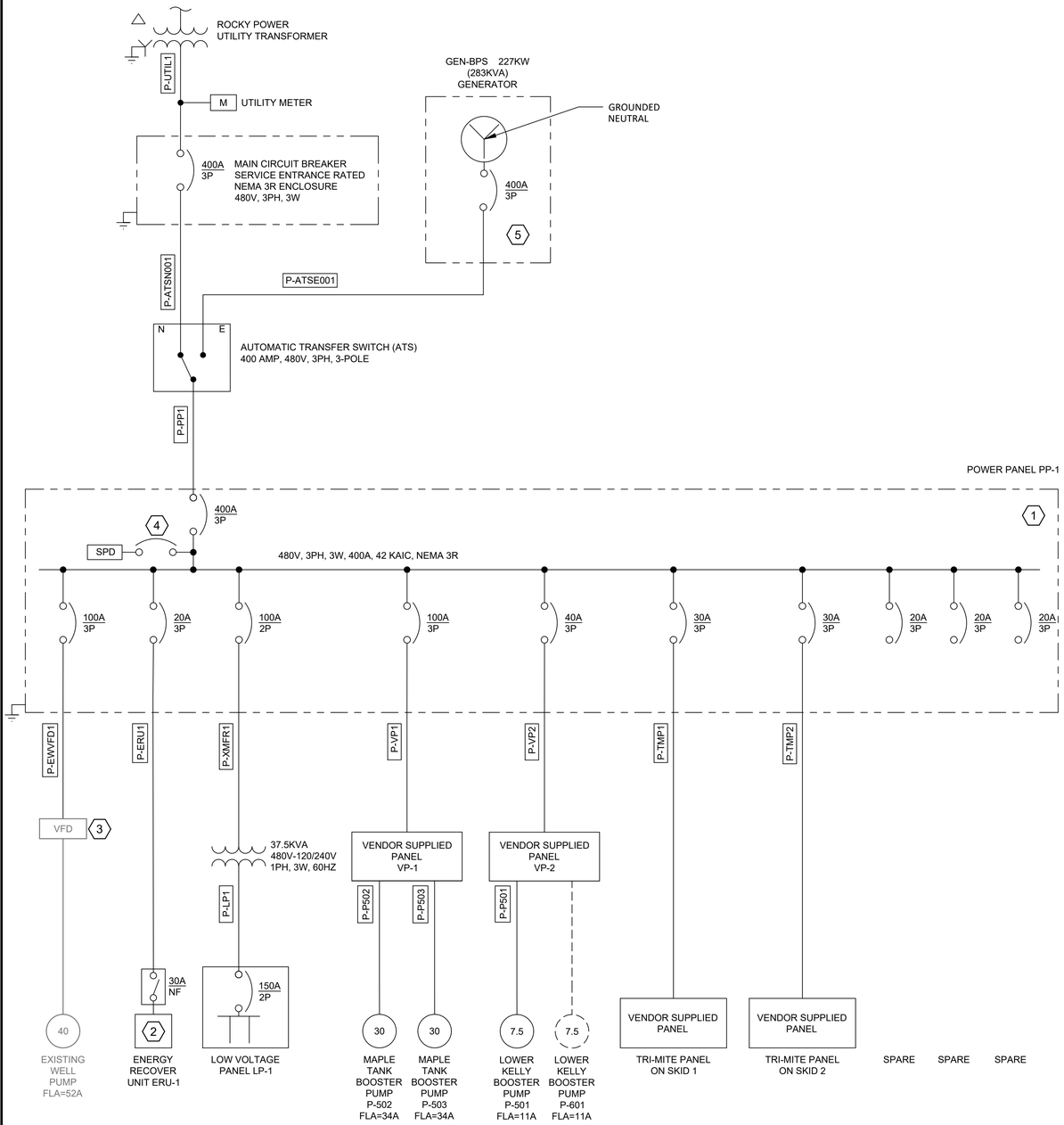
ATTENTION:
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DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E1.0

ISSUE FOR CONSTRUCTION

I:\PROJECTS\GREEN HILL\8.0 DRAWINGS\GREEN HILL.DWG, 7/9/2024

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ONE-LINE DIAGRAM

NOTES BY SYMBOL " ⬡ ":

1. CONTRACTOR TO PROVIDE 42 CIRCUIT POWER PANEL. PROVIDE EQUIPPED SPACES FOR FUTURE CIRCUITS.
2. REFER TO NOTE 1 ON SHEET E6.0.
3. CONTRACTOR TO FIELD VERIFY LOCATION OF EXISTING VFD WITH OPERATIONS STAFF AND INSTALL CONDUIT/CONDUCTOR RUNS TO POWER THE EXISTING VFD AS SHOWN.
4. CIRCUIT BREAKER FOR SURGE PROTECTIVE DEVICE SHALL BE SIZED BY THE PANEL MANUFACTURER.
5. GENERATOR AND ATS SIZES SHOWN ARE SIZED FOR THE ELECTRICAL LOAD OF THE PROJECT. THE CONTRACTOR SHALL COORDINATE WITH THE OWNER FOR SIZE OF GENERATOR PRE-PURCHASED. THE GENERATOR SHALL HAVE A CIRCUIT BREAKER AS SHOWN, AND SHALL NOT EXCEED THE ATS AND PANEL PP-1 MAIN CIRCUIT BREAKER RATINGS.

CIRCUIT TAG	MAX CKT VOLTAGE	CONDUIT SIZE (INCHES)	CONDUCTORS	FROM	TO
P-UTIL1	480	2	2 SETS EACH: 4#3/0, #2G	UTILITY TRANSFORMER	INCOMING BREAKER SERVICE ENTRANCE (NEMA 3R)
P-ATSN001	480	2	2 SETS EACH: 3#3/0, #2G	INCOMING BREAKER SERVICE ENTRANCE (NEMA 3R)	ATS
P-ATSE001	480	2	2 SETS EACH: 3#3/0, #2G	GENERATOR	ATS
P-PP1	480	2	2 SETS EACH: 3#3/0, #2G	ATS	POWER PANEL PP-1
P-VP1	480	2	3#1, 1#8G	POWER PANEL PP-1	VENDOR SUPPLIED PANEL VP-1
P-EWVFD1	480	2	3#1, 1#8G	POWER PANEL PP-1	EXISTING WELL VFD
P-P502	480	1	3#6, 1#10G	VENDOR SUPPLIED PANEL VP-1	MAPLE TANK BOOSTER PUMP P-502
P-P503	480	1	3#6, 1#10G	VENDOR SUPPLIED PANEL VP-1	MAPLE TANK BOOSTER PUMP P-503
P-VP2	480	1	3#8, 1#10G	POWER PANEL PP-1	VENDOR SUPPLIED PANEL VP-2
P-P501	480	1	3#12, 1#12G	VENDOR SUPPLIED PANEL VP-2	LOWER KELLY BOOSTER PUMP P-501
P-ERU1	480	1	3#12, 1#12G	POWER PANEL PP-1	ENERGY RECOVER UNIT ERU-1
P-NGH1	240	1	2#12, 1#12G	LP-1	NATURAL GAS HEATER 1 NGH-1
P-NGH2	240	1	2#12, 1#12G	LP-1	NATURAL GAS HEATER 2 NGH-2
P-EF1	240	1	2#12, 1#12G	LP-1	EXHAUST FAN EF-1
P-TMP1	480	1	3#10, 1#10G	POWER PANEL PP-1	TRI-MITE PANEL TMP-1
P-TMP2	480	1	3#10, 1#10G	POWER PANEL PP-1	TRI-MITE PANEL TMP-2
P-XFMR1	480	2	2#1, 1#8G	POWER PANEL PP-1	TRANSFORMER XMFR-1
P-LP1	240	2	3#3/0, 1#4G	XMFR-1	LIGHTING PANEL LP-1
P-CP002	120	1	2#12, 1#12G	LP-1	CP-002 (POTASSIUM PERMANGANATE)
P-CP00101	120	1	2#12, 1#12G	LP-1	CP-001-01 (COAG PUMP)
P-CP101	120	1	2#12, 1#12G	LP-1	CP-101 (POLY PUMP)
P-CP201	120	1	2#12, 1#12G	LP-1	CP-201 (POLY PUMP)
P-CP500-01	120	1	2#12, 1#12G	LP-1	CP500-01 SODIUM HYPO DOSING PUMPS
P-CP500-02	120	1	2#12, 1#12G	LP-1	CP500-02 SODIUM HYPO DOSING PUMPS
P-FIT201	120	1	2#12, 1#12G	LP-1	FIT-201
P-FIT009	120	1	2#12, 1#12G	LP-1	FIT-009
P-V303	120	1	2#12, 1#12G	LP-1	V-303
P-V300	120	1	2#12, 1#12G	LP-1	V-300
P-PCP001	120	1	2#12, 1#12G	LP-1	PROCESS CONTROL PANEL
P-GEN001	120	1	2#10, 1#10G	LP-1	GENERATOR LV CIRCUIT
P-GEN002	120	1	2#10, 1#10G	LP-1	GENERATOR LV CIRCUIT
P-GEN003	120	1	2#10, 1#10G	LP-1	GENERATOR LV CIRCUIT
P-MIX-01	120	1	2#12, 1#12G	LP-1	PPM STORAGE TANK MIXER
P-MIX-02	120	1	2#12, 1#12G	LP-1	COAG STORAGE TANK MIXER
P-MIX-03	120	1	2#12, 1#12G	LP-1	POLYMER STORAGE TANK MIXER
C-GEN001	24	1	4#14, 1#14G	GENERATOR	ATS
C-CP002-01	24	1	1PR #16 TSP	PROCESS CONTROL PANEL	POTASSIUM PERMANGANATE PUMP ANALOG SIGNALS
C-CP00101-01	24	1	1PR #16 TSP	PROCESS CONTROL PANEL	COAG PUMP PUMP ANALOG SIGNALS
C-CP002-02	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	POTASSIUM PERMANGANATE PUMP DIGITAL SIGNALS
C-CP00101-02	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	COAG PUMP DIGITAL SIGNALS
C-FIT201	24	1	1PR #16 TSP	PROCESS CONTROL PANEL	FIT-201
C-FIT009	24	1	1PR #16 TSP	PROCESS CONTROL PANEL	FIT-009
C-V303	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	V-303
C-V300	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	V-300
C-CP101	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	CP-101 (POLY PUMP)
C-CP201	120	1	2#14, 1#14G	PROCESS CONTROL PANEL	CP-201 (POLY PUMP)
C-UNIT1-A	24	2	6-1 PR #16 TSP	TRI-MITE J-BOX	PROCESS CONTROL PANEL
C-UNIT1-D	24	2	30#14, 1#14G	TRI-MITE J-BOX	PROCESS CONTROL PANEL

CABLE SCHEDULE

PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY
JONES
07/10/24
STATE OF UTAH

BOARDER SIZE 22X34
DESIGNED RC
DRAWN RC
CHECKED AAR
APPROVED ZJ

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

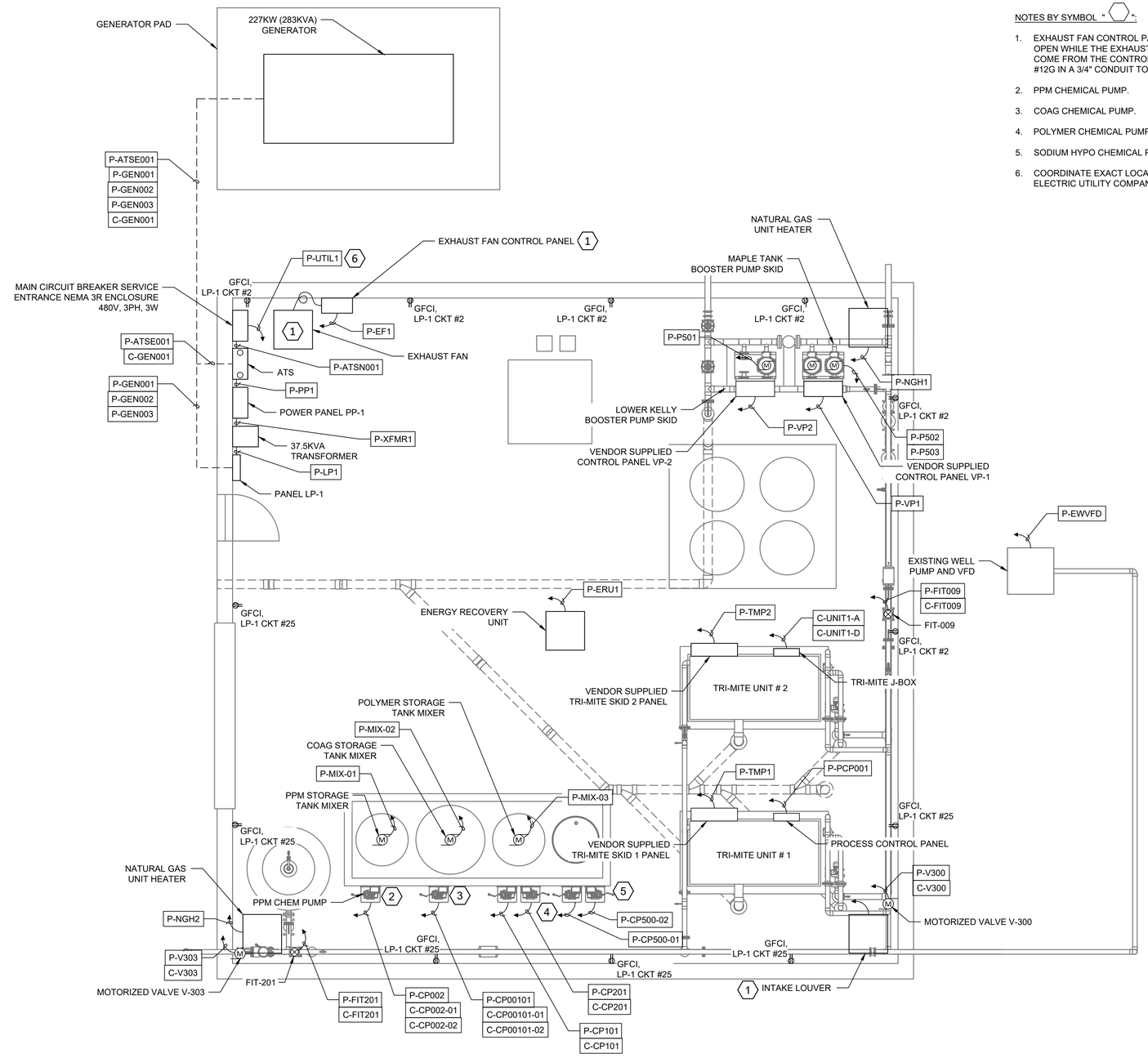
ONE-LINE DIAGRAM AND CABLE SCHEDULE

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E2.0

ISSUE FOR CONSTRUCTION

I:\PROJECTS\GREEN HILLS\8.0 DRAWINGS\GREEN HILL.DWG, 7/9/2024



NOTES BY SYMBOL " ⬡ ":

1. EXHAUST FAN CONTROL PANEL. THE MOTORIZED DAMPER/LOUVER SHALL OPEN WHILE THE EXHAUST FAN IS RUNNING. POWER FOR THE LOUVER TO COME FROM THE CONTROL PANEL. THE CONTRACTOR SHALL PROVIDE 2#12, #12G IN A 3/4" CONDUIT TO THE LOUVER. SEE SCHEMATIC ON SHEET E6.0.
2. PPM CHEMICAL PUMP.
3. COAG CHEMICAL PUMP.
4. POLYMER CHEMICAL PUMPS.
5. SODIUM HYPO CHEMICAL PUMPS.
6. COORDINATE EXACT LOCATION WITH UTILITY TRANSFORMER WITH THE ELECTRIC UTILITY COMPANY.

BUILDING POWER AND CONTROLS PLAN

1/4"=1'-0"

0 2' 4'

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I:\PROJECTS\GREEN HILL\8.0 DRAWINGS\GREEN HILL.DWG, 7/9/2024

PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY JONES
07/10/24
STATE OF UTAH

BOARDER SIZE	22X34
DESIGNED	RC
DRAWN	RC
CHECKED	AAR
APPROVED	ZJ

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

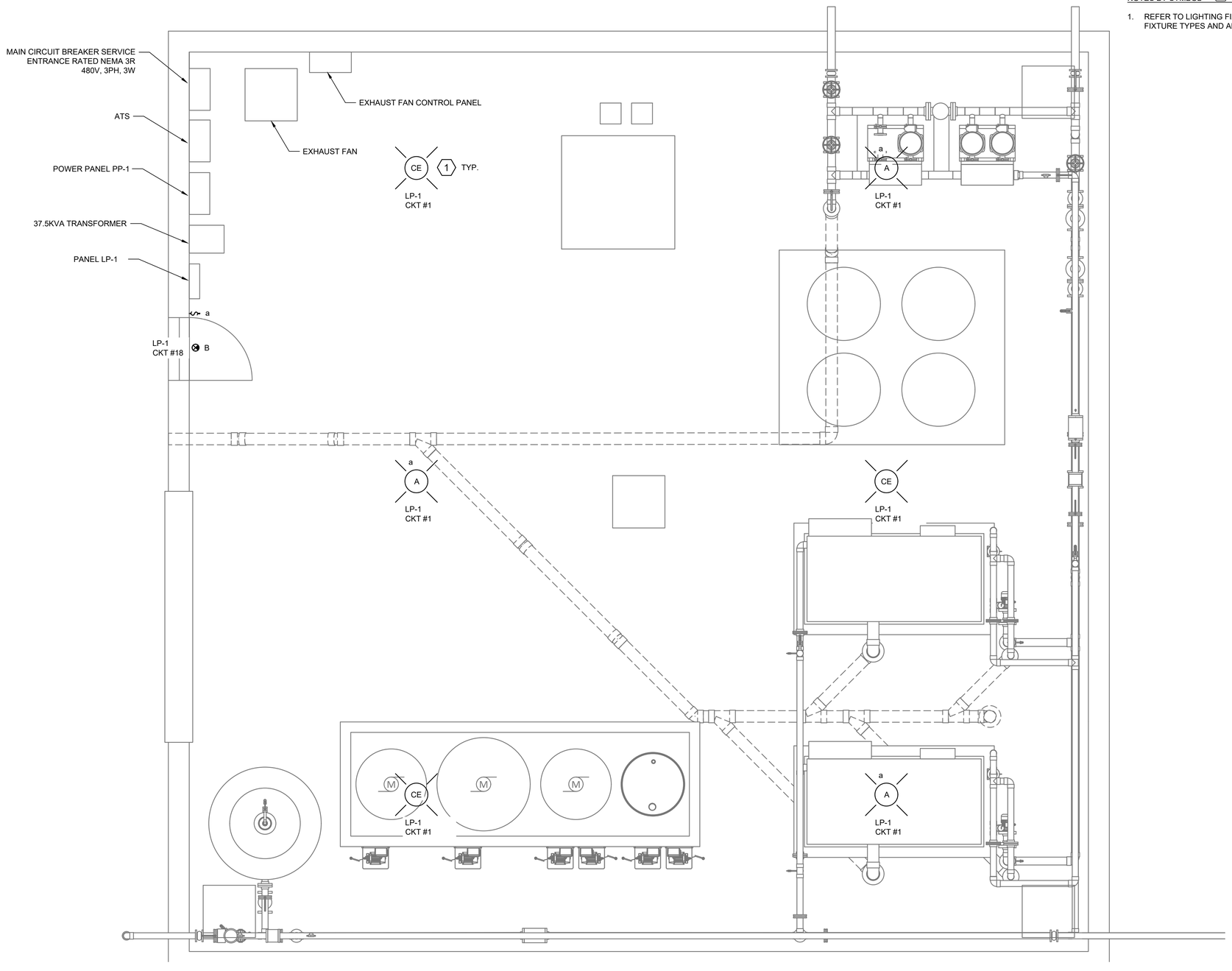
BUILDING POWER AND CONTROLS PLAN

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DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E3.0

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NOTES BY SYMBOL "⬡":

1. REFER TO LIGHTING FIXTURE SCHEDULE ON SHEET E6.0 FOR LIGHTING FIXTURE TYPES AND ADDITIONAL INFORMATION.

BUILDING LIGHTING PLAN

3/8"=1'-0"

0 1' 3'

PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY JONES
07/10/24
STATE OF UTAH

BOARDER SIZE	22X34
DESIGNED	RC
DRAWN	RC
CHECKED	AAR
APPROVED	ZJ

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

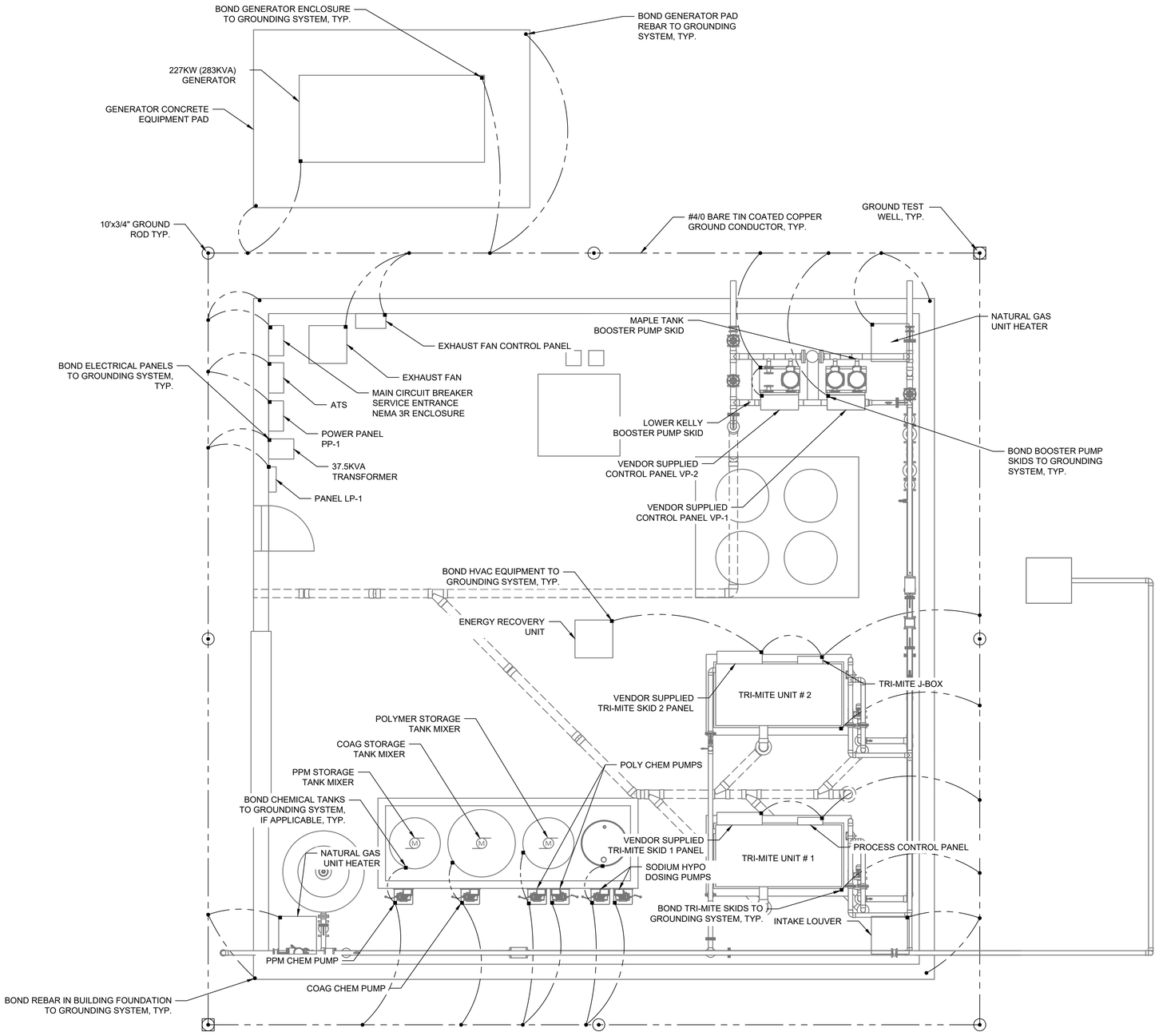
BUILDING LIGHTING PLAN

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DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E4.0

ISSUE FOR CONSTRUCTION

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BUILDING GROUNDING PLAN

1/4"=1'-0"

0 2' 4'

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PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY JONES
07/10/24
STATE OF UTAH

BOARDER SIZE	22X34
DESIGNED	RC
DRAWN	RC
CHECKED	AAR
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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

BUILDING GROUNDING PLAN

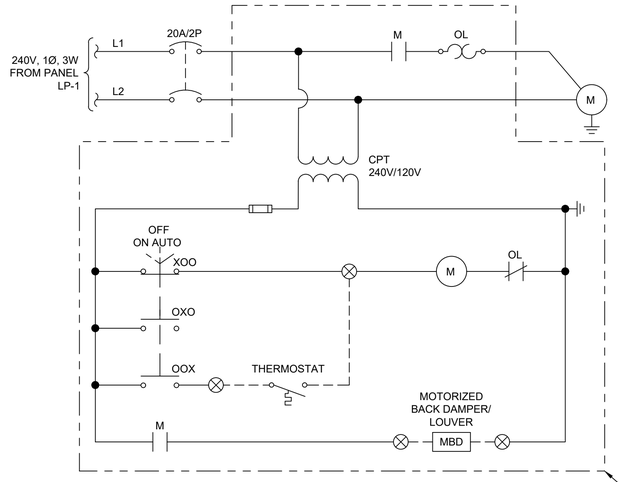
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DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E5.0

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TYPICAL SCHEMATIC - EXAUST FAN WITH DAMPER

NEMA 3R ENCLOSURE. THE CONTRACTOR IS RESPONSIBLE TO SIZE PER THE LATEST NEC REQUIREMENTS.

NOTES BY SYMBOL "⬡":

1. CIRCUITS FOR HVAC LOADS (NATURAL GAS HEATERS, EXHAUST FAN, MOTORIZED LOUVER, AND ENERGY RECOVERY UNIT) WERE SIZED BASED ON THE FOLLOWING GENERAL DATA.

   - NATURAL GAS HEATER - 240V, 1PH, 1/4HP
   - EXHAUST FAN - 240V, 1PH, 1/4HP
   - LOUVER - 120V, 1PH, 1/4HP
   - ENERGY RECOVERY UNIT - 140V, 3PH, 13FLA

   ONCE THE HVAC EQUIPMENT IS SELECTED, THE CONTRACTOR SHALL VERIFY THE CIRCUIT RATINGS (OVERCURRENT PROTECTION, CONDUCTOR/CONDUIT SIZE, CONDUCTOR QTY) WITH THE ENGINEER.

LIGHTING FIXTURE SCHEDULE					
TYPE	**VOLTAGE**	**WATTS**	**MANUFACTURER AND MODEL NUMBER**	**MOUNTING**	**NOTES**
A	120	74W	HOLOPHANE MODEL NO. PETROLUX, PXLW 10000LM MD0 40K 70CRI UNM	CEILING, MH:13FT AFF	
B	120	4.3W	LITHONIA MODEL NO. LHQM LED R M6	WALL, MH: 10FT AFF	
CE	120	74W	HOLOPHANE MODEL NO. PETROLUX, PXLW 10000LM MD0 40K 70CRI UNM E10WMCP	CEILING, MH:13FT AFF	PROVIDE LIGHTING FIXTURE WITH BATTERY BACKUP OPTION

LIGHTING FIXTURE SCHEDULE

PANEL: LP-1											
	MCB (AMPS):	150				ENCLOSURE NEMA RATING:		3R			
	BUS RATING (AMPS):	150				MOUNTING:		SURFACE MOUNTED			
	L-L VOLTAGE (VOLTS):	240				SCCR:		22KA SCCR			
	L-N VOLTAGE (VOLTS):	120				PHASE:		1-PH, 3 WIRE			
NOTES	LOAD DESCRIPTION	LOAD (VOLT AMPS) AΦ	LOAD (VOLT AMPS) BΦ	BREAKER AMPS/ POLES	CIRCUIT NO	CIRCUIT NO	BREAKER AMPS/ POLES	LOAD (VOLT AMPS) AΦ	LOAD (VOLT AMPS) BΦ	LOAD DESCRIPTION	NOTES
	LIGHTS	800		20/1	1	2	20/1	1080		RECEPTACLES (NORTH)	
	CP-002		180	20/1	3	4	20/1		180	CP-00101	
	CP-101	180		20/1	5	6	20/1	180		CP-201	
	CP-500-01		180	20/1	7	8	20/1		180	CP-500-02	
	FIT-201	180		20/1	9	10	20/1	180		FIT-009	
	V-303		180	20/1	11	12	20/1		180	V-300	
⬡1	NATURAL GAS HEATER 1	1920		20/2	13	14	20/2	1920		NATURAL GAS HEATER 2	⬡1
			1920		15	16			1920		
⬡1	EXHAUST FAN	1920		20/2	17	18	20/1	30		BUILDING EMERGENCY LIGHTING	
			1920		19	20	30/1		1200	GENERATOR LV CIRCUIT	
	GENERATOR LV CIRCUIT	1200		30/1	21	22	30/1	1200		GENERATOR LV CIRCUIT	
	PROCESS CONTROL PANEL		600	20/1	23	24	20/1		530	COAG STORAGE TANK MIXER	
	RECEPTACLES (SOUTH)	1080		20/1	25	26	20/1	530		PPM STORAGE TANK MIXER	
	POLYMER STORAGE TANK MIXER		530	20/1	27	28	20/1			SPARE	
	SPARE			20/1	29	30	20/1			SPARE	
	SPARE			20/1	31	32	20/1			SPARE	
	SPARE			20/1	33	34	20/1			SPARE	
	SPARE			20/1	35	36	20/1			SPARE	
	SPACE				37	38				SPACE	
	SPACE				39	40				SPACE	
	SPACE				41	42				SPACE	
	TOTAL VA (LEFT SIDE)	7280	5510					5120	4190		
	TOTAL CONNECTED VA	22100									
	CONNECTED AMPS	103									
NOTES											
1)	PROVIDE PANEL WITH SURGE PROTECTIVE DEVICE.										

LP-1 PANEL SCHEDULE

PROFESSIONAL ENGINEER
No. 13492417-2202
ZACHARY
JONES
07/10/24
STATE OF UTAH

BOARDER SIZE	22X34
DESIGNED	RC
DRAWN	RC
CHECKED	AAR
APPROVED	ZJ

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

ELECTRICAL SCHEMATIC AND SCHEDULES

ATTENTION:
0 1/2 1
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DATE: JULY, 2024
PROJECT: 220583
REV:
SHEET: E6.0

ISSUE FOR CONSTRUCTION

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DESIGN CRITERIA

1. BUILDING CODE: IBC 2021
2. LATERAL LOAD DESIGN DATA
   - A. RISK CATEGORY: III
   - B. WIND DESIGN CRITERIA
     - a. ULTIMATE WIND SPEED: 109 MPH
     - b. EXPOSURE CATEGORY: C
     - c. ENCLOSURE: ENCLOSED STRUCTURE
   - C. SEISMIC DESIGN CRITERIA
     - a. SEISMIC IMPORTANCE FACTOR: 1.25
     - b. SITE CLASS: D
     - c. SHORT PERIOD SPECTRAL ACCELERATION (Ss): 0.764g
     - d. ONE SECOND SPECTRAL ACCELERATION (S1): 0.263g
     - e. SHORT PERIOD RESPONSE ACCELERATION (SDS): 0.611g
     - f. ONE SECOND RESPONSE ACCELERATION (SD1): N/A
     - g. SEISMIC RESISTING SYSTEM: SPECIAL REINFORCED CONCRETE SHEAR WALLS SEISMIC RESISTANCE (R=5)
   - D. ANALYSIS METHOD: EQUIVALENT LATERAL FORCE PROCEDURE
3. GRAVITY LOADS
   - A. DEAD LOADS
     - a. DEAD LOADS ARE DEFINED AS THE WEIGHT OF ALL PERMANENT STRUCTURAL COMPONENTS OF THE BUILDING
     - b. ASSUMED ROOF SELF WEIGHT: 10 PSF SUPERIMPOSED
   - B. LIVE LOADS
     - a. ROOF: 20 PSF
     - b. TYPICAL SLAB ON GRADE: 125 PSF (LIGHT MANUFACTURING)
   - C. SNOW LOADS
     - a. GROUND SNOW LOAD (Pg): 166 PSF
     - b. FLAT-ROOF SNOW LOAD (Pf): 127.82 PSF
     - c. SNOW IMPORTANCE FACTOR (Is): 1.10
     - d. SNOW EXPOSURE FACTOR (Ce): 1.0
     - e. THERMAL FACTOR (Ct): 1.0
     - f. ADDITIONAL SNOW DRIFT PER APPLICABLE BUILDING CODE(S)
   - D. CONSTRUCTION LOADS
     - a. NOT TO EXCEED THE DESIGN LIVE LOADS
4. FOUNDATION DESIGN CRITERIA
   - A. FOUNDATION DESIGN IS BASED UPON THE FOLLOWING SOIL PARAMETERS:
     - a. NET ALLOWABLE SOIL BEARING PRESSURE: 2000 PSF (ASSUMED BASED OFF OF IBC 2021 AND SOIL SITE CLASSIFICATION GC FROM WEBSOILSURVERY FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE)
     - b. FROST DEPTH: 24 INCHES
   - B. EQUIVALENT FLUID WEIGHTS FOR SLOPED SOIL
     - a. AT-REST: EFW_R = 100 PCF
     - b. ACTIVE: EFW_A = 50 PCF
   - C. EQUIVALENT FLUID WEIGHTS FOR HORIZONTAL SOIL
     - a. AT-REST: EFW_R = 55 PCF
     - b. ACTIVE: EFW_A = 40 PCF
     - c. PASSIVE: EFW_P = 300 PCF
   - D. ASSUMED EARTH PRESSURE PARAMETERS:
     - a. SOIL DENSITY = 135 PCF
     - b. COEFFICIENT OF FRICTION: 0.25

GENERAL NOTES

1. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE SPECIFICATIONS AND PROJECT DRAWINGS BY OTHER DISCIPLINES. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE CODES LISTED.
2. THE GENERAL CONTRACTOR SHALL COMPARE AND COORDINATE THE DRAWINGS OF ALL DISCIPLINES AND REPORT ANY DISCREPANCIES BETWEEN THE DRAWINGS TO THE ARCHITECT AND ENGINEER.
3. THE GENERAL CONTRACTOR SHALL COORDINATE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR ANCHORED, EMBEDDED OR SUPPORTED ITEMS. NOTIFY THE ARCHITECT / ENGINEER OF ANY DISCREPANCIES.
4. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND ELEVATIONS RELATING TO EXISTING CONDITIONS BY MAKING FIELD SURVEYS AND MEASUREMENTS PRIOR TO COMMENCING FABRICATION OR CONSTRUCTION.
5. METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND IMPLEMENTING THE NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGE OF CONSTRUCTION.
6. TEMPORARY BRACING, SHEETING, SHORING, ETC., REQUIRED TO ENSURE THE STRUCTURAL INTEGRITY/STABILITY OF THE EXISTING BUILDINGS, SIDEWALKS, UTILITIES, ETC. DURING CONSTRUCTION IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE DESIGNED BY A REGISTERED PROFESSIONAL ENGINEER EMPLOYED BY THE CONTRACTOR.
7. WHEN NOT SPECIFICALLY INDICATED ON THE STRUCTURAL DRAWINGS, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING SLEEVE AND BLOCK-OUT REQUIREMENTS FOR PENETRATIONS PRIOR TO FABRICATION OR ERECTION OF THE STRUCTURE. PENETRATIONS OF STRUCTURAL MEMBERS ARE SUBJECT TO APPROVAL BY THE ENGINEER. THE CONTRACTOR IS ALSO RESPONSIBLE FOR DETERMINING ANCHORAGE AND HANGER REQUIREMENTS REQUIRED FOR SUPPORTING EQUIPMENT, FINISHES, UTILITIES, ETC. NOT INDICATED ON THE STRUCTURAL DRAWINGS.
8. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING AND COORDINATING DIMENSIONS AND INSTALLATION DETAILS OF PURCHASED EQUIPMENT WITH THE SUPPORTING STRUCTURE. ANY CONFLICTS BETWEEN THESE ITEMS AND THE BUILDING STRUCTURE IS TO BE BROUGHT TO THE ATTENTION OF THE EOR FOR RESOLUTION.
9. THE STRUCTURAL DRAWINGS GOVERN THE WORK FOR STRUCTURAL FEATURES, UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ON PLANS AND DETAILS ARE TO GOVERN THE STRUCTURAL WORK. DIMENSIONAL CONFLICTS IN THE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
10. FOR ADDITIONAL INFORMATION NOT COVERED IN THESE GENERAL NOTES, REFER TO THE PROJECT SPECIFICATIONS. IN CASE OF CONFLICT BETWEEN THE GENERAL NOTES, SPECIFICATIONS, AND DRAWINGS, THE MOST STRINGENT REQUIREMENTS AS DETERMINED BY THE ENGINEER WILL GOVERN.
11. WORK NOT INDICATED ON A PART OF THE DRAWINGS, BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING LOCATIONS, IS TO BE REPEATED.
12. DETAILS DESIGNATED AS "TYPICAL DETAILS", APPLY GENERALLY TO THE DRAWINGS IN AREAS WHERE CONDITIONS ARE SIMILAR TO THOSE DESCRIBED IN THE DETAILS.
13. SHOP DRAWINGS:
    - A. SHOP DRAWINGS FOR ALL MATERIALS ARE TO BE SUBMITTED TO THE ENGINEER FOR REVIEW PRIOR TO THE START OF FABRICATION OR COMMENCEMENT OF WORK.
    - B. SHOP DRAWINGS MUST BE CHECKED AND STAMPED BY THE CONTRACTOR PRIOR TO SUBMISSION. THE CONTRACTOR'S STAMP OF APPROVAL WILL CONSTITUTE CERTIFICATION THAT HE HAS VERIFIED ALL FIELD MEASUREMENTS, CONSTRUCTION CRITERIA, MATERIALS AND SIMILAR DATA AND HAS CHECKED EACH DRAWING FOR COMPLETENESS, COORDINATION, AND COMPLIANCE WITH THE CONTRACT DOCUMENTS.
    - C. REPRODUCTION OF ANY PORTION OF THE STRUCTURAL CONTRACT DRAWINGS FOR SUBMITTAL AS SHOP DRAWINGS IS PROHIBITED.
    - D. CHANGES TO SHOP DRAWINGS THAT ARE RE-SUBMITTED MUST BE CLOUDED OR SOMEHOW INDICATE THAT A CHANGE HAS BEEN MADE TO PREVIOUSLY ISSUED AND REVIEWED DRAWING.
    - E. THE CONTRACTOR IS TO PROVIDE THE ENGINEER WITH WRITTEN NOTICE OF DEVIATIONS OF ANY TYPE FROM THE REQUIREMENTS OF THE CONSTRUCTION DOCUMENTS. THE NOTICE MUST BE RECEIVED PRIOR TO SHOP DRAWING SUBMITTAL. THE CONTRACTOR REMAINS LIABLE FOR ANY DEVIATION UNLESS REVIEWED BY THE ENGINEER AND ACKNOWLEDGED IN WRITING, PRIOR TO THE RECEIPT OF THE SHOP DRAWINGS.

FOUNDATIONS

1. FOUNDATIONS HAVE BEEN DESIGNED AND ARE TO BE CONSTRUCTED IN ACCORDANCE WITH PRESUMPTIVE VALUES FROM TABLE 1806.2 OF THE 2021 INTERNATIONAL BUILDING CODE.
2. FOUNDATIONS ARE TO BE PLACED ON STRUCTURAL FILL PLACED OVER COMPACTED NATIVE GRAVEL. IT IS RECOMMENDED THAT STRUCTURAL FILL SUBGRADES REMAIN IN A COMPACTED CONDITION DURING FOUNDATION PREPARATIONS, CONSTRUCTION OF FORMWORK, AND REINFORCING STEEL PLACEMENT.
3. THE CONTRACTOR IS TO RETAIN THE SERVICES OF A PROFESSIONAL GEOTECHNICAL ENGINEER, SUBJECT TO THE APPROVAL OF THE OWNER, TO VERIFY THAT THE MATERIAL ON WHICH FOUNDATIONS BEAR HAS AT LEAST THE CAPACITY AS NOTED IN THE DESIGN CRITERIA. THE GEOTECHNICAL ENGINEER IS TO MAKE RECOMMENDATIONS FOR IMPROVING AREAS THAT DO NOT MEET THE DESIGN CRITERIA.
4. ALL EXTERIOR FOOTINGS ARE TO BEAR A MINIMUM OF 24" BELOW FINISHED GRADE. ELEVATIONS SHOWN ON THE DRAWINGS AT WHICH FOUNDATIONS BEAR ARE APPROXIMATE AND MAY VARY TO SUIT SUBSURFACE SOIL CONDITIONS.
5. CONCRETE SLABS-ON-GRADE HAVE BEEN DESIGNED TO BEAR ON PROPERLY COMPACTED SUB-GRADE SOILS AND CRUSHED AGGREGATE BASE.
6. PRIOR TO PLACING CONCRETE, ANY WATER PRESENT IS TO BE PUMPED OUT FROM THE BOTTOM OF EXCAVATIONS.
7. VAPOR RETARDERS BENEATH CONCRETE SLABS-ON-GRADE MUST CONSIST OF THICK, PUNCTURE-PROOF POLYETHYLENE SHEETING PLACED IMMEDIATELY BELOW THE FLOOR SLAB.

REINFORCED CONCRETE

1. REINFORCED CONCRETE WORK IS TO BE IN ACCORDANCE WITH THE AMERICAN CONCRETE INSTITUTE (ACI) "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE - ACI 318" (LATEST EDITION) AND THE "SPECIFICATIONS FOR STRUCTURAL CONCRETE FOR BUILDINGS- ACI 301" (LATEST EDITION).
2. MIXING, TRANSPORTING, PLACING AND TESTING OF CONCRETE IS TO BE DONE IN ACCORDANCE WITH ACI 301.
3. PRIOR TO CONCRETE PLACEMENT, THE CONTRACTOR MUST SUBMIT CONCRETE MIX DESIGNS FOR EACH TYPE OF CONCRETE TO BE USED TO THE ENGINEER FOR REVIEW.
4. THE SLUMP AT POINT OF PLACEMENT IS NOT TO EXCEED 4" +/-1" AND THE WATER/CEMENT RATIO IS NOT TO EXCEED 0.45. IF ADDITIONAL SLUMP (UP TO 8") IS DESIRED FOR PUMPING, A SUPER-PLASTICIZER ADMIXTURE MAY BE ADDED.
5. ALL CONCRETE IS EXPOSED TO WEATHER AND FREEZE/THAW AND SHALL BE AIR ENTRAINED FROM 5.5% ±1.5% IN ACCORDANCE WITH ACI RECOMMENDATIONS. AIR ENTRAINING ADMIXTURE SHALL CONFORM TO ASTM C260.
6. CONCRETE TO BE NORMAL WEIGHT CONCRETE (150 PCF) WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH (F'c) OF 5000 PSI AND CEMENT CONFORMING TO ASTM C 150, TYPE I OR II.
7. REINFORCEMENT:
   - A. DEFORMED BARS: ASTM A 615/A 615M, GRADE 60
8. REINFORCEMENT IS TO BE DETAILED, FABRICATED, AND PLACED IN ACCORDANCE WITH THE ACI "DETAILING MANUAL NO. SP-66" (LATEST EDITION).
9. SPLICES (LAPS) OF REINFORCING BARS SHALL BE CLASS 'B' TENSION LAPS PER ACI 318 (LATEST EDITION) UNLESS NOTED OTHERWISE. REFER TO THE MINIMUM LAP SPLICES OF REINFORCING BARS IN TENSION SCHEDULE.
10. PROVIDE ADEQUATE CONCRETE COVER IN ACCORDANCE WITH THE REQUIREMENTS AS SET FORTH BY ACI 318. REFER TO THE CONCRETE COVER SCHEDULE.
11. REINFORCEMENT IS TO BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF REQUIRED, ADDITIONAL BARS, STIRRUPS, OR CHAIRS WILL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL BARS WHERE NECESSARY DURING CONSTRUCTION.
12. CONTINUOUS REINFORCING BARS TO BE TURNED AND LAPPED AT CORNERS AND INTERSECTIONS OF WALLS AND FOOTINGS. HOOKED BARS TO HAVE STANDARD ACI HOOKS UNLESS NOTED OTHERWISE.
13. CONTINUOUS TOP BARS TO BE SPLICED AT MID-SPAN. CONTINUOUS BOTTOM BARS TO BE SPLICED AT CENTERLINE OF SUPPORTS (OR AS SHOWN ON DETAILS).
14. LEVELING GROUT TO BE NON-SHRINK, NON-METALLIC TYPE, FACTORY PREMIXED IN ACCORDANCE WITH ASTM C 1107, HAVING A MINIMUM COMPRESSIVE STRENGTH OF NOT LESS THAN 5000 PSI.
15. SLEEVES, INSERTS, MECHANICAL OPENINGS, CONDUITS, PIPES, RECESSES, DEPRESSIONS, CURBS AND OTHER EMBEDDED ITEMS TO BE PROVIDED FOR AS SHOWN ON THE ARCHITECTURAL AND ELECTRICAL DRAWINGS AND AS REQUIRED BY EQUIPMENT MANUFACTURERS. INSTALLATION OF THESE ITEMS TO BE COORDINATED AND PROVIDED FOR PRIOR TO PLACING CONCRETE.
16. ANCHOR ROD LOCATIONS SHALL BE AS INDICATED. THE MINIMUM ANCHOR ROD EMBEDMENT SHALL BE AS INDICATED ON THESE STRUCTURAL DRAWINGS.
17. ANCHOR RODS TO BE ASTM F1554 (fy=36ksi), GALVANIZED.
18. CONCRETE SLABS TO BE CURED BY METHOD COMPATIBLE WITH SPECIFIED FLOOR FINISH. WHERE ACCEPTABLE USE A LIQUID MEMBRANE-CURING COMPOUND AT THE MANUFACTURERS RECOMMENDED COVERAGE.
19. SLOPE SLABS-ON-GRADE TO DRAIN AS REQUIRED. MAINTAIN MINIMUM DESIGN THICKNESS INDICATED.
20. DIVIDE FLOOR SLABS-ON-GRADE INTO SEGMENTS BY MEANS OF ISOLATION, CONTROL AND CONSTRUCTION JOINTS AS INDICATED ON THE DRAWINGS. SAW JOINTS TO BE CUT AS SOON AS POSSIBLE WITHOUT RAVELING THE SURFACE. POSITION OF CONSTRUCTION JOINTS OTHER THAN THOSE SHOWN ON THE DRAWINGS ARE TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
21. PROVIDE FINISHED SLAB-ON-GRADE WITH SPECIFIED OVERALL VALUES OF FLATNESS (FF) = 25 AND LEVELNESS (FL) = 20 ALONG WITH MINIMUM LOCAL VALUES OF FLATNESS (FF) = 17 AND LEVELNESS (FL) = 15.

STRUCTURAL STEEL

1. MATERIALS:
   - A. W-SHAPES & WT-SHAPES: ASTM A992
   - B. S-SHAPES, M-SHAPES, HP-SHAPES: ASTM A36
   - C. ST-SHAPES & MT-SHAPES: ASTM A36
   - D. C-SHAPES & MC-SHAPES: ASTM A36
   - E. ANGLES & PLATES: ASTM A36
   - F. HSS SHAPES: ASTM A500, GRADE B
   - G. STEEL PIPE: ASTM A53 (TYPE E OR S), GRADE B
   - H. HIGH STRENGTH BOLTS: ASTM A325
   - I. MACHINE BOLTS: ASTM A307
   - J. ANCHOR RODS: ASTM F1554, GRADE 55 TYPE S1 (UNO)
   - K. WELDED HEADED STUDS: ASTM A108
   - L. DEFORMED BAR ANCHORS: ASTM A496
   - M. WELDING ELECTRODES: AWS D1.1, E70 SERIES
2. NON-SHRINK, NON-METALLIC GROUT WITH A 28 DAY STRENGTH OF 5000 PSI SHALL BE USED UNDER BASE PLATES.
3. ENGINEER SHALL BE CONTACTED FOR APPROVAL OF ANY FIELD MODIFICATIONS OF ANCHOR BOLTS OR RODS AND COLUMN BASE PLATES (PER OSHA).
4. TEMPORARY BRACING OF STRUCTURAL STEEL ELEMENTS IS THE RESPONSIBILITY OF THE CONTRACTOR. STRUCTURAL STABILITY SHALL BE MAINTAINED AT ALL TIMES DURING THE ERECTION PROCESS. CONTRACTOR MUST PROVIDE NOTIFICATION TO THE ERECTOR THAT, BY TESTING, THE FOUNDATION AND SUPPORTING WALLS HAVE ATTAINED SUFFICIENT STRENGTH TO SUPPORT THE STEEL TO BE ERECTED BEFORE ERECTING STRUCTURAL STEEL.
5. PROVIDE ONE SHOP COAT OF PRIMER (TT-P-636) ON ALL STEEL EXCEPT FOR ITEMS TO BE HOT DIPPED GALVANIZED OR SPRAY FIREPROOFED. DO NOT PAINT PORTIONS EMBEDDED IN CONCRETE.
6. FRAMING CONNECTIONS NOT DETAILED, OR CONNECTIONS THAT ARE MODIFIED FROM THOSE DETAILED, SHALL BE DESIGNED BY SUPPLIER FOR THE END REACTION SHOWN ON THE PLAN. IF NO REACTION IS PROVIDED, DESIGN FOR 1/2 THE BEAM MAXIMUM UNIFORM LOAD PER AISC MANUAL FOR STEEL CONSTRUCTION. SUBMIT SIGNED AND SEALED CALCULATIONS.
7. ALL WELD OPERATORS SHALL BE CURRENTLY AWS QUALIFIED.
8. SHOP CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED. USE 3/16" FILLET WELD MINIMUM.
9. FIELD CONNECTIONS SHALL BE WELDED OR HIGH STRENGTH BOLTED AS DETAILED. NO FIELD WELDING OF HOT DIPPED GALVANIZED MEMBERS WILL BE ALLOWED. USE 3/16" FILLET WELD MINIMUM.
10. DURING THE ERECTION OF STEEL BEAMS AND DIAGONAL BRACING, ALL BOLTING AND FIELD WELDING SHALL BE COMPLETE BEFORE RELEASING HOISTING CABLES.
11. SUBMIT FOR REVIEW SHOP DRAWINGS OF STEEL DETAILS PRIOR TO FABRICATING STRUCTURAL STEEL.
12. ALL EXTERIOR ELEMENTS AND THOSE ELEMENTS NOTED TO BE GALVANIZED SHALL BE HOT DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123 AFTER SANDBLAST CLEANING PER SSPC-SP10. USE ASTM A325 BOLTS HOT DIPPED GALVANIZED WITH GALVANIZED HARDENED WASHERS AND GALVANIZED HEAVY HEX NUTS FOR BOLTING OF GALVANIZED ITEMS.
13. STEEL COLUMNS, BASE PLATES, AND ALL STEEL BELOW GRADE SHALL HAVE A MINIMUM 3" CONCRETE COVER PROTECTION.
14. MEMBERS NOTED AS "CONTINUOUS" SHALL BE FULLY WELDED AT ALL BUTT SPLICES OR CONNECTIONS SHALL BE DETAILED TO PROVIDE CONTINUITY.

STEEL JOISTS:

1. THE MANUFACTURER OF THE JOISTS SHALL BE A MEMBER OF THE STEEL JOIST INSTITUTE.
2. PROVIDE ONE SHOP COAT OF PRIMER (TT-P-636) EXCEPT ITEMS TO RECEIVE SPRAY FIREPROOFING.
3. SEE MECHANICAL DRAWINGS FOR SPRINKLER PIPE SUPPORT.
4. REFER TO DETAILS FOR SPECIAL TREATMENT OF:
   - A. SUPPORTING CONCENTRATED LOADS
5. JOISTS SHALL BE DESIGNED TO RESIST A NET UPLIFT AS SHOWN ON LOADING DIAGRAMS.
6. CONNECT JOIST BEARING PLATES TO JOIST TOP CHORD FOR 4K.
7. SUBMIT FOR REVIEW SHOP DRAWINGS OF JOIST DETAILS FOR FABRICATION AND ERECTION PRIOR TO FABRICATING JOISTS. PROVIDE HORIZONTAL OR DIAGONAL TYPE BRIDGING FOR ALL JOISTS AS REQUIRED BY SJI SPECIFICATION AND AS INDICATED ON THE DRAWINGS. THE ENDS OF ALL BRIDGING LINES TERMINATING AT BEAMS SHALL BE ANCHORED THERETO AT TOP AND BOTTOM CHORDS. PROVIDE ALL REQUIRED BRIDGING ANCHORS.
8. ALL JOISTS SHALL BE DESIGNED FOR A SINGLE CONCENTRATED TRAVELING PROVISIONAL LOAD OF 300 POUNDS ALONG THE TOP CHORD AND 100 POUNDS ALONG THE BOTTOM CHORD APPLIED BETWEEN PANEL POINTS.
9. JOIST DIAGONAL MEMBERS LOCATED IN THE MIDDLE QUARTER OF THE SPAN SHALL BE DESIGNED FOR A MINIMUM SHEAR, IN COMPRESSION, OF 15 PERCENT OF THE END REACTION. THIS MINIMUM DESIGN LOAD SHALL BE TO ACCOUNT FOR THE POSSIBILITY OF SHEAR REVERSAL DUE TO UNBALANCED LOADING.
10. JOIST SEATS SHALL HAVE THE CAPACITY TO RESIST A LATERAL LOAD APPLIED TO THE TOP CHORD, PERPENDICULAR TO THE SPAN (ROLLOVER). PROVIDE A MINIMUM ROLLOVER FORCE OF 2,000 POUNDS FOR SEATS UP TO 3 1/2 INCHES DEEP AND 1,200 POUNDS FOR SEAT OVER 3 1/2 INCHES DEEP.

STEEL ROOF DECK:

1. ROOF DECK SHALL BE 1-1/2" DEEP. SEE ROOF PLAN FOR GAGE AND PROFILE DESIGNATION.
2. ROOF DECK SHALL BE PLACED SO AS TO COVER AT LEAST TWO SPANS. NO SINGLE SPAN CONDITIONS SHALL BE USED WITHOUT APPROVAL FOR THE ENGINEER.
3. DECK SHALL BE FABRICATED SO THAT DECK RUNS CONTINUOUSLY OVER OPENINGS. THE OPENINGS IN THE DECK SHALL NOT BE CUT UNTIL THE OPENING IS NEEDED (PER OSHA).
4. STEEL DECK SHALL CONFORM TO ASTM A653 GRADE 50 (Fy = 50,000 PSI).
5. STEEL DECK SHALL BE GALVANIZED WITH A PROTECTIVE ZINC COATING CONFORMING TO ASTM A924, WITH COATING DESIGNATION G90.
6. SEE ROOF PLAN AND DETAILS FOR ROOF DECK ATTACHMENT AND FORCES IMPOSED DUE TO UPLIFT AND DIAPHRAGM SHEAR UNDER WIND LOADING. SEE SPECIFICATIONS FOR INSPECTION AND REPORTING REQUIRED ON ROOF DECK ATTACHMENT.
7. PROVIDE A MINIMUM END BEARING OF 2" OVER SUPPORTS. END LAPS OF SHEETS SHALL BE A MINIMUM OF TWO INCHES AND SHALL OCCUR OVER SUPPORTS.
8. THE CONTRACTOR SHALL COORDINATE ALL TRADE REQUIREMENTS AND CONFIRM THE SIZE AND LOCATION OF ALL OPENINGS. OPENINGS LARGER THAN 12", AND AS DETAILED, SHALL HAVE STEEL FRAMING SUPPORTING ALL EDGES. SEE TYPICAL ANGLE FRAMING DETAILS.
9. STEEL MEMBERS SUPPORTING STEEL DECK AT THE PERIMETER OF THE BUILDING SHALL BE CONTINUOUS, BUTT WELD PIECES WHERE SPLICES OCCUR.

MISCELLANEOUS STEEL

1. STRUCTURAL STEEL WORK IS TO BE DETAILED AND CONSTRUCTED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) "SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS" (LATEST EDITION) AND THE "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES".
2. STRUCTURAL STEEL, UNLESS NOTED OTHERWISE, TO CONFORM TO THE REQUIREMENTS OF ASTM STANDARDS AS INDICATED ON THE STEEL MATERIAL SCHEDULE ON DRAWING ON THE FOLLOWING SHEET.
3. POST INSTALLED ANCHORS HAVE BEEN DESIGNED WITH HILTI ANCHORS (NOTED BELOW) AS THE BASIS OF DESIGN. PROVIDE ANY APPROPRIATE ANCHOR WITH SIZE AND FINISH AS NOTED AND EQUIVALENT SHEAR AND TENSION CAPACITIES AFTER MODIFICATION DUE TO EMBEDMENT, SPACING AND EDGE DISTANCES. OTHER AVAILABLE MANUFACTURERS INCLUDE SIMPSON, ITW RED HEAD AND POWERS FASTENERS. INSTALL ANCHORS PER THE MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS.
   - A. EXPANSION ANCHORS: KWIK BOLT 3
   - B. SLEEVE ANCHORS: HLC SLEEVE ANCHOR
   - C. ADHESIVE ANCHORS: HIT HY-200 (CONCRETE)
4. WELDING TO BE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY (AWS) "STRUCTURAL WELDING CODE-ANSI/AWS D1.1/D1.1M" (LATEST EDITION). USE E70XX ELECTRODES UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

SPECIAL INSPECTIONS AND TESTING (QUALITY ASSURANCE PLAN)

1. GENERAL:
   - A. INDEPENDENT TESTING LAB SHALL BE RETAINED BY OWNER TO PROVIDE INSPECTIONS AND SPECIAL INSPECTIONS AS DESCRIBED HEREIN.
   - B. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PROVIDING ON SITE ACCESS TO ALL REQUIRED INSPECTIONS AND NOTIFIES TESTING LAB IN TIME TO PERFORM SUCH INSPECTIONS PRIOR.
   - C. DO NOT COVER WORK REQUIRED TO BE INSPECTED PRIOR TO INSPECTION BEING MADE. IF WORK IS COVERED, CONTRACTOR WILL BE RESPONSIBLE FOR UNCOVERING AS NECESSARY.
   - D. THE CONTRACTOR SHALL CORRECT ALL DEFICIENCIES AS NOTED WITHIN THE SPECIAL INSPECTION REPORTS AND/OR THE ENGINEER OF RECORD'S FIELD OBSERVATION (STRUCTURAL OBSERVATIONS) REPORTS TO BRING THE CONSTRUCTION INTO COMPLIANCE WITH THE CONTRACT DOCUMENTS, ADDENDUMS, REVISIONS, RFI'S, AND/OR WRITTEN INSTRUCTIONS. THE CONTRACTOR IS RESPONSIBLE TO REQUEST SUMMARY REPORTS FROM THE SPECIAL INSPECTOR AND ENGINEER OF RECORD AT THE TIME OF THE PROJECT SUBSTANTIAL COMPLETION. PRIOR TO REQUESTING THE SUMMARY OF STRUCTURAL OBSERVATION REPORTS FROM THE ENGINEER OF RECORD, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER OF RECORD A LETTER STATING THAT ALL OUTSTANDING ITEMS NOTED ON PREVIOUS STRUCTURAL OBSERVATION REPORTS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS, ADDENDUMS, REVISIONS, RFI'S, AND/OR WRITTEN INSTRUCTIONS.
2. SPECIAL INSPECTIONS:
   - A. ALL SPECIAL INSPECTIONS SHALL BE PERFORMED TO MEET THE REQUIREMENTS OF THE 2018 INTERNATIONAL BUILDING CODE (IBC) AS RECOMMENDED BY THE LOCAL BUILDING JURISDICTION.
   - B. REQUIRED SPECIAL INSPECTIONS SHALL BE PERFORMED BY AN INDEPENDENT CERTIFIED TESTING LABORATORY EMPLOYED BY THE OWNER PER SECTION 1701 OF THE 2018 IBC FOR THE AREAS INDICATED IN THE SPECIAL INSPECTION PROGRAM.
   - C. THE INDEPENDENT CERTIFIED TESTING LABORATORY AND INSPECTORS SHALL BE A QUALIFIED PERSON WHO SHALL SHOW COMPETENCE TO THE SATISFACTION OF THE LOCAL BUILDING OFFICIAL, OWNER, AND ENGINEER OF RECORD FOR THE PARTICULAR OPERATION. ALL SPECIAL INSPECTION REPORTS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT AND ENGINEER OF RECORD STATING THE PROJECT NAME AND ADDRESS.
   - D. THE CONTRACTOR AND SPECIAL INSPECTOR SHALL NOTIFY THE ENGINEER OF RECORD OF ANY ITEMS NOT COMPLYING WITH THE PROJECT SPECIFICATIONS, CONTRACT DOCUMENTS AND/OR APPLICABLE CODES BEFORE PROCEEDING WITH ANY WORK INVOLVING THAT ITEM. THE ENGINEER OF RECORD WILL REVIEW THE ITEM AND DETERMINE ITS ACCEPTABILITY. IF WORK INVOLVING THAT ITEM PROCEEDS WITHOUT PRIOR APPROVAL FROM THE ENGINEER OF RECORD, THEN THE WORK WILL BE CONSIDERED NON-COMPLIANT.
3. SPECIAL INSPECTION PROGRAM NOTES:
   - A. ITEMS CHECKED WITH "X" SHALL BE INSPECTED IN ACCORDANCE WITH IBC CHAPTER 17 BY A CERTIFIED SPECIAL INSPECTOR FROM A TESTING AGENCY APPROVED BY THE BUILDING OFFICIAL.
   - B. THE CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND-OR SEISMIC-FORCE-RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM OR A WIND-OR SEISMIC-RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS PROGRAM, SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND THE OWNER PRIOR TO THE COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT PER CHAPTER 17 OF THE IBC.
   - C. SPECIAL INSPECTION IS NOT REQUIRED FOR WORK PERFORMED BY AN APPROVED FABRICATOR MEETING THE REQUIREMENTS OF CHAPTER 17 OF THE IBC.
   - D. THE SPECIAL INSPECTOR SHALL PROVIDE A COPY OF THEIR REPORT TO THE BUILDING OFFICIAL, OWNER, ENGINEER OF RECORD AND CONTRACTOR.
   - E. CONTINUOUS SPECIAL INSPECTION MEANS FULL-TIME OBSERVATION OF THE WORK REQUIRING SPECIAL INSPECTION BY THE APPROVED SPECIAL INSPECTOR PRESENT IN THE AREA WHERE THE WORK IS BEING PERFORMED.
   - F. PERIODIC SPECIAL INSPECTION MEANS PART-TIME OR INTERMITTENT INSPECTIONS OF THE WORK AT INTERVALS NECESSARY TO CONFIRM THAT THE WORK REQUIRING SPECIAL INSPECTIONS IS IN CONFORMANCE WITH THE APPROVED PERMIT CONSTRUCTION DOCUMENTS AND SPECIFICATIONS.
   - G. ALL BIDDER DESIGNED/DEFERRED SUBMITTAL COMPONENTS, WHERE SHOWN, SHALL INCLUDE A QUALITY ASSURANCE PROGRAM FOR SPECIAL INSPECTIONS WHERE REQUIRED BY CHAPTER 17 OF THE IBC.
   - H. PERIODIC SPECIAL INSPECTIONS IS REQUIRED FOR NAIL ATTACHMENTS, BOLTING, ANCHORING AND OTHER FASTENING COMPONENTS WITHIN THE SEISMIC-FORCE-RESISTING SYSTEM, INCLUDING LATERAL WALL BRACING AND HOLDOWNS.

PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

REVISIONS

NO.	DATE

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CONSTRUCTION DRAWINGS FOR:

MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL DESIGN CRITERIA AND GENERAL NOTES

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
SHEET: S0.1

ISSUE FOR CONSTRUCTION

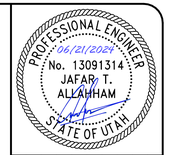
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STANDARD STEEL DOORS AND FRAMES

1. GENERAL:
   - A. ALL WORK SHALL BE IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED RECOMMENDATIONS AND SPECIFICATIONS AND COORDINATED WITH APPROPRIATE RELATED SUBCONTRACTORS WORK TO ASSURE A PROPER INSTALLATION. FIELD CONDITIONS AND DIMENSIONS SHALL BE VERIFIED PRIOR TO FABRICATION.
   - B. ALL WORK SHALL CONFORM TO AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI), AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) AND UNDERWRITERS' LABORATORIES, INC. (UL) STANDARDS WHERE APPLICABLE.
   - C. FINISH HARDWARE SHALL BE INSTALLED PER MANUFACTURER'S PUBLISHED DIRECTIONS. ALL HARDWARE SHALL BE REMOVED AFTER FITTING AND THE FINAL INSTALLATION OF HARDWARE SHALL BE MADE AFTER THE FINISH PAINTING.
2. SUBMITTALS:
   - A. SHOP DRAWINGS, MANUFACTURER'S LITERATURE, WIRING DIAGRAMS AND ANY ENGINEERING CALCULATIONS THAT MAY BE REQUIRED ELSEWHERE IN THIS SECTION SHALL BE SUBMITTED. CALCULATIONS BY A REGISTERED CIVIL OR STRUCTURAL ENGINEER SHALL BE SUBMITTED WHICH SHOW THAT THE WINDOWS, ENTRANCES AND STOREFRONT SYSTEMS AND THEIR STRUCTURAL CONNECTIONS ARE DESIGNED TO MEET CODE REQUIREMENTS AND LOADS. SHOP DRAWINGS SHALL SHOW DETAILS OF THE PRODUCTS AND SYSTEMS AND CONNECTIONS TO ADJOINING MATERIALS. SCHEDULES SHOWING SIZES, TYPES, AND LOCATIONS OF GLASS SHALL BE SUBMITTED ALONG WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   - B. JAMB DEPTHS, TRIM PROFILE, AND BACKBENDS SHALL BE INDICATED ON SHOP DRAWINGS.
3. PRODUCTS:
   - A. ALL WORK SHALL BE SHOP-FABRICATED AND SHOP ASSEMBLED WHERE POSSIBLE. TEMPORARY STIFFENERS, SPACERS, ETC. NECESSARY TO FACILITATE HANDLING AND ACCURATE ERECTION SHALL BE PROVIDED. DOORS, WINDOWS, AND FRAMES SHALL BE FABRICATED FROM PRIME QUALITY COMMERCIAL GRADE COLD-ROLLED STEEL CONFORMING TO ASTM A366, TYPE II OR III.
   - B. DOORS, WINDOWS AND FRAMES SHALL BEAR UL LABEL INDICATING TYPE OF RATING CERTIFIED. DESIGNS AND CONSTRUCTION SHALL HAVE SPECIFIC UL APPROVAL ACCORDING TO CURRENT PROCEDURES FOR 1-1/2-HOUR FIRE RATING. HOLLOW METAL DOORS AND FRAMES FOR FIRE RATED OPENINGS SHALL CONFORM TO UNDERWRITERS' LABORATORIES LISTING AND BE UL LABELED.
   - C. ALL EXTERIOR DOORS, WINDOWS AND FRAMES SHALL BE FABRICATED ENTIRELY OF GALVANIZED MATERIALS.
   - D. AFTER FABRICATION, ALL TOOL MARKS, AND OTHER SURFACE IMPERFECTIONS SHALL BE FILLED AND GROUND SMOOTH.
   - E. DOORS, WINDOWS, AND FRAMES SHALL BE CHEMICALLY TREATED TO ENSURE MAXIMUM PAINT ADHESION AND SHALL HAVE ALL EXPOSED SURFACES PAINTED WITH A RUST-INHIBITIVE PRIMER AFTER FABRICATION. PRIME COAT SHALL BE CAPABLE OF PASSING 120-HOUR SALT SPRAY TEST ASTM B117 AND 250-HOUR HUMIDITY TEST ASTM STANDARD D1735.
   - F. DOORS AND FRAMES SHALL BE REINFORCED AND DRILLED OR TAPPED FOR FULLY TEMPLATED MORTISED HARDWARE; AND SHALL BE REINFORCED WITH PLATES FOR SURFACE-MOUNTED HARDWARE, MEETING ANSI A115 REQUIREMENTS. HARDWARE SHALL BE AS SPECIFIED IN "FINISH HARDWARE" AND/OR AS SHOWN.
   - G. PRESSED METAL FRAMES FOR DOORS AND OTHER OPENINGS SHALL BE COMBINATION BUCKLED FRAME AND TRIM OF TYPE AND SIZES AS SHOWN. METAL SHALL BE NOT LIGHTER THAN 14-GAGE STEEL. FRAMES SHALL BE OF THE WELDED UNIT TYPE. SPECIAL FRAMES, OVERSIZED FRAMES, AND FRAMES WITH TRANSOM SHALL BE PROVIDED WHERE SHOWN.
   - H. FRAMES FOR MULTIPLE OR SPECIAL OPENINGS SHALL HAVE MULLION AND/OR RAIL MEMBERS WHICH ARE CLOSED TUBULAR SHAPES HAVING NO VISIBLE SEAMS OR JOINTS. ALL JOINTS BETWEEN FACES OF ABUTTING MEMBERS SHALL BE SECURELY WELDED AND FINISHED SMOOTH.
   - I. ALL FINISHED WORK SHALL BE STRONG AND RIGID, NEAT IN APPEARANCE, SQUARE, TRUE, AND FREE OF DEFECTS, WARP, OR BUCKLE. MOLDED MEMBERS SHALL BE CLEAN CUT, STRAIGHT, AND OF UNIFORM PROFILE THROUGHOUT THEIR LENGTHS. CORNER JOINTS SHALL HAVE ALL CONTACT EDGES TIGHTLY CLOSED, WITH TRIM FACES MITERED, WELDED AND FINISHED SMOOTH. THE USE OF GUSSETS WILL NOT BE PERMITTED.
   - J. FLOOR ANCHORS SHALL BE WELDED INSIDE EACH JAMB, WITH HOLES PROVIDED FOR FLOOR ANCHORAGE. MINIMUM THICKNESS OF FLOOR ANCHORS SHALL BE 14-GAGE.
   - K. FRAMES FOR INSTALLATION IN MASONRY AND/OR CONCRETE WALLS SHALL BE PROVIDED WITH ADJUSTABLE JAMB ANCHORS OF THE T-STRAP, STIRRUPS AND STRAP, OR WIRE TYPE. THE NUMBER OF ANCHORS PROVIDED PER JAMB SHALL BE (3) ANCHORS FOR FRAMES UP TO 7'-6" IN HEIGHT.
   - L. FRAMES TO BE ANCHORED TO PREVIOUSLY PLACED CONCRETE, MASONRY, OR STRUCTURAL STEEL SHALL BE PROVIDED WITH ANCHORS OF SUITABLE DESIGN AS SHOWN ON APPROVED SHOP DRAWINGS.DUST COVER BOXES OR MORTAR GUARDS OF NOT LESS THAN 24-GAGE STEEL SHALL BE PROVIDED AT ALL HARDWARE MORTISES ON FRAMES TO BE SET IN MASONRY, CONCRETE OR PLASTER WALLS.
   - M. METAL DOORS SHALL BE FULL FLUSH DESIGN, 1-3/4" THICK. FACE SHEETS SHALL BE NOT LESS THAN COLD ROLLED STRETCHER-LEVELLED 16-GAGE STEEL, HOLLOW METAL CONSTRUCTION. ALL DOORS SHALL HAVE FLUSH SEAMLESS FACE SHEETS. THE DOOR TOP AND BOTTOM SHALL BE INTERNALLY REINFORCED BY STEEL MEMBERS WELDED IN PLACE. TOPS OF EXTERIOR DOORS SHALL BE PROVIDED WITH FLUSH WEATHERTIGHT TOPS. DOORS SHALL BE INSULATED WITH URETHANE CORES WITH A MINIMUM "R" VALUE OF 11.
   - N. DOORS SHALL BE RIGID, AND NEAT IN APPEARANCE, FREE FROM WARPAGE, OR BUCKLE. CORNER BENDS SHALL BE TRUE AND STRAIGHT AND OF MINIMUM RADIUS FOR THE GAUGE OF METAL USED. DOUBLE DOORS SHALL HAVE A REMOVABLE MULLION.
   - O. PROGRAMMABLE DOOR LOCK SHALL BE PROVIDED AND BE A REMOTELY PROGRAMMABLE DOOR LOCK, SCHLAGE ELECTRONIC ACCESS LOCK, OR ENGINEER 'S APPROVED EQUAL.
4. EXECUTION:
   - A. FRAMES SHALL BE SET PLUMB AND SQUARE IN A TRUE PLANE. STEEL SHIMS SHALL BE PROVIDED TIGHT BETWEEN FRAME ANCHORS AND STRUCTURE, AND RIGIDLY ATTACHED.
   - B. DOORS SHALL BE INSTALLED PLUMB AND SQUARE AND LEVEL WITH THE FRAMES SECURELY ANCHORED TO THE ADJOINING CONSTRUCTION. DOORS SHALL OPERATE FREELY, BUT NOT LOOSELY. THE DOOR CLEARANCES SHALL BE 3/32-INCH PLUS OR MINUS 1/32-INCH AND SHALL NOT EXCEED THE MANUFACTURER'S PRINTED RECOMMENDATIONS. DOOR AFTER INSTALLATION SHALL BE FREE FROM RATTLING IN A CLOSED POSITION.
   - C. FINISH HARDWARE SHALL BE INSTALLED IN ACCORDANCE WITH HARDWARE MANUFACTURER'S TEMPLATES. OPERABLE PARTS SHALL BE ADJUSTED FOR CORRECT FUNCTION. HARDWARE, EXCEPT FOR PRIME COATED ITEMS, SHALL BE REMOVED, TAGGED, BOXED AND REINSTALLED AFTER FINISH PAINTING IS COMPLETED.
   - D. FRAMES INSTALLED INTO PREVIOUSLY PLACED CONCRETE, MASONRY OR STEEL STRUCTURES SHALL HAVE FASTENERS AND FASTENER FRAME DIMPLES FILLED WITH AUTO PUTTY OR EQUAL. THE FASTENERS AND FILLERS AT DIMPLE HOLES SHALL BE GROUND SMOOTH (NON-VISIBLE) BEFORE PAINTING. FASTENER LOCATIONS SHALL NOT BE VISIBLE WHEN PAINTING IS FINISHED.
5. GUARANTEE:
   - A. ANY DOOR THAT BECOMES WARPED IN EXCESS OF 3/16-INCH OUT-OF-PLANE DURING THE 12-MONTH GUARANTEE PERIOD UNDER THE CONTRACT SHALL BE REPLACED.

FINISH HARDWARE:

1. GENERAL:
   - A. THE CONTRACTOR SHALL PROVIDE ALL ARCHITECTURAL HARDWARE AS SPECIFIED AND SHOWN, TOGETHER WITH ANY ADDITIONAL ITEMS NECESSARY TO ASSURE THE PROPER OPERATION OF ALL DOORS, WINDOWS AND OTHER ARCHITECTURAL INSTALLATIONS. ITEMS NOT SPECIFICALLY MENTIONED BUT NECESSARY TO COMPLETE THE WORK SHALL BE PROVIDED OF A TYPE AND QUALITY SUITABLE TO THE SERVICE REQUIRED AND COMPARABLE TO OTHER HARDWARE.
   - B. FINISH HARDWARE SHALL BE COORDINATED WITH ALL OTHER WORK REQUIRING BUILDER'S HARDWARE OR ATTACHING TO IT. COPIES OF SCHEDULES, TEMPLATES, ETC., SHALL BE FURNISHED IN AMPLE TIME TO AVOID FABRICATION AND CONSTRUCTION DELAYS. EACH ITEM OF HARDWARE SHALL BE IDENTIFIED ACCORDING TO THE APPROVED LIST AND SCHEDULE. ALL HARDWARE SHALL BE MADE TO TEMPLATE. HARDWARE SHALL BE DELIVERED TO THE JOB IN UNOPENED PACKAGES, COMPLETE WITH FASTENINGS AND ACCESSORIES, BEARING THE MANUFACTURER'S LABELS.
   - C. EXIT DOORS SHALL BE OPENABLE AT ALL TIMES FROM THE INSIDE WITHOUT THE USE OF KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT.
   - D. ALL LOCKS AND CYLINDERS SHALL BE MASTER KEYED TO MATCH THE OWNER'S EXISTING BUILDINGS.
   - E. ALL LOCK CYLINDERS SHALL BE CONSTRUCTION MASTER KEYED OR CONSTRUCTION CYLINDERS' CONSTRUCTION KEYED.
   - F. ALL LOCKS SHALL BE FURNISHED WITH 5 KEYS PER CYLINDER KEYING COMBINATION. ALL KEYS ALONG WITH FIVE MASTER KEYS SHALL BE DELIVERED TO THE OWNER AT THE COMPLETION OF THE JOB.
2. SUBMITTALS:
   - A. THE CONTRACTOR SHALL SUBMIT A COMPLETE DETAILED HARDWARE LIST AND A SCHEDULE ALONG WITH MANUFACTURER'S LITERATURE ON EACH ITEM FOR APPROVAL. NO HARDWARE SHALL BE DELIVERED UNTIL THE HARDWARE SCHEDULE HAS BEEN APPROVED BY THE ENGINEER. THE SAMPLES OF ALL ITEMS REQUESTED SHALL BE FURNISHED BY THE HARDWARE SUPPLIER NO LATER THAN 10 DAYS AFTER SAID REQUEST IS RECEIVED.
3. PRODUCTS:
   - A. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SCREWS, BOLTS AND OTHER FASTENERS OF SUITABLE SIZE AND TYPE TO SECURE THE HARDWARE INTO POSITION. THE FASTENERS SHALL MATCH THE HARDWARE IN MATERIAL AND FINISH.
   - B. THE HARDWARE PROVIDED, SUCH AS EXPANSION BOLTS, HEX BOLTS, TOGGLE BOLTS AND OTHER APPROVED ANCHORAGES, SHALL BE COORDINATED WITH THE JOB AND TO EACH SETTING CONDITION.
   - C. PHILLIPS HEAD SCREWS SHALL BE USED AT EXPOSED CONDITIONS. MACHINE SCREWS SHALL BE USED AT METAL DOORS AND FRAMES.
4. MANUFACTURERS, DESIGN, FINISH :
   - A. HARDWARE NUMBERS SHALL BE FROM THE CATALOGS OF THE MANUFACTURER AND THE ITEM SHALL BE FURNISHED IN THE DESIGN AND FINISH INDICATED. MANUFACTURERS LISTED BELOW ARE APPROVED MANUFACTURERS.
     - a. BUTTS: HAGER, LAWRENCE, STANLEY, MCKINNEY OR EQUIVALENT (626)
     - b. LOCKSETS, LATCHSETS: REMOTELY PROGRAMMABLE DOOR LOCK, SCHLAGE NDEB MOBILE ENABLED WIRELESS LOCK OR APPROVED EQUAL.
     - c. CLOSERS: LCN, SMOOTHIE 4040 SERIES EXTERIOR DOORS, 4030 SERIES INTERIOR DOORS OR EQUIVALENT, SPRAYED ENAMEL ALUMINUM FINISH.
     - d. STOPS: IVES, CONCAVE RUBBER, WROUGHT WALL BUMPERS (B26D), GLYNN JOHNSON, SARGENT OR EQUIVALENT.
     - e. DEADBOLT: SCHLAGE B600 SERIES OR EQUIVALENT, FINISH 626.
   - B. BUTTS - PROVIDE HOLD-FAST PINS IN BUTTS ON ALL EXTERIOR DOORS OPENING OUT WHETHER SCHEDULED OR NOT. BUTTS FOR 1 -3/4" THICK DOORS: 4-1/2" X 4-1/2".
   - C. LOCKSETS AND LATCHSETS - BACKSET: 2-3/4". STRIKES: STANDARD A.S.A. 4-7/8" FOR HOLLOW METAL FRAMES, EXCEPT FOR SPECIAL STRIKES DICTATED BY THE HARDWARE SPECIFIED OR REQUIRED.
   - D. CLOSERS - IT SHALL BE THE HARDWARE SUPPLIER'S RESPONSIBILITY TO FURNISH DOOR CLOSERS TO COMPLY WITH THE MANUFACTURER'S RECOMMENDATIONS FOR SIZE AND INSTALLED CONDITION. FULL RACK AND PINION TYPE WITH DUAL ADJUSTABLE CLOSING CONTROLS. PROVIDE ADJUSTABLE BACK -CHECK FEATURE. SUPPLY ARM TYPES, BRACKETS, PLATES AND ALL OTHER REQUIRED ACCESSORIES AND FASTENERS FOR THEIR PROPER INSTALLATION. CORNER BRACKETS SHALL BE AVOIDED WHEREVER POSSIBLE. CLOSERS SHALL NOT BE EXPOSED ON THE EXTERIOR. WHERE WALL CONDITIONS PERMIT, INTERIOR DOORS SHALL SWING 180 DEGREES.
   - E. STOPS - IT SHALL BE THE HARDWARE SUPPLIER'S RESPONSIBILITY TO FURNISH DOOR STOPS IN ACCORDANCE WITH THE INSTALLED CONDITIONS. USE CONCAVE RUBBER BUMPERS IN ALL AREAS. USE MACHINE SCREW AND EXPANSION SHIELD AT ALL MASONRY PARTITIONS (IVES 408-1/2 OR EQUIVALENT).
   - F. DOOR SILENCERS - PROVIDE WHETHER SCHEDULED OR NOT. GLYNN JOHNSON TYPE #64 OR EQUIVALENT FOR ALL FRAMES. THREE FOR EACH LEAF OF SINGLE OPENINGS. ONE FOR EACH LEAF OF DOUBLE OPENINGS IN HEAD.
   - G. WEATHER-STRIPPING SHALL BE MANUFACTURED BY PEMKO MANUFACTURING CO., ZERO WEATHER-STRIPPING CO., OR EQUIVALENT. ALL EXTERIOR DOORS (EXCEPT ROLL-UP AND ENTRANCE DOORS) SHALL BE WEATHER-STRIPPED WITH NEOPRENE SPONGE RUBBER AND BOTTOM SWEEPS UNLESS SPECIFIED OTHERWISE.
   - H. ALL COMPONENT PARTS OF LOCKSETS SHALL BE THE PRODUCE OF ONE MANUFACTURER.
5. EXECUTION.
   - A. ALL LOCKS, EXIT DEVICES, HINGES, THRESHOLDS AND OTHER SIMILAR ITEMS SHALL BE INDIVIDUALLY PACKED IN SEPARATE, SUITABLE ORIGINAL CONTAINERS AS FURNISHED BY THE HARDWARE MANUFACTURERS.
   - B. CONTRACTOR SHALL CHECK THE HARDWARE UPON DELIVERY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER STORAGE OF ALL HARDWARE UNTIL READY FOR APPLICATION.
   - C. ALL REQUIRED ITEMS OF HARDWARE, INCLUDING CYLINDERS FOR LOCKS, AND FITTING, ADJUSTING AND SECURING EACH ITEM NEATLY AND FIRMLY IN PLACE, SHALL BE IN PERFECT WORKING ORDER. ANY WORK LESS THAN THIS SHALL FORM A BASIS FOR CORRECTIVE MEASURES.
   - D. ALL FINISH HARDWARE SHALL BE FITTED AND DISMANTLED AND REHUNG WHERE REQUIRED FOR FINISH PAINTING WORK. ALL HINGES SHALL BE INSTALLED SO AS NOT TO BIND.
   - E. STRIPPABLE COATING OR REMOVABLE TAPE PROTECTION OR OTHER MEANS TO PREVENT ANY DAMAGE OR STAINING OF HARDWARE DURING CONSTRUCTION SHALL BE USED. SUCH PROTECTIVE MEASURES SHALL BE REMOVED PRIOR TO FINAL CLEANING FOR OWNER'S ACCEPTANCE OF PROJECT.
   - C. DO NOT APPLY HOT ASPHALT WHEN SUBSTRATE CONDITION CAUSES FOAMING.
   - D. COMPLY WITH DAMPPROOFING MATERIAL MANUFACTURER'S WRITTEN RECOMMENDATIONS AND KEEP AT LEAST 25 DEGREES F BELOW THE FLASH POINT.
   - E. PRIME MASONRY AND OTHER POROUS SUBSTRATES.
   - F. APPLY A UNIFORM COAT OF HOT ASPHALT BY MOPPING OR SPRAYING AT NOT LESS THAN 20 LB OR 2.5 GAL/100 FT^2.
   - G. APPLY TWO BRUSH OR SPRAY COLD-APPLIED ASPHALT SEAL COATS AT NOT LESS THAN 1.25 GAL/100 FT^2 FOR FIRST COAT AND 1 GAL/100 FT^2 FOR SECOND COAT OR 1 TROWEL COAT AT NOT LESS THAN 4 GAL/100 FT^2.
   - H. APPLY TWO BRUSH OR SPRAY COLD-APPLIED EMULSIFIED ASPHALT SEAL COATS AT NOT LESS THAN 1.5 GAL/100 FT^2 FOR FIRST COAT AND 1 GAL/100 FT^2 FOR SECOND COAT, 1 FIBERED BRUSH OR SPRAY COAT AT NOT LESS THAN 3 GAL/100 FT^2, OR 1 TROWEL COAT AT NOT LESS THAN 4 GAL/100 FT^2.
4. EXECUTION:
   - A. EXAMINE SUBSTRATES WITH INSTALLER PRESENT FOR COMPLIANCE WITH REQUIREMENTS FOR SURFACE SMOOTHNESS AND OTHER CONDITIONS AFFECTING PERFORMANCE OF WORK.
   - B. PROCEED WITH DAMPPROOFING APPLICATION ONLY AFTER SUBSTRATE CONSTRUCTION AND PENETRATING WORK HAVE BEEN COMPLETED AND UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.
   - C. TEST FOR SURFACE MOISTURE ACCORDING TO ASTM D 4263.



BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

REVISIONS		
NO.	DATE	

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CONSTRUCTION DRAWINGS FOR:

MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL DESIGN CRITERIA AND GENERAL NOTES

ISSUE FOR CONSTRUCTION

ATTENTION:

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S0.2

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ABBREVIATIONS

ADD'L	ADDITIONAL
ASD	ALLOWABLE STRESS DESIGN
ACI	AMERICAN CONCRETE INSTITUTE
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
AISI	AMERICAN IRON AND STEEL INSTITUTE
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AWS	AMERICAN WELDING SOCIETY
AB	ANCHOR BOLT
BM	BEAM
BP	BASE PLATE
BRG	BEARING
BLK	BLOCK
BLKG	BLOCKING
BOT	BOTTOM
BRKT	BRACKET
CIP	CAST-IN-PLACE
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CMU	CONCRETE MASONRY UNIT
CRSI	CONCRETE REINFORCING STEEL INSTITUTE
CONST JT	CONSTRUCTION JOINT
CONT	CONTINUOUS
CJ	CONTROL JOINT
DBL	DOUBLE
DET	DETAIL
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIR	DIRECTION
DP	DEEP
DWLS	DOWELS
EA	EACH
EE	EACH END
EF	EACH FACE
EJ	EXPANSION JOINT
EOR	ENGINEER OF RECORD
ES	EACH SIDE
EQ	EQUAL
EW	EACH WAY
EXP BOLT	EXPANSION BOLT
EXP JT	EXPANSION JOINT
EXT	EXTERIOR
FF	FAR FACE
FT	FOOT OR FEET
FTG	FOOTING
FIN	FINISH
FL	FLOOR
FTG	FOOTING
FND	FOUNDATION
GALV	GALVANIZED
GA	GAUGE
GR	GRADE
GB	GRADE BEAM
GP	GUSSET PLATE
HD	HOLD-DOWN
HDR	HEADER
HT	HEIGHT
HEF	HORIZONTAL EACH FACE
HIF	HORIZONTAL INSIDE FACE
HOF	HORIZONTAL OUTSIDE FACE
HORIZ	HORIZONTAL
IBC	INTERNATIONAL BUILDING CODE
IN	INCH
ID	INSIDE DIAMETER
JT	JOINT
JST	JOIST
K	KIP (1000 POUNDS)
LW	LIGHT WEIGHT
LRFD	LOAD AND RESISTANCE FACTOR DESIGN
LLV	LONG LEG VERTICAL
LP	LOW POINT
LSL	LAMINATED STRAND LUMBER
MAS	MASONRY
MTL	METAL
NF	NEAR FACE
NWC	NORMAL WEIGHT CONCRETE
NIC	NOT IN CONTRACT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPNG	OPENING
PC	PILE CAP
PCF	POUNDS PER CUBIC FOOT
PEMB	PREENGINEERED METAL BUILDING
PL	PLATE
PT	POINT OR PRESSURE TREATED
PVC	POLYVINYL CHLORIDE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
R	RADIUS
REINF	REINFORCED
RETG	RETAINING
RET	RETURN
REQ'D	REQUIRED
RE	WITH REFERENCE TO
SC	SHEAR CONNECTOR
SCHED	SCHEDULE
SECT	SECTION
SHT	SHEET
SHTHG	SHEATHING
SLV	SHORT LEG VERTICAL
SIM	SIMILAR
SOG	SLAB ON GRADE
SL	SPLICE LENGTH
SQ	SQUARE
STD	STANDARD
STL	STEEL
SDI	STEEL DECK INSTITUTE
SF	STEP FOOTING OR SQUARE FOOT
STAGG	STAGGER
STIFF	STIFFENER
STR	STRUCTURAL
SUP	SUPPORT
SYM	SYMMETRICAL
THK	THICK OR THICKNESS
THRD	THREADED
T&B	TOP AND BOTTOM
T	THICKNESS OF SLAB
TO	TOP OF
TOC	TOP OF CONCRETE
TOF	TOP OF FOUNDATION
TOS	TOP OF STEEL
TOW	TOP OF WALL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
US	UNDERSIDE
VEF	VERTICAL EACH FACE
VIF	VERTICAL INSIDE FACE OR VERIFY IN FIELD
VOF	VERTICAL OUTSIDE FACE
W	WIDE
WWF	WELDED WIRE FABRIC
W/	WITH
WP	WORKING POINT

TABLE 1705.3
REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

ITEM	CONTINUOUS	PERIODIC	COMMENTS
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT		x	ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3
2. REINFORCING BAR WELDING A. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706 B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16" C. INSPECT ALL OTHER WELDS	 x	 x x	AWS D1.4 ACI 318: 26.6.4
3. INSPECT ANCHORS CAST IN CONCRETE		x	ACI 318: 17.8.2
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A	x 	 x	ACI 318: 17.8.2.4 ACI 318: 17.8.2
5. VERIFY USE OF REQUIRED DESIGN MIX		x	ACI 318: CH. 19, 26.4.3, 26.4.4 IBC 1904.1; 1904.2
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE	x		ASTM C31 ASTM C172 ACI 318: 26.5, 26.12
7. INSPECT CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES	x		ACI 318: 26.5
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES		x	ACI 318: 26.5.3-26.5.5
9. INSPECT PRESTRESSED CONCRETE FOR: A. APPLICATION OF PRESTRESSING FORCE B. GROUTING OF BONDED PRESTRESSING TENDONS	x x		ACI 318: 26.10
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS		x	ACI 318: 26.9
11. FOR PRECAST CONCRETE DIAPHRAGM CONNECTIONS OR REINFORCEMENT AT JOINTS CLASSIFIED AS MODERATE OR HIGH DEFORMABILITY ELEMENTS (MDE OR HDE) IN STRUCTURES ASSIGNED TO SEISMIC DESIGN CATEGORY C, D, E OR F, INSPECT SUCH CONNECTIONS AND REINFORCEMENT IN THE FIELD FOR: A. INSTALLATION OF THE EMBEDDED PARTS B. COMPLETION OF THE CONTINUITY OF REINFORCEMENT ACROSS JOINTS C. COMPLETION OF CONNECTIONS IN THE FIELD	 x x x	 	ACI 318: 26.13.1.3 ACI 550.5
12. INSPECT INSTALLATION TOLERANCES OF PRECAST CONCRETE DIAPHRAGM CONNECTIONS FOR COMPLIANCE WITH ACI 550.5		x	ACI 318: 26.13.1.3
13. VERIFY IN SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCUTURAL SLABS		x	ACI 318: 26.11.2
INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED		x	ACI 318:26.11.1.2(B)

TABLE 1705.6
REQUIRED SPECIAL INSPECTIONS AND TESTS OF SOILS

ITEM	CONTINUOUS	PERIODIC
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.		x
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.		x
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.		x
4. DURING FILL PLACEMENT, VERIFY USE OF PROPER MATERIALS AND PROCEDURES IN ACCORDANCE WITH THE PROVISIONS OF THE APPROVED GEOTECHNICAL REPORT. VERIFY DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	x	
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PRE-PARED PROPERLY.		x

TABLE 1705.2.3
REQUIRED SPECIAL INSPECTIONS OF OPEN-WEB STEEL JOIST AND JOIST GIRDERS

ITEM	CONTINUOUS	PERIODIC	REFERENCE
INSTALLATION OF OPEN-WEB STEEL JOIST AND JOIST GIRDERS END CONNECTIONS - WELDING AND BOLTING BRIDGING - HORIZONTAL OR DIAGONAL		x	SJI SPECIFICATIONS LISTED IN SECTION 2207.1
STANDARD BRIDGING		x	SJI SPECIFICATIONS LISTED IN SECTION 2207.1
BRIDGING THAT DIFFERS FROM THE SJI SPECIFICATIONS LISTED IN SECTION 2207.1		x	

MINIMUM REQUIREMENTS FOR INSPECTIONS OF STRUCTURAL STEEL CONSTRUCTION

INSPECTION TASKS	QC	QA	REFERENCE
INSPECTION TASKS PRIOR TO WELDING			
WELDER QUALIFICATION RECORDS AND CONTINUITY RECORDS	P	O	AISC 360-16 TABLE N5.4-1
WPS AVAILABLE	P	P	AISC 360-16 TABLE N5.4-1
MANUFACTURING CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	P	P	AISC 360-16 TABLE N5.4-1
MATERIAL IDENTIFICATION (TYPE/GRADE)	O	O	AISC 360-16 TABLE N5.4-1
WELDER IDENTIFICATION SYSTEM	O	O	AISC 360-16 TABLE N5.4-1
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY) • JOINT PREPARATION • DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATIONS) • BACKING TYPE AND FIT (IF APPLICABLE)	O	O	AISC 360-16 TABLE N5.4-1
FIT-UP OF CJP GROOVE WELDS OF HSS T-, Y-, AND K-JOINTS WITHOUT BACKING (INCLUDING JOINT GEOMETRY) • JOINT PREPARATION • DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATIONS)	P	O	AISC 360-16 TABLE N5.4-1
CONFIGURATION AND FINISH OF ACCESS HOLES	O	O	AISC 360-16 TABLE N5.4-1
FIT-UP OF FILLET WELDS • DIMENSIONS (ALIGNMENT, GAPS AT ROOTS) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATIONS)	O	O	AISC 360-16 TABLE N5.4-1
CHECK WELDING EQUIPMENT	O	-	AISC 360-16 TABLE N5.4-1
INSPECTION TASKS DURING WELDING			
CONTROL AND HANDLING OF WELDING CONSUMABLES • PACKAGING • EXPOSURE CONTROL	O	O	AISC 360-16 TABLE N5.4-2
NO WELDING OVER CRACKED TACK WELDS	O	O	AISC 360-16 TABLE N5.4-2
ENVIRONMENTAL CONDITIONS • WIND SPEED WITHIN LIMITS • PRECIPITATION AND TEMPERATURE	O	O	AISC 360-16 TABLE N5.4-2
WPS FOLLOWED • SETTINGS ON WELDING EQUIPMENT • TRAVEL SPEED • SELECTED WELDING MATERIALS • SHIELDING GAS TYPE/FLOWRATE • PREHEAT APPLIED • INTERPASS TEMPERATURE MAINTAINED (MIN/MAX) • PROPER POSITION (F, V, H, OH)	O	O	AISC 360-16 TABLE N5.4-2
WELDING TECHNIQUES - INTERPASS AND FINAL CLEANING - EACH PASS WITHIN PROFILE LIMITATIONS - EACH PASS MEETS QUALITY REQUIREMENTS	O	O	AISC 360-16 TABLE N5.4-2
PLACEMENT AND INSTALLATION OF STEEL HEADED STUD ANCHORS	P	P	AISC 360-16 TABLE N5.4-2
INSPECTION TASKS AFTER WELDING			
WELDS CLEANED	O	O	AISC 360-16 TABLE N5.4-3
SIZE, LENGTH AND LOCATIONS OF WELDS	P	P	AISC 360-16 TABLE N5.4-3
WELDS MEET VISUAL ACCEPTANCE CRITERIA • CRACK PROHIBITION • WELD/BASE-METAL FUSION • CRATER CROSS SECTION • WELD PROFILES • WELD SIZE • UNDERCUT • POROSITY	P	P	AISC 360-16 TABLE N5.4-3
ARC STRIKES	P	P	AISC 360-16 TABLE N5.4-3
K-AREA	P	P	AISC 360-16 TABLE N5.4-3
WELD ACCESS HOLES IN ROLLED HEAVY SHAPES AND BUILT-UP HEAVY SHAPES	P	P	AISC 360-16 TABLE N5.4-3
BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)	P	P	AISC 360-16 TABLE N5.4-3
REPAIR ACTIVITIES	P	P	AISC 360-16 TABLE N5.4-3
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	P	P	AISC 360-16 TABLE N5.4-3
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	P	P	AISC 360-16 TABLE N5.4-3
NO PROHIBITED WELDS HAVE BEEN ADDED WITHOUT THE APPROVAL OF THE EOR	O	O	AISC 360-16 TABLE N5.4-3
INSPECTION TASKS PRIOR TO BOLTING			
MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS	O	P	AISC 360-16 TABLE N5.6-1
FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	O	O	AISC 360-16 TABLE N5.6-1
CORRECT FASTENERS SELECTED FOR JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE)	O	O	AISC 360-16 TABLE N5.6-1
CORRECT BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	O	O	AISC 360-16 TABLE N5.6-1
CONNECTION ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	O	O	AISC 360-16 TABLE N5.6-1
PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED	P	O	AISC 360-16 TABLE N5.6-1
PROTECTED STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	O	O	AISC 360-16 TABLE N5.6-1
INSPECTION TASKS DURING BOLTING			
FASTENER ASSEMBLIES PLACED IN ALL HOLES AND WASHERS AND NUTS ARE POSITIONED AS REQUIRED	O	O	AISC 360-16 TABLE N5.6-2
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	O	O	AISC 360-16 TABLE N5.6-2
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	O	O	AISC 360-16 TABLE N5.6-2
FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	O	O	AISC 360-16 TABLE N5.6-2
INSPECTION TASKS AFTER BOLTING			
DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	P	P	AISC 360-16 TABLE N5.6-3

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. OPERATIONS NEED NOT BE DELAYED PENDING THESE INSPECTIONS
P - PERFORM THESE TASKS FOR EACH WELDED JOINT OR MEMBER, EACH BOLTED CONNECTION, OR EACH STEEL ELEMENT

STEEL MATERIALS SCHEDULE

STRUCTURAL ELEMENT	f_y YIELD STRENGTH (KSI)	ASTM REFERENCE
WIDE FLANGE SHAPES	50	ASTM A992/A992M
ANGLE & CHANNEL SHAPES	36	ASTM A36/A36M
CONNECTIONS, PLATES, & ALL OTHERS	36	ASTM A36/A36M
ANCHOR RODS	36	ASTM F 1554
HSS RECTANGULAR TUBE	46	ASTM A500 GRADE B
HSS ROUND TUBE	42	ASTM A500 GRADE B

DOORS

EXTERIOR DOOR	L.I.F. 36 X 84 VISION LITE 520 STEEL DOOR OR APPROVED EQUAL
ROLLING STEEL SERVICE DOOR	DOOR MODEL 600 COIL-AWAY AS BASIS OF DESIGN

MINIMUM TENSION DEVELOPMENT / LAP SPLICE LENGTH (CLASS B) OF REINFORCING BARS (PER ACI 318-19)

f'_c = 4000 / 4500 /5000 PSI

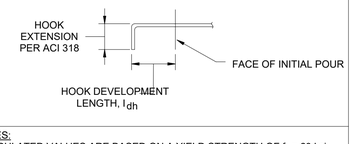
BAR SIZE	TOP BARS		OTHER BARS	
	CASE 1	CASE 2	CASE 1	CASE 2
#3	25 / 23 / 22	37 / 35 / 33	19 / 18 / 17	28 / 27 / 25
#4	33 / 31 / 29	49 / 46 / 44	25 / 24 / 23	37 / 35 / 34
#5	41 / 38 / 36	61 / 57 / 54	31 / 30 / 28	47 / 44 / 42
#6	49 / 46 / 44	73 / 69 / 65	37 / 35 / 34	56 / 53 / 50
#7	71 / 67 / 63	106 / 100 / 95	54 / 51 / 49	81 / 77 / 73
#8	81 / 76 / 72	121 / 114 / 108	62 / 59 / 56	93 / 88 / 83
#9	91 / 86 / 81	136 / 128 / 122	70 / 66 / 63	105 / 99 / 94
#10	102 / 96 / 92	153 / 144 / 137	79 / 74 / 71	118 / 111 / 106
#11	114 / 107 / 102	170 / 160 / 152	87 / 82 / 78	131 / 123 / 117

NOTES:
1. LAP SPLICE LENGTHS ARE IN INCHES.
2. TABULATED VALUES ARE BASED ON A YIELD STRENGTH OF f_y = 60 ksi.
3. CONCRETE IS NORMAL WEIGHT (150 PCF).
4. TOP BARS INDICATES HORIZONTAL REINFORCEMENT WHICH IS PLACED ABOVE 12" OR MORE OF FRESH CONCRETE.
5. UNLESS OTHERWISE NOTED, UTILIZE CLASS B LAP SPLICES.
6. DEVELOPMENT LENGTH OF AN UNLAPPED BAR OR CLASS A SPLICE IS EQUAL TO THE TABULATED VALUE DIVIDED BY 1.3.
7. FOR SLABS AND WALLS, CONTRACTOR MAY PROVIDE REDUCED SPLICE LENGTHS IN ACCORDANCE WITH ACI 318, CHAPTER 25.

CASES FOR CLASS B LAP SPLICES	
CASE 1	COVER ≥ $1d_b$ AND C-C SPACING ≥ $2d_b$
CASE 2	OTHER CASES

STANDARD HOOKS IN TENSION (PER ACI 318-19)

BAR SIZE	l_{dh}			HOOK EXTENSION
	f'_c = 4000 PSI	f'_c = 4500 PSI	f'_c = 5000 PSI	
#3	6"	6"	6"	6"
#4	6"	6"	6"	8"
#5	7 1/2"	7 1/4"	7 1/4"	10"
#6	9 3/4"	9 3/4"	9 1/2"	1' - 0 1/4"
#7	1' - 0 1/4"	1' - 0"	1' - 0"	1'-2"
#8	1'-3"	1'-2 3/4"	1'-2 3/4"	1'-4"
#9	1'-6"	1'-5 3/4"	1'-5 3/4"	1'- 7 1/4"
#10	1'-9 1/2"	1'-9"	1'-8 3/4"	1' - 9 3/4"
#11	2'-1 1/4"	2'-0 3/4"	2'-0 1/4"	2'-0"



NOTES:
1. TABULATED VALUES ARE BASED ON A YIELD STRENGTH OF f_y = 60 ksi
2. CONCRETE IS NORMAL WEIGHT (150 PCF)
3. REDUCTION FACTORS BASED ON ACI 318 FOR COVER, STIRRUPS, OR EXCESS REINFORCEMENT HAVE NOT BEEN APPLIED.
4. ANY REDUCTION BASED ON FACTORS FROM ACI 318 SHALL NOT REDUCE l_{dh} TO LESS THAN $8d_b$ OR 6".

CONCRETE COVER SCHEDULE

FOOTINGS (EARTH FORMED)	3-in.
COLUMNS/PIERS (TO TIES)	1.5-in.
SLAB-ON-GRADE:	
NOT EXPOSED TO WEATHER	T/3 OR 3/4-in.
EXPOSED TO WEATHER	1.5-in.
FOUNDATION WALLS (NO SURFACES SHALL BE EARTH FORMED):	
#5 AND SMALLER REINFORCEMENT	1.5-IN.
#6 TO #11 REINFORCEMENT	2-IN.

NOTES:
1. MINIMUM CONCRETE COVER PROTECTION FOR REINFORCING BARS SHALL BE LISTED BELOW (SEE ACI 318-14 FOR CONDITIONS NOT NOTED).
2. DIMENSIONS FOR BAR PLACEMENT PROVIDED IN SECTIONS SUPERCEDE MINIMUM COVER REQUIREMENTS SHOWN HERE.
3. DIMENSIONS ARE IN INCHES.
4. PROVIDE STANDARD BAR CHAIRS AND SUPPORT BARS (4'-0" MAXIMUM) TO MAINTAIN CONCRETE COVER SPECIFIED.

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06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

REVISIONS								
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DATE								

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

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CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL SYMBOLS, ABBREVIATIONS, AND SCHEDULES

ISSUE FOR CONSTRUCTION

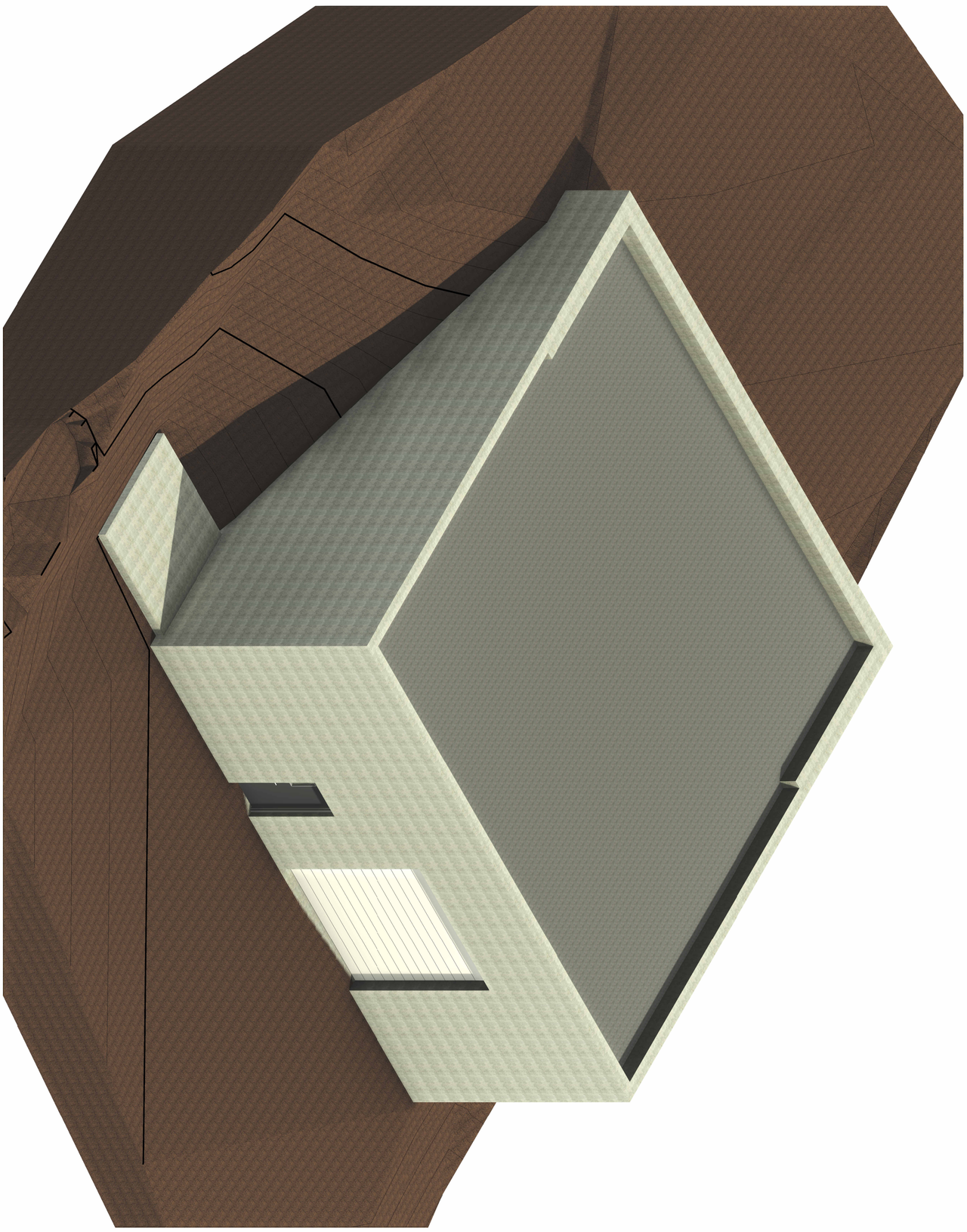
ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
SHEET: S0.3

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1
S1.0

RENDER VIEW



SHEET: S1.0

PROJECT: 220583

DATE: JUNE, 2024

IF THIS BAR DOES NOT MEASURE 1" ON THIS SHEET, THEN DRAWING IS NOT TO SCALE

0 1/2 1

ATTENTION:

CONSTRUCTION DRAWINGS FOR:

MAPLEWELL TREATMENT FACILITY PROJECT

RENDER VIEW

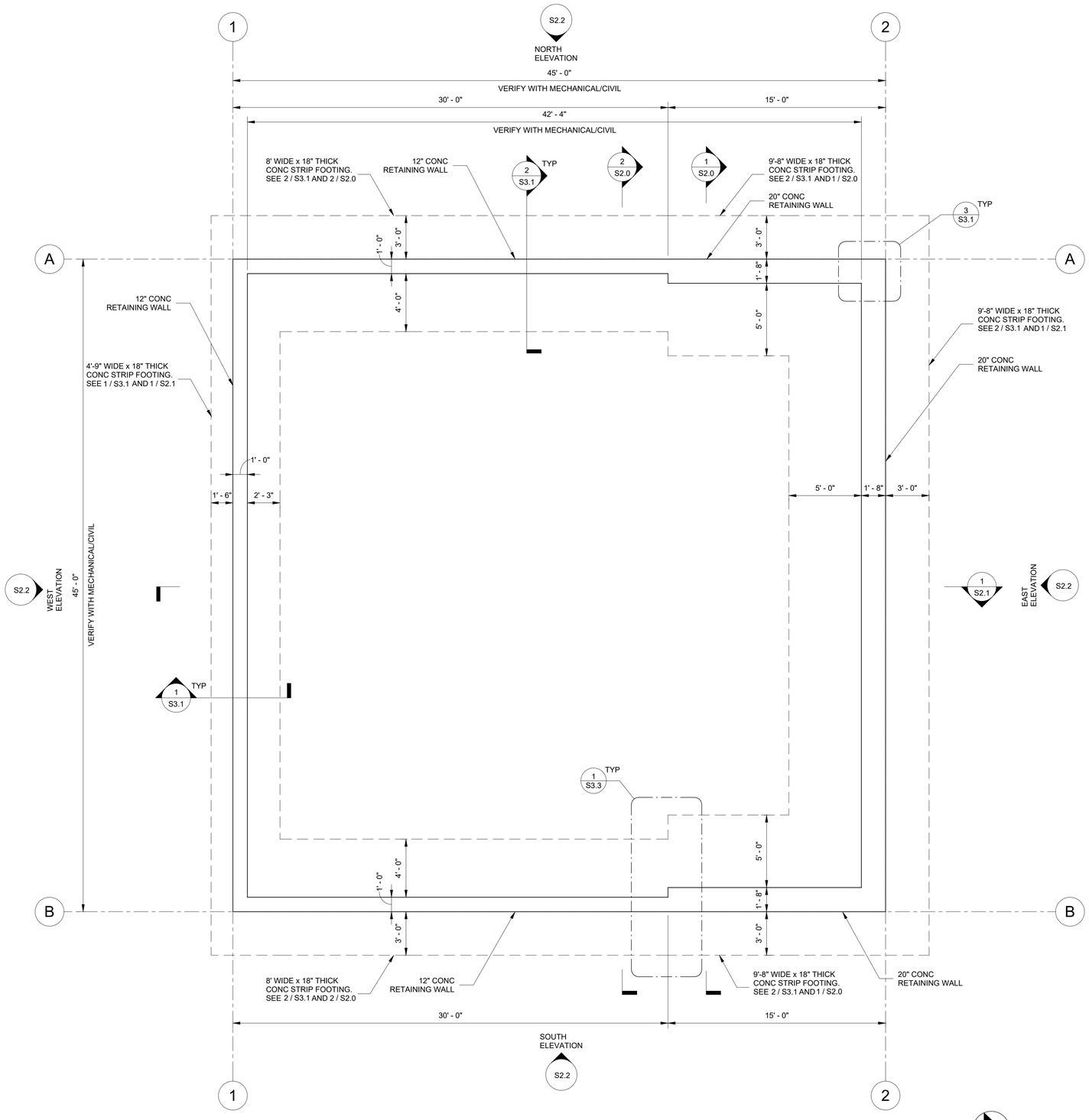
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REVISIONS			BORDER SIZE
NO.		DATE	22X34
			DESIGNED
			KK
			DRAWN
			KK
			CHECKED
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No. 13091314
JAFAR T. ALABBAM
STATE OF UTAH
06/12/2024

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1 S1.1 **FINISHED FLOOR**
SCALE: 1/4" = 1'-0"

FOUNDATION NOTES:

1. REFERENCE GENERAL NOTES AND DESIGN CRITERIA.
2. COORDINATE DIMENSIONS, WALL OPENINGS, ELEVATIONS, SECTIONS, AND DETAILS WITH CIVIL, MECHANICAL, AND PLUMBING DRAWINGS. NOTIFY THE EOR OF ANY DISCREPANCY PRIOR TO COMMENCING ANY WORK.
3. TYPICAL TOP OF CONCRETE SLAB = 0'-0", WHERE 0-0" IS DATUM. ALL ELEVATIONS ARE REFERENCED FROM DATUM. REFER TO CIVIL DRAWINGS FOR ACTUAL GROUND FLOOR ELEVATION.
4. TYPICAL TOP OF FOOTING ELEVATION = -2'-0"
5. FOR PIPING UNDER SLAB, SEE CIVIL, MECHANICAL, AND PLUMBING DRAWINGS.
6. SEE 9 / S3.1 FOR BURIED PIPES RUNNING PARALLEL AND PERPENDICULAR TO FOOTINGS.
7. DO NOT BACKFILL EXTERIOR WALLS UNTIL ROOF FRAMING, ROOF DECKING, AND SLAB ON GRADE ARE IN PLACE.

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06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

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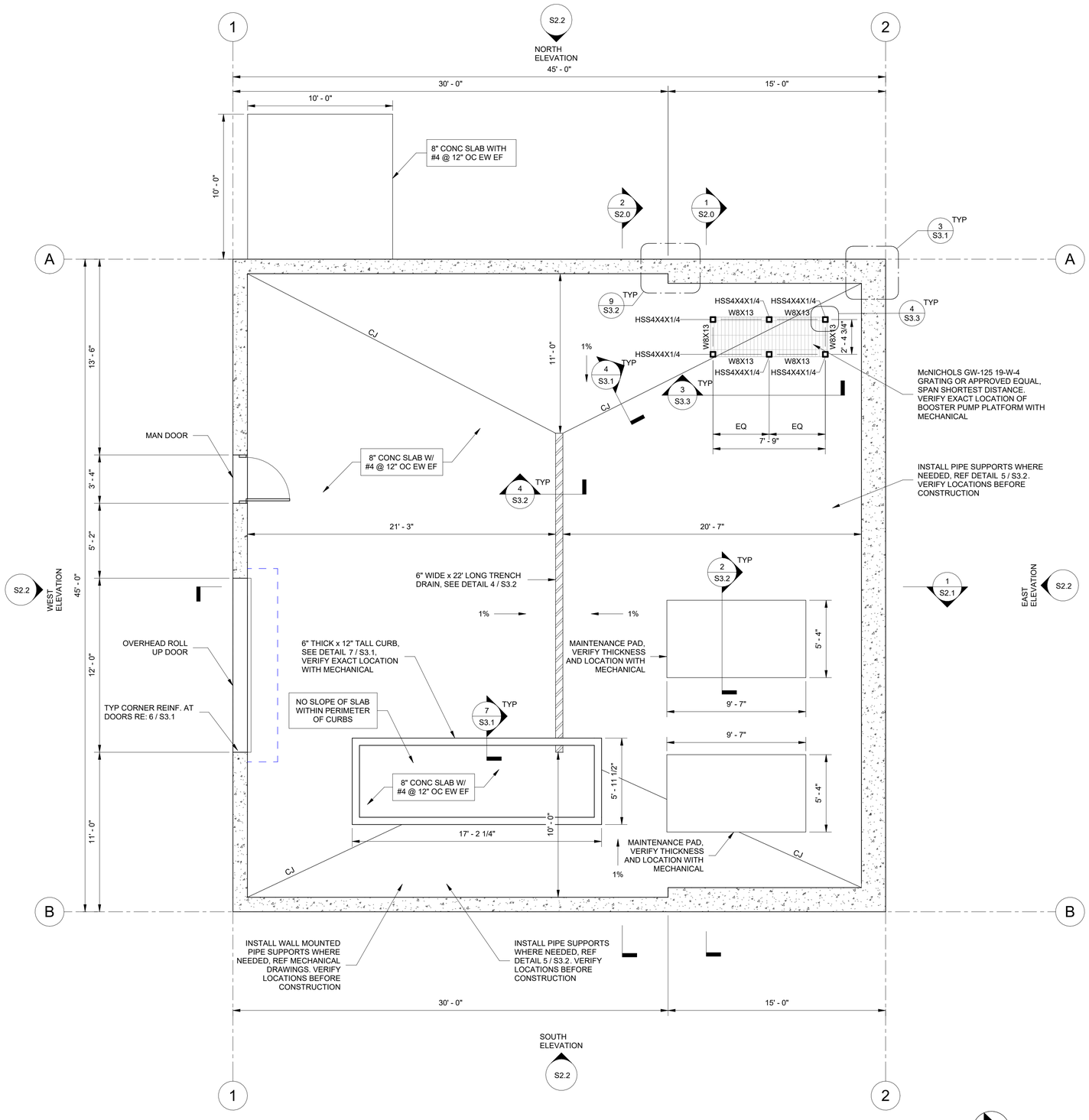
CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
FOUNDATION PLAN

ISSUE FOR CONSTRUCTION

ATTENTION:
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DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S1.1

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1 FINISHED FLOOR PLAN
SCALE: 1/4" = 1'-0"
S1.2

FRAMING NOTES:

1. VERIFY ALL PLAN DIMENSIONS WITH CIVIL, MECHANICAL, AND PLUMBING. NOTIFY THE EOR OF ANY DISCREPANCY PRIOR TO COMMENCING ANY WORK.
2. VARIFY LOCATIONS OF SLOPED SLABS AND TRENCH DRAINS WITH CIVIL, MECHANICAL, AND PLUMBING DRAWINGS.
3. SEE CIVIL DRAWINGS FOR EXTERIOR CONCRETE WORK AT DOORS, SIDEWALKS, ETC.
4. VERIFY WALL AND FLOOR OPENINGS WITH CIVIL, MECHANICAL, AND PLUMBING DRAWINGS.
5. SEE 6 / S3.2 FOR REINFORCING AROUND MISCELLANEOUS OPENINGS IN CONCRETE WALLS.
6. SUPPORT BARS SHALL NOT BE USED BELOW BOTTOM BAR LAYERS. ALL BARS IN BOTTOM LOWER LAYER TO BE CHAIRED. SUPPORT BARS MAY BE USED BELOW TOP BAR LAYERS PROVIDED THEY ARE IN ADDITION TO BARS SPECIFIED.
7. CJ DENOTES SLAB CONTROL JOINT, SPACE SLAB CONTROL JOINTS WITH A SPACING NOT TO EXCEED 12'-0" OC AND WITH A LENGTH TO WIDTH RATIO NO GREATER THAN 1.5 TO 1.
8. SEE 4 / S3.1 FOR TYPICAL CONSTRUCTION AND CONTROL JOINTS IN FLOOR SLABS.
9. PROVIDE ADDITIONAL REINFORCEMENT AT DISCONTINUOUS SLAB JOINTS.
10. FLOORS TO SLOPE AT 1% TO TRENCH DRAIN.
11. LOCATION OF EQUIPMENT PADS AND CURBS MAY VARY BASED OFF FINAL EQUIPMENT SELECTION. VARIFY LOCATIONS WITH CIVIL AND MECHANICAL DRAWINGS.
12. DO NOT BACKFILL EXTERIOR WALLS UNTIL ROOF FRAMING, ROOF DECKING, AND SLAB ON GRADE ARE IN PLACE.
13. VERIFY ALL PIPE SUPPORT LOCATIONS BEFORE CONSTRUCTION.

PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

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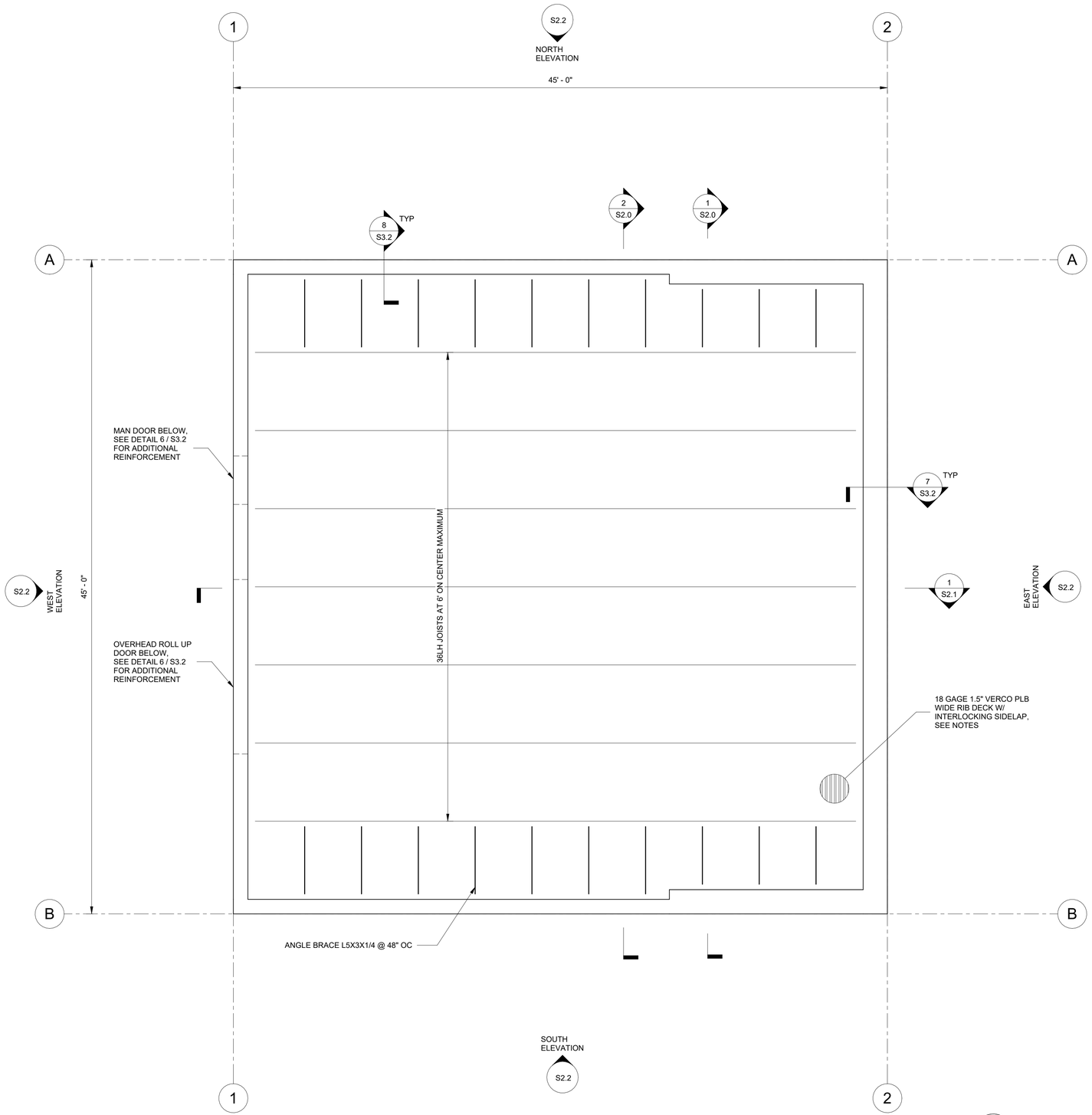
CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
FINISHED FLOOR PLAN

ISSUE FOR CONSTRUCTION

ATTENTION:
0 1/2 1
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DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S1.2

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1 ROOF PLAN
S1.3
SCALE: 1/4" = 1'-0"

ROOF FRAMING NOTES:

1. REFERENCE GENERAL NOTES AND DESIGN CRITERIA.
2. ALL DUCTS, CHASES, AND PIPES SHALL BE PER MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS.
3. METAL DECK SHALL BE 18 GA PAINTED TYPE VERCO "PLB" WIDE RIB W/ DECK W/ INTERLOCKING SIDE SEAM. WELD DECK W/ 9/36 WELD PATTERN W/ 5/8" ARC SPOT WELD SIDE LAP FASTENING AND 3/4" ARC SPOT WELD SUPPORT FASTENING.
4. ROOF JOISTS SHALL BE BY OTHERS AND DESIGNED FOR 10 PSF SUPERIMPOSED DEAD LOAD, 20 PSF LIVE ROOF, 127.82 PSF SNOW LOAD, 2.44 PSF VERTICAL SEISMIC LOAD, AND 29.8 PSF VERTICAL WIND LOAD.
5. CONFIRM ALL ROOF LOADS FROM MECHANICAL AND HVAC EQUIPMENT INCLUDING HEATERS, ROOFTOP UNITS, PIPES, AND DEHUMIDIFIERS WITH THEIR RESPECTIVE SHEETS OR DISCIPLINES. SEE DETAIL 2 / S3.3 FOR ADDITIONAL REINFORCEMENT FOR HANGING EQUIPMENT.
6. DO NOT BACKFILL EXTERIOR WALLS UNTIL ROOF FRAMING, ROOF DECKING, AND SLAB ON GRADE ARE IN PLACE.

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06/21/2024
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JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
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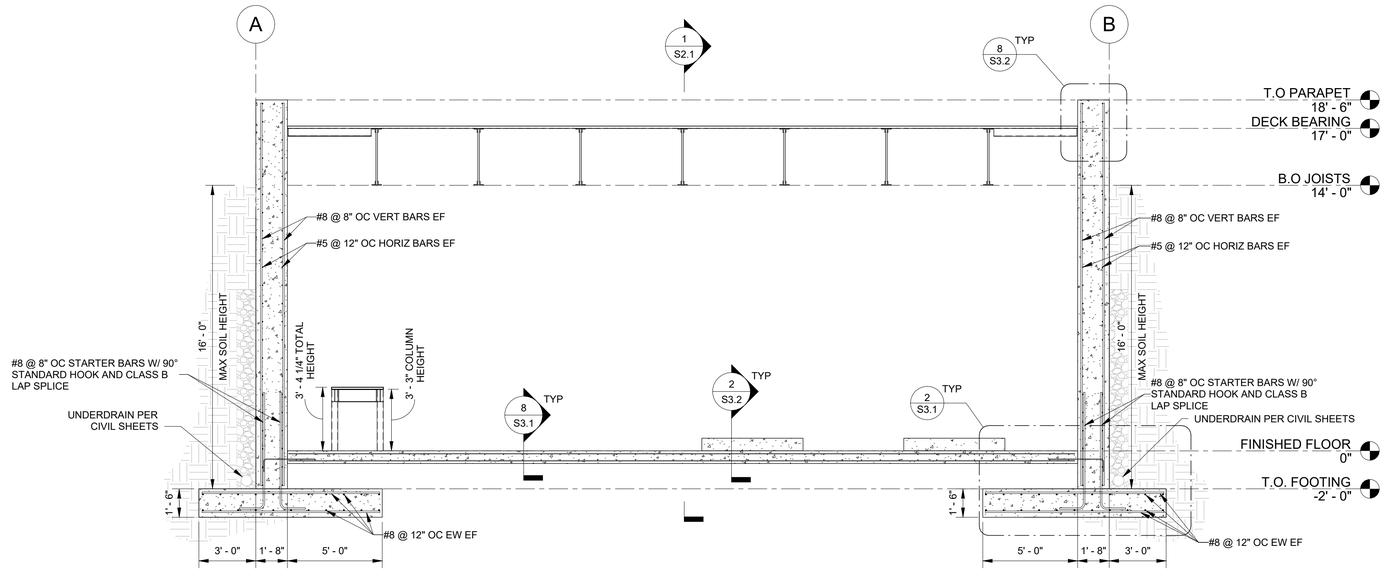
CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
ROOF PLAN

ATTENTION:
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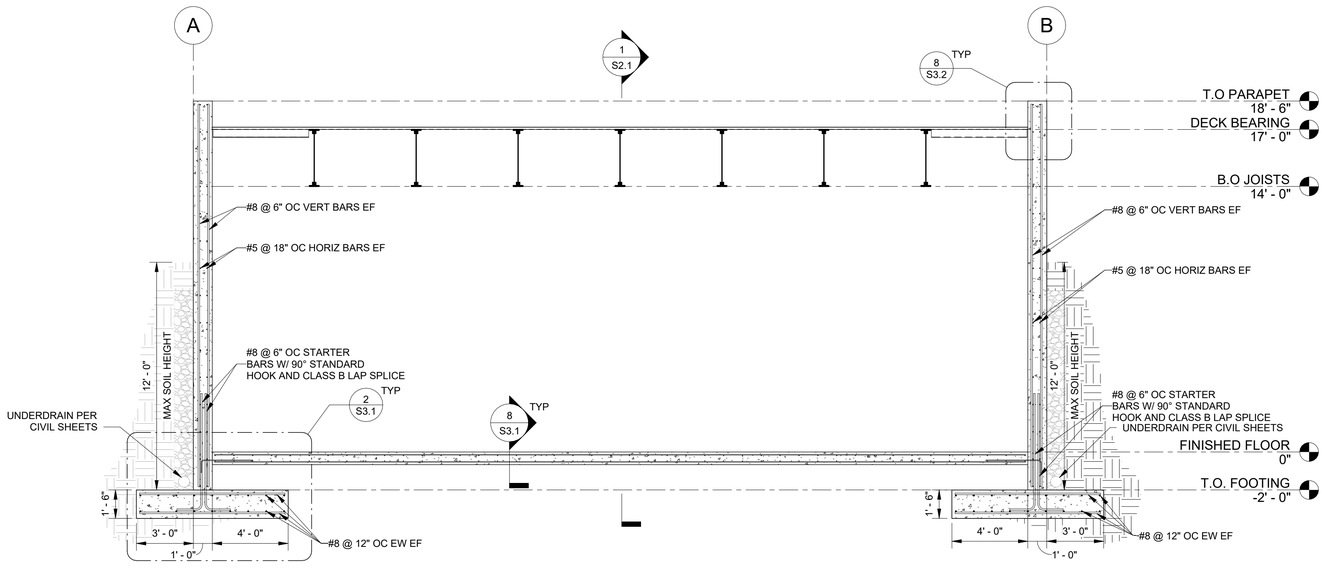
DATE: JUNE, 2024
PROJECT: 220583
SHEET: S1.3

ISSUE FOR CONSTRUCTION

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1 NORTH-SOUTH SECTION VIEW 20" WALLS
SCALE: 1/4" = 1'-0"
S2.0



2 NORTH-SOUTH SECTION VIEW 12" WALLS
SCALE: 1/4" = 1'-0"
S2.0

NOTES:

1. DO NOT BACKFILL EXTERIOR WALLS UNTIL ROOF FRAMING, ROOF DECKING, AND SLAB ON GRADE ARE IN PLACE.

PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
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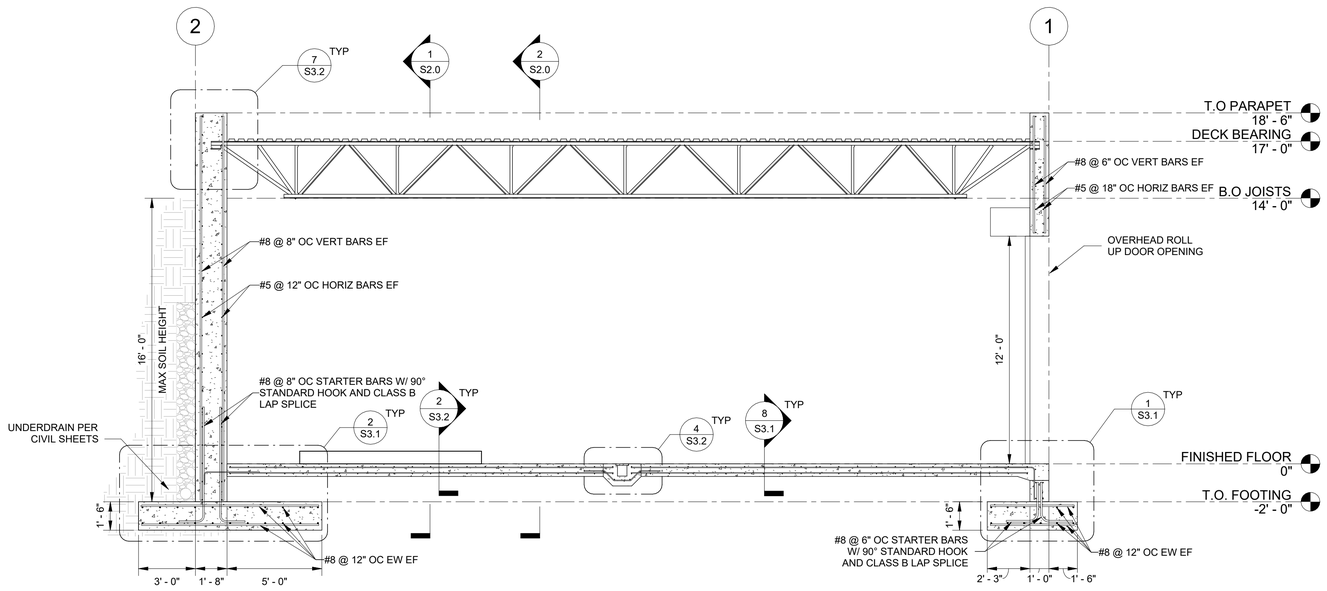
CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
SECTION VIEWS

ISSUE FOR CONSTRUCTION

ATTENTION:
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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S2.0

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1 S2.1 EAST-WEST SECTION VIEW

SCALE: 1/4" = 1'-0"

NOTES:

1. DO NOT BACKFILL EXTERIOR WALLS UNTIL ROOF FRAMING, ROOF DECKING, AND SLAB ON GRADE ARE IN PLACE.

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No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
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CONSTRUCTION DRAWINGS FOR:

MAPLEWELL TREATMENT FACILITY PROJECT

SECTION VIEWS

ATTENTION:

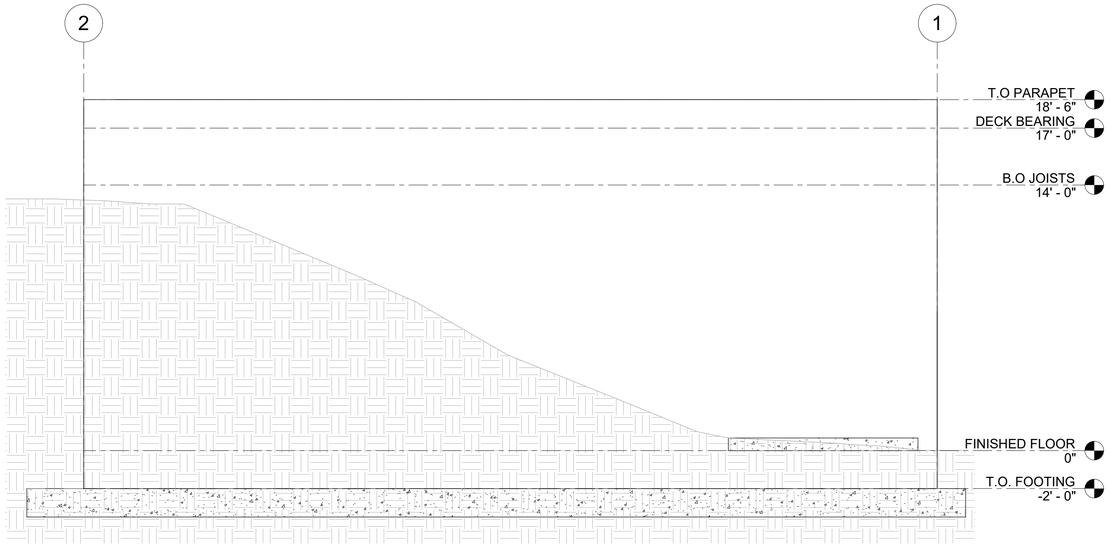
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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

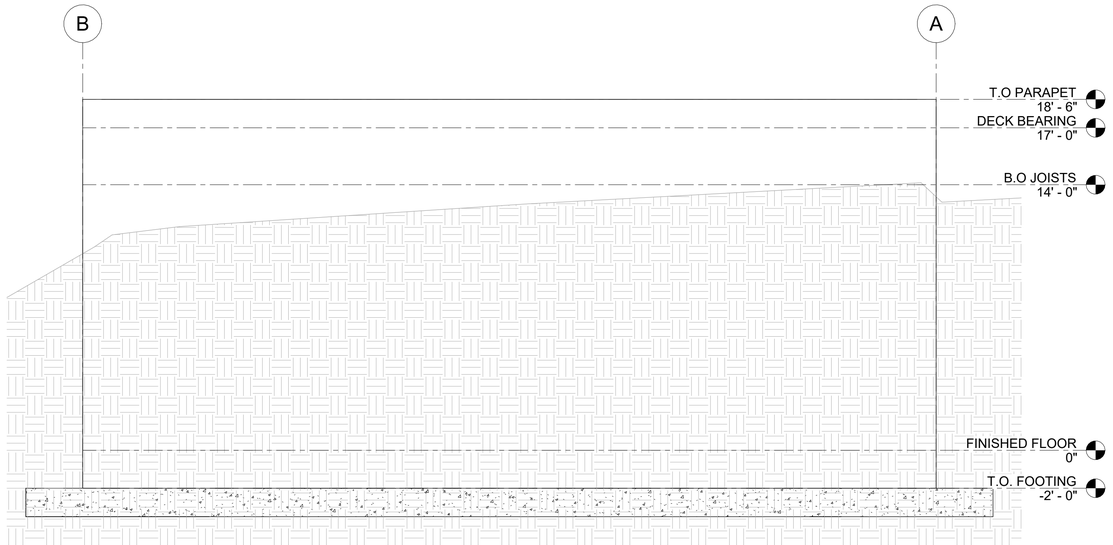
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PROJECT:	220583
SHEET:	S2.1

ISSUE FOR CONSTRUCTION

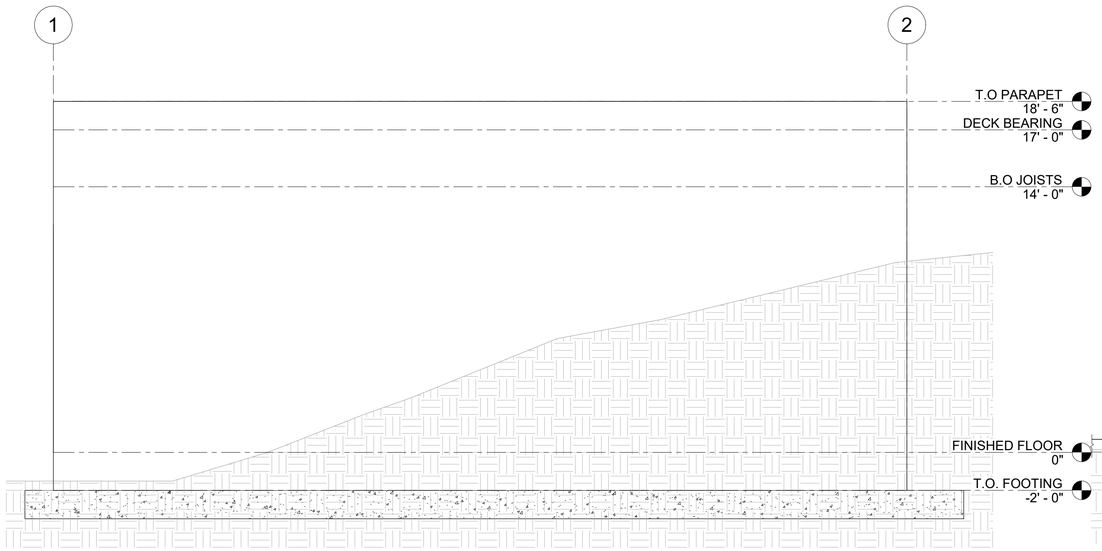
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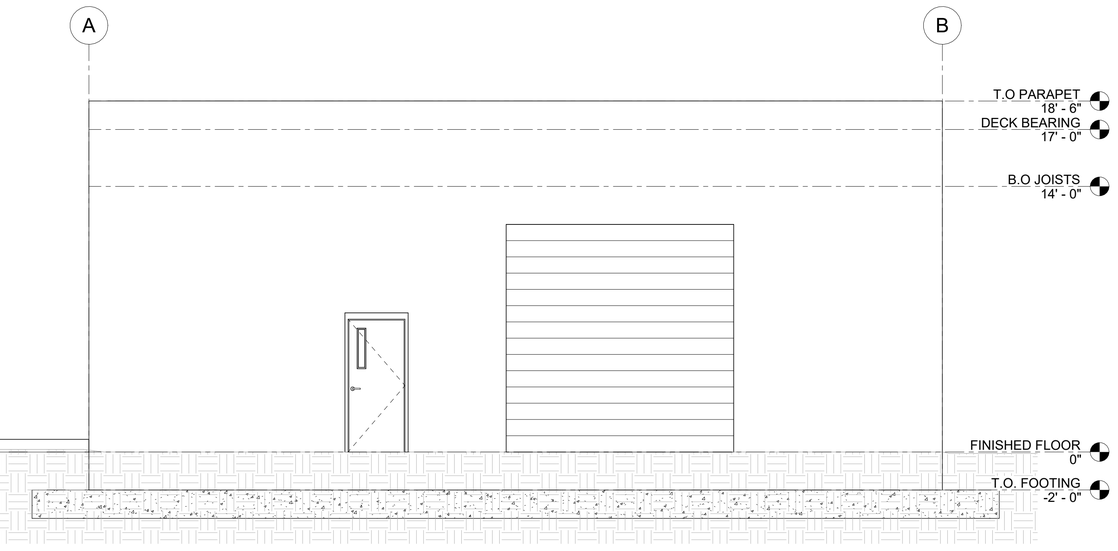
1 NORTH ELEVATION
SCALE: 1/4" = 1'-0"
S2.2



2 EAST ELEVATION
SCALE: 1/4" = 1'-0"
S2.2



3 SOUTH ELEVATION
SCALE: 1/4" = 1'-0"
S2.2



4 WEST ELEVATION
SCALE: 1/4" = 1'-0"
S2.2

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06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

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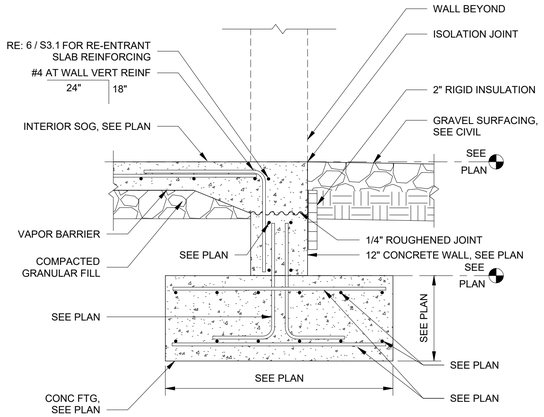
CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
ELEVATION VIEWS

ISSUE FOR CONSTRUCTION

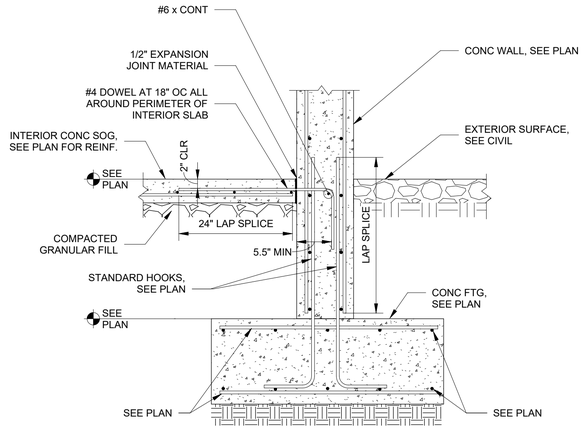
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DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S2.2

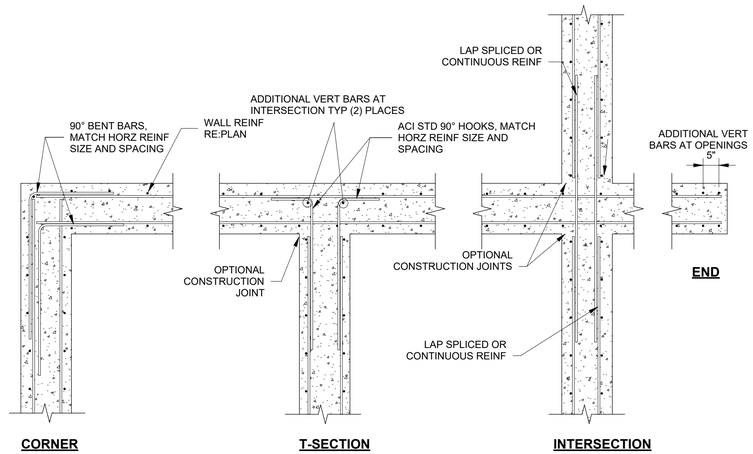
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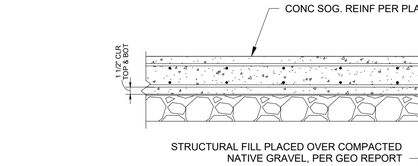
1 CONC WALL TO FOUNDATION @ DOOR OPENING
NTS



2 TYPICAL CONCRETE WALL
NTS



3 TYPICAL CONCRETE WALL REINF AT CORNER (DOUBLE)
NTS



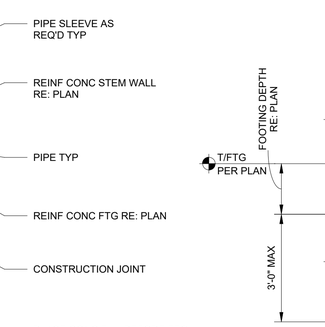
CONTROL JOINT

CONSTRUCTION JOINT

NOTES:
1. WHEN DEPTH ≤ 6", PROVIDE 3/4"ø X 1'-2" @ 12" OC DOWEL.
2. WHEN DEPTH 6" < DEPTH ≤ 8", PROVIDE 1"ø X 1'-4" @ 12" OC DOWEL.
3. WHEN DEPTH 8" < DEPTH ≤ 11", PROVIDE 1-1/4"ø X 1'-6" @ 12" OC DOWEL.

4 TYPICAL SLAB ON GRADE JOINTS
NTS

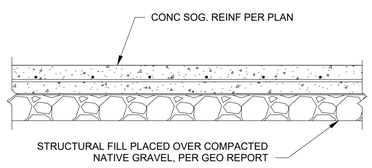
5 TYPICAL ISOLATION JOINT AT GRADE
NTS



6 WALL OPENING CORNER SLAB REINFORCING
NTS

7 TYPICAL CURB ON SLAB/CONDUIT IN SLAB
NTS

AT 8" SLAB OR MORE



AT 6" SLAB OR LESS

8 TYPICAL SLAB ON GRADE
NTS

NOTES:

1. PRIOR TO CONSTRUCTION, STRUCTURAL ENGINEER OF RECORD SHALL REVIEW PIPES/SLEEVES GREATER THAN 8" DIA AND SPACED CLOSER THAN 3" APART.
2. ALUMINUM MATERIALS SHALL NOT BE EMBEDDED IN CONCRETE

ELEVATION

SECTION

9 TYPICAL PIPE AND TRENCH LOCATIONS AT CONCRETE STEMWALL/FOOTING
NTS

PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

REVISIONS

NO.	DATE

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COLLABORATE. INNOVATE. CREATE.
2175 W. 3000 S., SUITE 200
HEBER CITY, UTAH 84032
435-315-3168 | WWW.ARDURRA.COM

CONSTRUCTION DRAWINGS FOR:

MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL CONCRETE DETAILS

ISSUE FOR CONSTRUCTION

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET OR 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
SHEET: S3.1

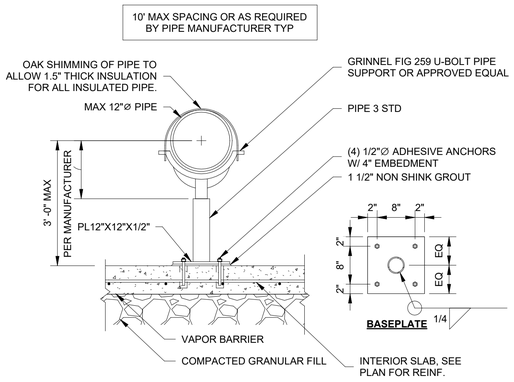
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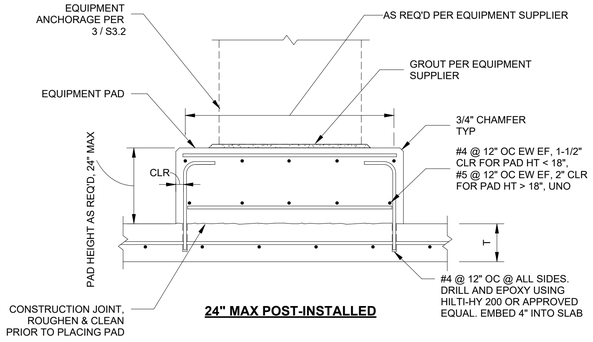
TYPICAL ANCHOR BOLT SCHEDULE				
INSTALLATION TYPE	CAST-IN-PLACE		DRILL-IN OPTIONS SUBMITTAL REQ'D	
BOLT TYPE	STANDARD J-BOLT	HEADED ANCHOR	ADHESIVE ANCHOR	EXPANSION ANCHOR
EMBEDMENT REQUIREMENTS	7 1/2"	12xDIA. UNO	8xDIA. UNO	
ANCHOR DIA.	5/8"ø MAX	5/8"ø TO 2 1/2"ø	5/8"ø TO 1"ø	

NOTES:

1. CONTRACTOR TO DETERMINE REQUIRED THREAD PROJECTION SUITABLE FOR THICKNESS OF MATERIALS BEING FASTENED PLUS GROUT ALLOWANCE.
2. CONTRACTOR MAY SELECT APPROPRIATE CAST-IN-PLACE ANCHOR BOLT OPTION WITHOUT SUBMITTAL
3. DRILL-IN OPTIONS ARE NOT APPROPRIATE AT ALL CONDITIONS. IF DRILL-IN METHOD IS DESIRED, SUBMIT MANUFACTURER'S INFORMATION, ALLOWABLE LOAD VS EMBEDMENT DATA AND LOCATIONS OF WHERE SUBSTITUTIONS ARE REQUESTED. ENGINEER WILL DETERMINE IF SUBMISSION IS SUITABLE AT LOCATION
4. EMBEDMENT OF DRILL-IN ANCHORS SHALL BE PER ENGINEER'S SUBMITTAL REVIEW COMMENTS.
5. AT PRESSURE TREATED SILLS, PROVIDE HOT-DIPPED GALVANIZED OR STAINLESS STEEL ANCHORS.

1 TYPICAL ANCHOR BOLT SCHEDULE
NTS

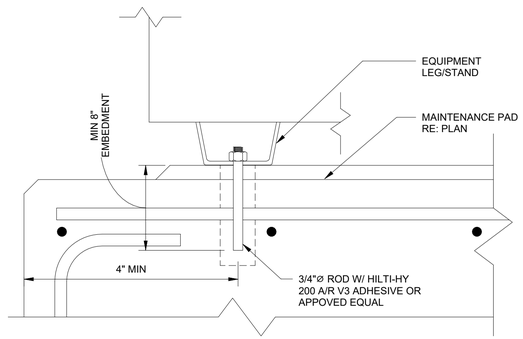




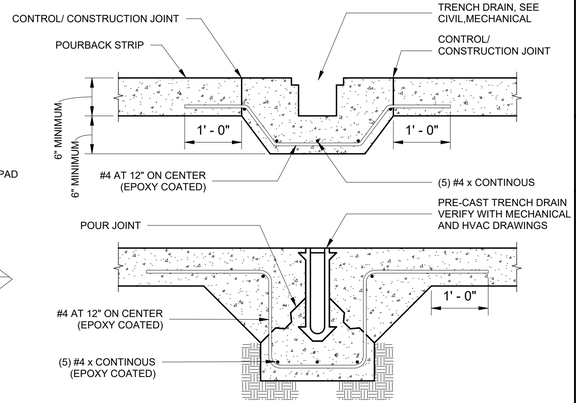
24" MAX POST-INSTALLED

1. FOLLOW ADHESIVE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION.
2. IF PROVIDED, EQUIPMENT MANUFACTURER INSTRUCTIONS FOR ANCHORAGE SHALL SUPERSEDE ANCHORAGE SHOWN

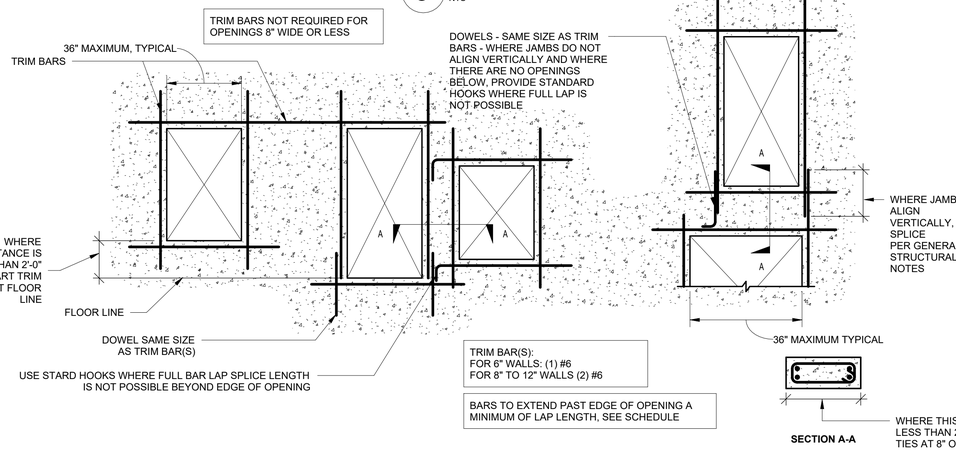
2 TYPICAL MAINTENANCE PAD
NTS



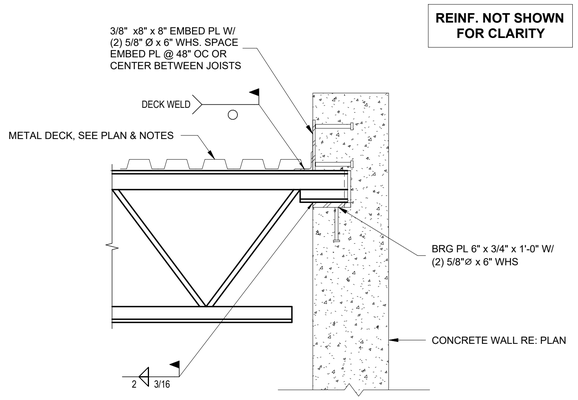
3 TYPICAL EQUIPMENT ANCHORAGE
NTS



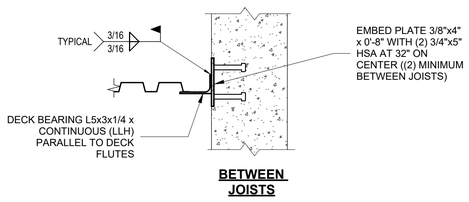
4 TRENCH DRAIN SECTION AND REINF.
NTS



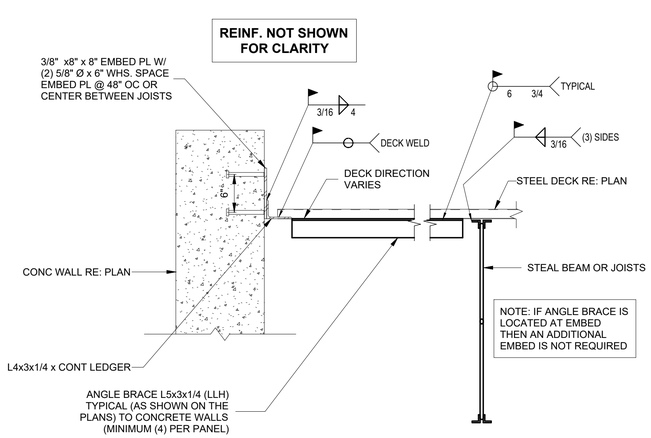
5 SADDLE PIPE SUPPORT
NTS

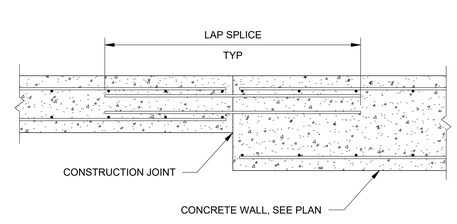


6 TYPICAL TRIM BARS AROUND MISCELLANEOUS CONCRETE WALL OPENINGS UNLESS NOTED OTHERWISE
NTS



BETWEEN JOISTS





7 TYPICAL JOIST / DECK BEARING DETAIL
NTS

8 STEEL DECK TO CONCRETE PARAPET WALL
NTS

9 REINF. LAP AT WALL TRANSITION DETAIL
NTS

PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

REVISIONS								
NO.								
DATE								

BORDER SIZE	22X34
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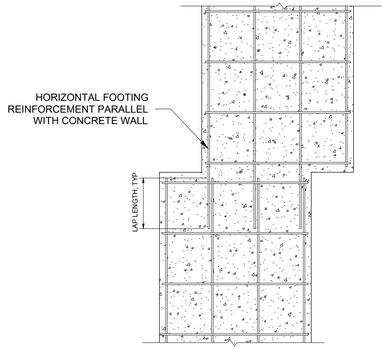
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CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL CONCRETE DETAILS

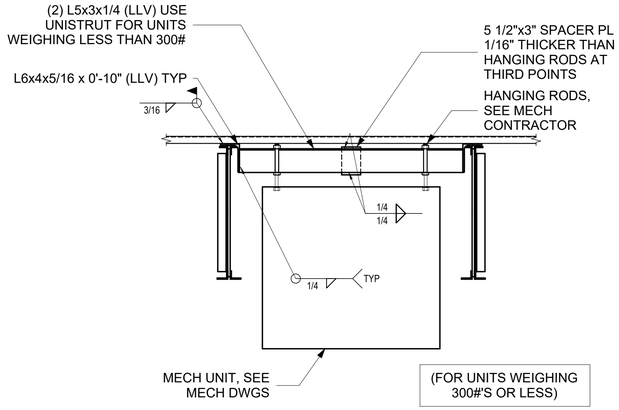
ATTENTION:
0 1/2 1
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DATE:	JUNE, 2024
PROJECT:	220583
SHEET:	S3.2

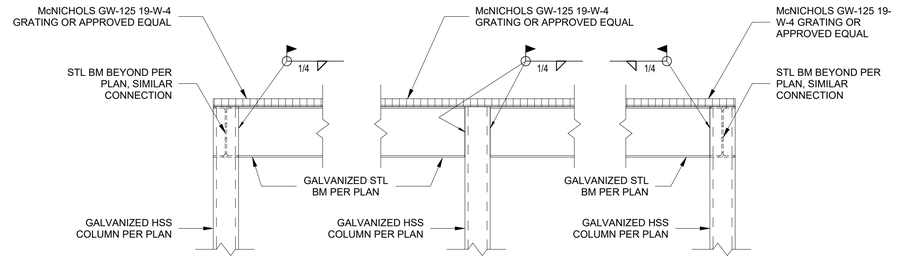
ISSUE FOR CONSTRUCTION



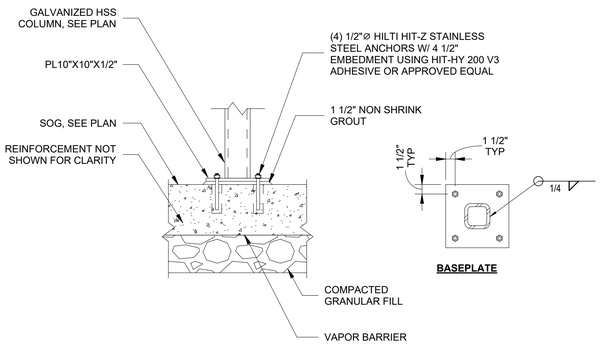
1 REINF. LAP AT FOOTING TRANSITION DETAIL
NTS



2 HANGING MECHANICAL UNIT
NTS



3 TYPICAL BOOSTER PUMP COLUMN TO BEAM CONNECTION
NTS



4 TYPICAL BOOSTER PUMP COLUMN BASEPLATES
NTS

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PROFESSIONAL ENGINEER
06/21/2024
No. 13091314
JAFAR T. ALLAHHAM
STATE OF UTAH

BORDER SIZE	22X34
DESIGNED	KK
DRAWN	KK
CHECKED	JA
APPROVED	JA

REVISIONS

NO.	DATE

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CONSTRUCTION DRAWINGS FOR:
MAPLEWELL TREATMENT FACILITY PROJECT
STRUCTURAL CONCRETE DETAILS

ATTENTION:
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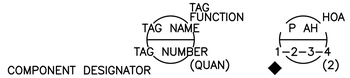
DATE: JUNE, 2024
PROJECT: 220583
SHEET: S3.3

ISSUE FOR CONSTRUCTION

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P:\220583-M223443_ACADDWG\SHEETS\P&IDN0.1 P&ID LEGEND 1 OF 2.DWG, 3/1/2024

INSTRUMENT TAG IDENTIFICATION



TAG NAME	P:	FIRST LETTER, SEE ISA TABLE BELOW
	AH:	SUCCEEDING LETTERS, SEE ISA TABLE BELOW
	HOA:	TAG FUNCTION ABBREVIATION, SEE LISTING AT RIGHT
TAG NUMBER	1:	UNIT NUMBER. UNIT (UNIT PROCESS) NUMBER IS A MAJOR PORTION OF THE ENTIRE TREATMENT PROCESS. SEE DRAWING NO. 09-N-1 FOR INTERFACE SUMMARY DIAGRAM.
	2:	LOOP NUMBER
	3:	DEVICE NUMBER
	4:	SECONDARY DEVICE NUMBER. USED WHEN MORE THAN ONE COMPONENT HAS THE SAME UNIT, LOOP AND DEVICE DESIGNATIONS.
(QUANTITY)	(2):	TOTAL NUMBER OF DEVICES WHERE MORE THAN ONE DEVICE IS REQUIRED. DEVICE NUMBERS ARE SEQUENTIAL BEGINNING WITH THE TAG NUMBER SHOWN. IF QUANTITY IS NOT SHOWN THEN ONE DEVICE ONLY IS REQUIRED.
COMPONENT DESIGNATOR	◆	SEE LISTING AT RIGHT

TAG FUNCTION ABBREVIATIONS

AI	ANALOG INPUT
ALT	ALTERNATE
AO	ANALOG OUTPUT
CLS	CLOSE(D)
CM	COMPUTER-MANUAL
DI	DIGITAL INPUT
DIFF	DIFFERENCE OR DIFFERENTIAL
DOP	DIGITAL OUTPUT
DO	DISSOLVED OXYGEN
F	FAIL
F(X)	CHARACTERIZED
FOR	FORWARD-STOP(OFF)-REVERSE (MAINTAINED CONTACT)
FSR	FORWARD-STOP-REVERSE (MOMENTARY CONTACT)
FT	FEET
HOA	HAND-OFF-AUTOMATIC (MAINTAINED CONTACT)
HOR	HAND-OFF-REMOTE (MAINTAINED CONTACT)
I	CURRENT-TO-CURRENT
IP	CURRENT-TO-PNEUMATIC
LL	LEAD-LAG (MAINTAINED CONTACT)
LOE	LOSS-OF-ECHO (ULTRASONIC SENOR FAILURE)
LOR	LOCAL-OFF-REMOTE (MAINTAINED CONTACT)
LOS	LOCKOUT STOP (LOCKABLE IN "STOP" POSITION. MOMENTARY CONTACT)
LR	LOCAL-REMOTE (MAINTAINED CONTACT)
MA	MANUAL-AUTOMATIC (MAINTAINED CONTACT)
MOA	MANUAL-OFF-AUTOMATIC (MAINTAINED CONTACT)
OPN	OPEN
OA	OFF-AUTOMATIC
OA	OFF-AUTOMATIC
OCA	OPEN-CLOSE-AUTOMATIC (MAINTAINED CONTACT)
OC	OPEN-CLOSE(D) (MAINTAINED CONTACT)
OCR	OPEN-CLOSE(D) (MAINTAINED CONTACT)
OSC	OPEN-STOP-CLOSE (MOMENTARY CONTACT SPRING RETURN TO CENTER POSITION)
O/L	ON-OFF-AUTOMATIC (MAINTAINED CONTACT)
OO	ON-OFF (MAINTAINED CONTACT)
OOA	ON-OFF-AUTOMATIC (MAINTAINED CONTACT)
OOR	ON-OFF-REMOTE (MAINTAINED CONTACT)
PB	PULL BOX
POS	POSITION
POT	POTENTIOMETER
RUN	RUN
RESET	RESET
SBL	SLUDGE BLANKET INTERFACE LEVEL
SEL	SELECTOR SWITCH
SPD	SPEED
SQRT	SQUARE ROOT
SS	START-STOP (MOMENTARY CONTACT)
SSA	START-STOP-AUTOMATIC (MOMENTARY CONTACT)
SSL	START-STOP-LOCK (LOCKABLE IN "STOP" POSITION. MOMENTARY CONTACT)
STP	MOTOR STOP
STR	MOTOR STARTER
SUM	SUMMATION
VB	VIBRATION
X	MULTIPLY
0-##	RANGE OF THE GIVEN INSTRUMENT

TAG SYMBOLS

	FIELD MOUNTED	PANEL MOUNTED ACCESSIBLE TO OPERATOR	PANEL MOUNTED NONACCESSIBLE TO OPERATOR	MOTOR STARTER MOUNTED ACCESSIBLE TO OPERATOR	MOTOR STARTER MOUNTED NONACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	( )	—	—	—	—
PROGRAMMABLE CONTROLLER-BASED FUNCTIONS			◇		◇
MULTIFUNCTION KEYPAD/DISPLAY FUNCTIONS	⟨ ⟩	⟷		⟷	
HMI/SCADA SOFTWARE-BASED FUNCTIONS		▭	▭		

INSTRUMENT SOCIETY OF AMERICA TABLE

LETTER	FIRST LETTER (S)		SUCCEEDING LETTERS		
	PROCESS OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (*)		ALARM (W. LOGGING)	ANNUNCIATE	
B	BURNER COMBUSTION		USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
C	USERS CHOICE (*)			CONTROL	
D	USERS CHOICE (*)	DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT		
F	FLOW RATE				FEEDBACK
G	USERS CHOICE (*)		GLASS		
H	HAND (MANUAL)				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE	TIME RATE OF CHANGE	KEYPAD (DATA ENTRY)	CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOTOR	MOMENTARY			MONITORING
N	USERS CHOICE (*)		USERS CHOICE (*)	USERS CHOICE (*)	USERS CHOICE (*)
O	USERS CHOICE (*)		ORIFICE		
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE			
R	RADIOACTIVITY		RECORD OR TREND		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	UNIVERSAL/MULTIVARIABLE (*)		MULTIFUNCTION (*)	MULTIFUNCTION (*)	MULTIFUNCTION (*)
V	VIBRATION			VALVE	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED (*)	X AXIS	UNCLASSIFIED (*)	UNCLASSIFIED (*)	CONTROL
Y	EVENT, STATE (W. LOGGING)	Y AXIS		RELAY OR COMPUTE (*)	
Z	POSITION, DIMENSION	Z AXIS		DRIVE. ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(*) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL.

SPECIAL CASES:
ETM – ELAPSED TIME METER
MS – MOTOR STARTER
MOR – MOTOR OVERLOAD RELAY
MPR – MOTOR PROTECTION RELAY

EQUIPMENT AND VALVE TAG IDENTIFICATION

TAG NUMBER

W-X-Y-Z
**

W:	EQUIPMENT OR SELF CONTAINED VALVE ABBREVIATION
X:	UNIT PROCESS NUMBER
Y:	LOOP NUMBER
Z:	UNIT NUMBER
**	COMPONENT DESIGNATOR

EQUIPMENT ABBREVIATIONS

E	EJECTOR
G	GATE
M	MECHANICAL EQUIPMENT
P	PUMP
T	TANK

SELF CONTAINED VALVE ABBREVIATIONS

ARV	AIR RELEASE VALVE
AVRV	AIR AND VACUUM RELIEF VALVE
LCV	LEVEL CONTROL VALVE
PCV	PRESSURE CONTROL VALVE
TCV	TEMPERATURE CONTROL VALVE
PSV	PRESSURE SAFETY (RELIEF) VALVE

LOCAL CONTROL PANEL TAG IDENTIFICATION

TAG NUMBER

W-X-Y-Z
◆

W	SITE IDENTIFIER (BUILDING NUMBER)
X	SEE EQUIPMENT LIST BELOW
Y	UNIT PROCESS NUMBER
Z	PANEL NUMBER
◆	COMPONENT DESIGNATOR

EQUIPMENT LIST

LCP – LOCAL CONTROL PANEL
CS – CONTROL STATION
ITC – INTERCONNECTING TERMINATION CABINET
AFD – ADJUSTABLE FREQUENCY DRIVE
AP – ALARM PANEL

POWER OPERATED VALVE TAG IDENTIFICATION

HKU	MULTIFUNCTION DISPLAY/KEYPAD
—S—	SERIAL LINK
—F—	PLC DATA HWY (FIBER OPTIC)
—DH—	PLC DATA HWY (COPPER)
FOC	FIBER OPTIC CONVERTER
PIC	PROCESSOR INTERFACE CARD
D	DATA OUTLET

COMPONENT DESIGNATORS

●	CRITICAL ALARM
◆	PROVIDE IN ACCORDANCE WITH SECTION 13400
◆◆	EXISTING COMPONENT TO BE RELOCATED IN ACCORDANCE WITH SECTION 13400
◆◆◆	OWNER FURNISHED COMPONENT TO BE INSTALLED IN ACCORDANCE WITH SECTION 13400
*	OWNER FURNISHED COMPONENT TO BE INSTALLED IN ACCORDANCE WITH DIVISION 11 AND DIVISION 15
**	PROVIDE AS PART OF A MANUFACTURER'S OR VENDOR'S PACKAGED SYSTEM IN ACCORDANCE WITH DIVISION 11, DIVISION 13 AND DIVISION 15
***	EXISTING COMPONENT TO BE RELOCATED IN ACCORDANCE WITH DIVISION 11 AND DIVISION 15
	PROVIDE COMPONENT WITHOUT A DESIGNATOR IN ACCORDANCE WITH DIVISION 11, DIVISION 13 AND DIVISION 15

GENERAL NOTES

1. HALF-TONED PORTIONS OF P&ID'S
   INDICATE EXISTING FACILITIES WHICH ARE NOT A PART OF THIS CONTRACT.
2. HALF-TONED RECTANGULAR SHAPES ON P&ID'S
   REPRESENT EXISTING CONTROL PANELS WHICH ARE NOT A PART OF THIS CONTRACT.
3. THERE IS NO INTENT TO SHOW ALL EXISTING FACILITIES ON THE P&ID'S.

NOTICE:

THIS IS A STANDARD LEGEND.
NOT ALL OF THE INFORMATION SHOWN ON THIS LEGEND IS USED IN THESE CONTRACT DRAWINGS.

LINE IDENTIFICATION

PROCESS FLOW

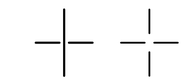
- FLOW STREAM IDENTIFIERS
- PI → NEW MAJOR PROCESS FLOW STREAM (CLOSED CONDUIT)
- RAS → NEW INTERMEDIATE PROCESS FLOW STREAM (CLOSED CONDUIT)
- ALP → NEW MINOR PROCESS FLOW STREAM (CLOSED CONDUIT)
- PI → EXISTING MAJOR PROCESS FLOW STREAM (CLOSED CONDUIT)
- RAS → EXISTING INTERMEDIATE PROCESS FLOW STREAM (CLOSED CONDUIT)
- ALP → EXISTING MINOR PROCESS FLOW STREAM (CLOSED CONDUIT)
- PI → FUTURE PROCESS FLOW STREAM

SIGNALS

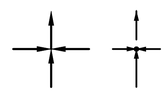
- DISCRETE (ON/OFF ETC.)
- MODULATED (4 TO 20 mADC ETC.)
- DN — DEVICENET LINK
- DATA HIGHWAY
- S — SERIAL LINK (RS-232, RS-485)
- INSTRUMENT SUPPLY OR CONNECTION TO EQUIPMENT
- FILLED SYSTEM (CAPILLARY TUBING ETC.)
- PNEUMATIC
- HYDRAULIC
- ELECTROMAGNETIC OR SONIC (GUIDED)
- ELECTROMAGNETIC OR SONIC (UNGUIDED)
- MECHANICAL LINK

STRUCTURES AND EQUIPMENT

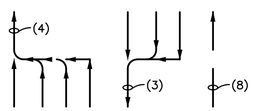
- NEW OR RELOCATED ITEM
- EXISTING ITEM
- NEW OR RELOCATED STRUCTURE
- EXISTING STRUCTURE



NON-CONNNECTING LINES



CONNECTING LINES



PARALLELING LINES. (PARENTHETICAL NUMBER INDICATES THE NUMBER OF SIGNALS REPRESENTED)



BOARDER SIZE 22X34 | DESIGNED JB | DRAWN RK | CHECKED CH | APPROVED CH

NO.	REVISIONS	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

P&ID LEGEND 1 OF 2

ATTENTION:
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DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: N0.1

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P:\220583-M2234413_ACADDWG\SHEETS\P&ID\N0.2 P&ID LEGEND 2 OF 2.DWG, 3/1/2024

VALVE SYMBOLS

- ECCENTRIC PLUG (SEAT/PORT)
- BUTTERFLY
- BALL
- GLOBE
- GATE
- KNIFE GATE
- PINCH
- NEEDLE
- SOLENOID
- THREE-WAY
- TELESCOPING
- BALL CHECK
- SWING CHECK
- SPLIT DISC CHECK
- DIAPHRAM CHECK
- CALIBRATED BALANCE
- PRESSURE CONTROL (REGULATED SIDE)
- PRESSURE RELIEF
- AIR RELEASE AND VACUUM RELIEF
- MUD
- SPRING INJECTION CHECK VALVE

GATE SYMBOLS

- SLUICE
- SLIDE
- FLAP GATE
- WIER GATE
- STOP PLANK

VALVE AND GATE POWER ACTUATOR SYMBOLS

- ELECTRIC MOTOR
- ELECTRIC MOTOR WITH POSITIONER
- PNEUMATIC WITH SOLENOID
- PNEUMATIC WITH POSITIONER
- HYDRAULIC WITH SOLENOID
- HYDRAULIC WITH POSITIONER

NOTE ON 'XX':

ON LOSS OF PRIMARY POWER (PNEUMATIC OR ELECTRICAL)

XX:

FC = FAIL CLOSED POSITION
FIP = FAIL INTERMEDIATE POSITION
FLP = FAIL LAST POSITION
FO = FAIL OPEN POSITION

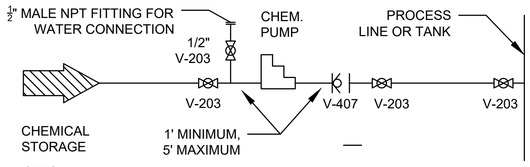
INSTRUMENT ELEMENT SYMBOLS

- PARSHALL FLUME
- ROTAMETER
- PROPELLER OR TURBINE METER
- SUSPENDED ULTRASONIC LEVEL ELEMENT
- PRESSURE GAUGE
- CLAMP ON ULTRASONIC FLOWMETER
- INSERTION FLOW METER M=MAGNETIC H=HOT WIRE
- MAGNETIC FLOWMETER
- PITOT-STATIC
- TARGET TYPE SENSOR
- VENTURI OR FLOW TUBE
- VORTEX SHEDDING
- ORIFICE METER
- VERTICAL FLOAT

MISCELLANEOUS SYMBOLS

- HARDWIRED INTERLOCK SEE SPECIFICATION
- MICROPROCESSOR BASED INTERLOCK SEE SPECIFICATION
- BLIND FLANGE OR CLEAN OUT
- AIR GAP
- STRAINER
- FLUSHING WATER CONNECTION
- SEAL WATER CONNECTION
- WATER CONNECTION
- COMPRESSED AIR CONNECTION
- AUTOMATIC SAMPLER
- DIFFUSER
- BUBBLER LEVEL ELEMENT
- VENT
- PURGE SET X: W = WATER A = AIR
- MIXING CHAMBER WITH MOTOR
- 120 VOLT, 60 HZ POWER SUPPLY POINT
- MIXER WITH ELECTRIC MOTOR
- ELECTRIC MOTOR
- MANUAL SAMPLE PORT
- AUTOMATIC DRAIN
- MANUAL DRIP TRAP
- DIAPHRAGM SEAL
- ANNULAR SEAL
- FLOW STRAIGHTENING VANE
- CALIBRATION CHAMBER
- DENSITY METER X: N – NUCLEAR O – OPTICAL U – ULTRASONIC
- RUPTURE DISK
- PULSATION DAMPENER
- TEE & BALL VALVE WITH 1/2" MALE NPT
- DOUBLE CONTAINED CHEMICAL LINE
- FLOWMETER WITH INTERGRAL RATE ADJUSTING NEEDLE VALVE
- PRESSURE DIFFERENTIAL SWITCH

CHEMICAL PUMP TYP. VALVING/FLUSHING DETAIL



NOTES:

1. ALL CHEMICAL PUMPS SHALL BE PROVIDED WITH FLUSHING ABILITY AND VALVING PER THIS DETAIL. VERIFY FIELD MODIFICATIONS WITH ENGINEER.
2. PROVIDE MINIMUM 1', MAXIMUM 5' OF MAINLINE CHEMICAL PIPE BETWEEN VALVES/TEES BEFORE/AFTER PUMP.
3. VALVES ON MAINLINE CHEMICAL LINES SHALL MATCH DESIGN LINE SIZE.
4. VALVES SHALL BE TRUE UNION FOR EASY REMOVAL, MATERIAL TO MATCH SPECIFIED PIPE, GENERALLY CPVC.
5. CHEMICAL PIPING DISCHARGING TO NON-PRESSURIZED TANK DOES NOT REQUIRE VALVE PRIOR TO DISCHARGE OR CHECK VALVE AFTER CHEMICAL PUMP. CHEMICAL PIPING WITH CHECK VALVE INTEGRATED INTO INJECTION QUILL DOES NOT REQUIRE CHECK VALVE AFTER CHEMICAL PUMP.

PUMP & COMPRESSOR SYMBOLS

- SUBMERSIBLE PUMP
- COMPRESSOR (PISTON)
- CENTRIFUGAL PUMP (DRY PIT)
- CHEMICAL FEED PUMP
- VERTICAL TURBINE PUMP
- PLUNGER PUMP
- PROCESSING CAVITY PUMP
- DIAPHRAGM PUMP
- CENTRIFUGAL BLOWER
- AIR LIFT PUMP
- ROTARY LOBE PUMP, BLOWER OR COMPRESSOR (POSITIVE DISPLACEMENT)

INTERFACE SYMBOLS

PROCESS FLOW

XXX = CONNECTED SHEET NO.
YYY = CONNECTOR DESIGNATOR

INTER-UNIT PROCESS:
A = PIPELINE SERVICE
B = CONNECTED ENGINEERING ITEM

NEW OR CONCURRENT — EXISTING — TO INTERFACE NOT IN CONTRACT

INPUTS & OUTPUTS (I/O) TO PLC OR DISTRIBUTED CONTROL SYSTEMS

- (X) ANALOG INPUT
- (X) ANALOG OUTPUT
- (X) PULSE INPUT
- (X) PULSE (MODULATING) OUTPUT
- (X) DIGITAL INPUT
- (X) DIGITAL OUTPUT

NOTE ON 'X':

X = TOTAL NUMBER OF I/O WHERE MORE THAN ONE I/O IS REQUIRED. IF QUANTITY IS NOT SHOWN THEN ONE I/O IS REQUIRED.

NOTICE:

THIS IS A STANDARD LEGEND.
NOT ALL OF THE INFORMATION SHOWN ON THIS LEGEND IS USED IN THESE CONTRACT DRAWINGS.

PROFESSIONAL STRUCTURAL ENGINEER — NO. 6880006 — G. Ryan Taylor — STATE OF UTAH
06/17/24

BOARDER SIZE 22X34 | DESIGNED JB | DRAWN RK | CHECKED CH | APPROVED CH

REVISIONS

NO.	DATE

ARDURRA
1998 W. JUDITH LANE
BOISE, IDAHO 83705
208-433-1900 | WWW.ARDURRA.COM

GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

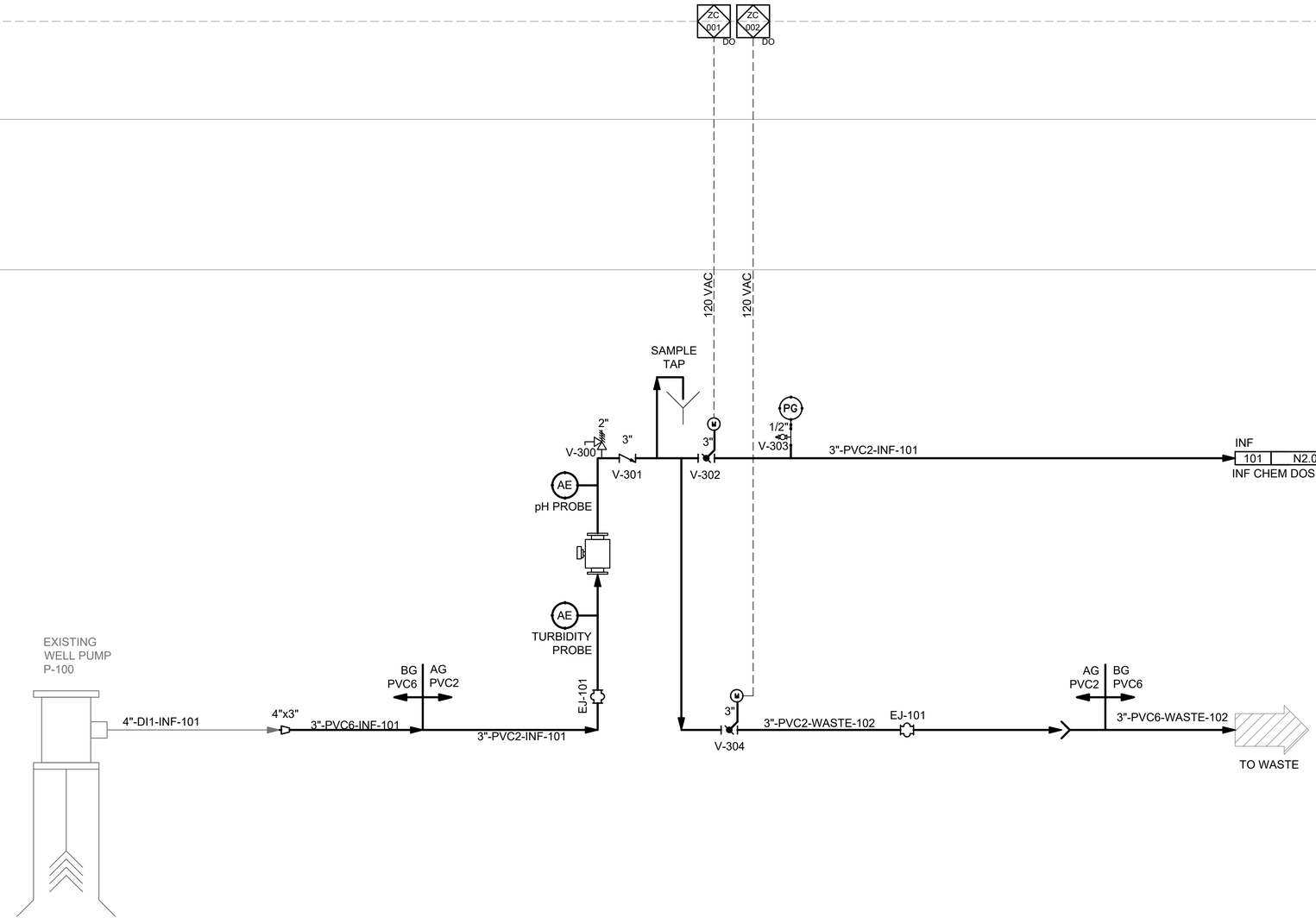
P&ID LEGEND 2 OF 2

ATTENTION:
0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV:
SHEET: N0.2

PROCESS
CONTROL
PANEL

POWER
PANEL



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P:\220583-M2234413_ACADDWG\SHEETS\P&ID\N1.0 P&ID INFLUENT LIFT STATION.DWG, 6/17/2024

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

NO.	DATE	REVISIONS

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

P&ID INFLUENT LIFT STATION

ATTENTION:
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DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: N1.0

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P:\220583-M2234413_ACADDWG\SHEETS\P&ID\N2.0 P&ID INFLUENT CHEMICAL DOSING I.DWG, 5/9/2024

PROCESS CONTROL PANEL

POWER PANEL

YC 001 DO

SC 001 AO

120 VAC

4-20mA (24 VDC)

3/4"
V-308

3/4"
V-307

3/4"
V-305

1/2"
V-306

CP-002
POTASSIUM PERMANGANATE

PPMW
331 | N3.2
TREATED WATER

1/2"-PVC2-PPMW-331

100-GAL. HDPE POTASSIUM PERMANGANATE STORAGE TANK

3/4"-PVC2-PPM-210

POTASSIUM PERMANGANATE

3/4"
V-309

FUTURE CHEM ADJ

INF
101 | N1.0
EXISTING LS

3"-PVC2-INF-101

1"
V-314

6"x1"

3"x4"

1,000 GALLON
FRP REACTION TANK
TK100-01

3"-PVC2-MIXING-110

3"
V-310

3"
V-312

3"-PVC2-MIXED-115

3"
V-313

3"
V-311

3"-PVC2-INF-200

INF
200 | N2.1
INF CHEM DOSING II

LIMITS OF WESTECH SCOPE OF SUPPLY

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

REVISIONS

NO.	DATE

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

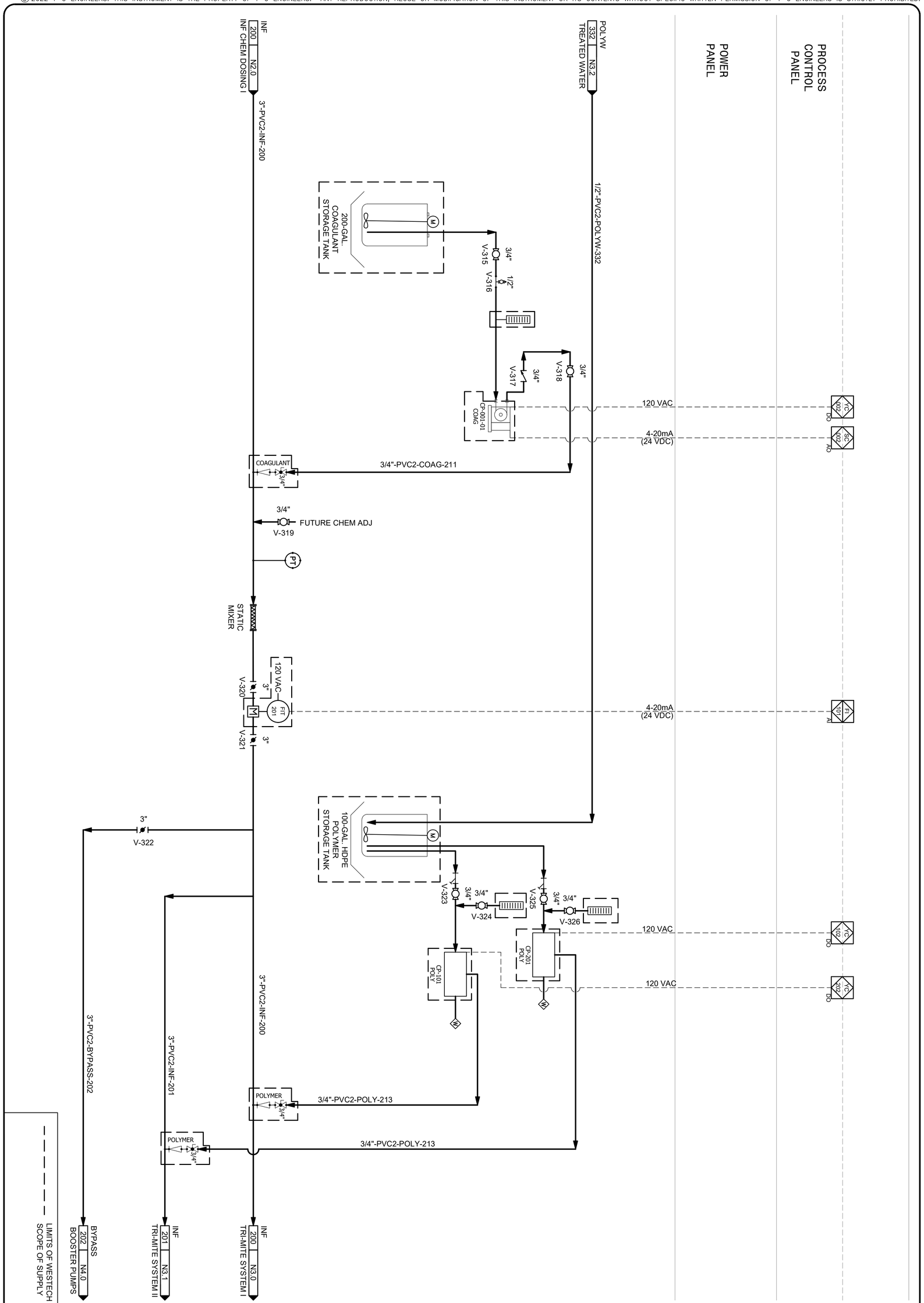
P&ID INFLUENT CHEMICAL DOSING I

ATTENTION:
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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

DATE: JUNE, 2024
PROJECT: 220583
REV: ----
SHEET: N2.0

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM

WEBER COUNTY, UTAH

P&ID INFLUENT CHEMICAL DOSING II

SHEET: N2.1
REV: ----
PROJECT: 220583
DATE: JUNE, 2024

IF THIS BAR DOES NOT MEASURE 1" ON 22X34 SHEET or 1/2" ON 11X17 SHEET, THEN DRAWING IS NOT TO SCALE

0 ATTENUATION 1/2 1

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REVISIONS			BOARDER SIZE
NO.		DATE	22X34
			DESIGNED
			JB
			DRAWN
			RK
			CHECKED
			CH
			APPROVED
			CH

NO. 6880008
G. Ryan Taylor
PROFESSIONAL ENGINEER
STATE OF IDAHO
06/17/24

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P:\220583-M223443_ACADDWG\SHEETS\P&ID\N3.0 P&ID TRI-MITE SYSTEM I.DWG, 6/17/2024

PROCESS CONTROL PANEL

POWER PANEL

YC 006 DO

230/460 VAC I

230/460 VAC

ZC 101 DO

PH 006 DI

PAH 101 DI

PAHH 101 DI

ZC 105 DO

ZC 104 DO

ZC 110 DO

ZC 106 DO

LC 102

LI 102 AI

PAL 102 DI

ZC 102 AO

ZC 108 AO

ZC 102 DO

AI 102 AI

AI 202 AI

ZC 103 DO

120 VAC

4-20mA (24 VDC)

INF
200 | N2.0
INF CHEM DOSING I

3"-PVC2-INF-200

V-101

V-109

10-15 PSI @ UNIT INLET

PI 101

PSH 101

PSHH 101

ADSORPTION CLARIFIER

FILTER

V-104

LIT 102

6"-PVC2-WASTE-350

WASTE
350 | N4.0
CITY SEWER

PI 102

PSL 102

LCV-102

3"-PVC2-EFF-301

EFF
301 | N4.0
BOOSTER PUMPS

LCV-108

3"-PVC2-WASTE-302

WASTE
302 | N4.0
CITY SEWER

TO LAB

SV-102

AIT 102

FROM AE-202

AE 102

EFFLUENT TURBIDIMETER

TO WASTE

V-103

SV-110

V-107

V-105

V-106

V-108

TRI-MITE UNIT #1

PI 006

PSH 006

PRV006

F006

AIR BLOWER # 1 B-005

BACKWASH
501 | N3.2
TRI-MITE BACKWASH

4"-PVC2-BACKWASH-501

V-327

HCV-009

LIMITS OF WESTECH SCOPE OF SUPPLY

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
CHECKED	CH
APPROVED	CH

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

P&ID TRI-MITE SYSTEM I

ATTENTION:
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PROJECT: 220583
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SHEET: N3.0

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P:\220583-M2234413_ACADDWG\SHEETS\P&ID\N3.1 P&ID TRI-MITE SYSTEM II.DWG, 6/17/2024

PROCESS CONTROL PANEL

POWER PANEL

YC 006 DO

230/460 VAC

ZC 201 DO | PH 007 DI | PAH 201 DI | PAHH 201 DI | ZC 205 DO | ZC 204 DO | ZC 210 DO | ZC 206 DO | LC 202 | LI 202 AI | PAL 202 DI | ZC 202 AO | ZC 208 AO | ZC 202 DO | ZC 203 DO

230/460 VAC | 120 VAC | 120 VAC | 120 VAC | 120 VAC | 120 VAC | 120 VAC | 120 VAC | 4-20mA (24 VDC) | 120 VAC | 120 VAC | 4-20mA (24 VDC) | 4-20mA (24 VDC) | 120 VAC | 120 VAC | 120 VAC

1" V-328

1"-PVC2-INF-201

INF 201 N2.1
INF CHEM DOSING II

3"-PVC2-INF-201

3" V-201

3" V-209

10-15 PSI @ UNIT INLET

PI 201 | PSH 201 | PSHH 201

ADSORPTION CLARIFIER

6" V-204

FILTER

LIT 202

TRI-MITE UNIT #2

PI 202 | PSL 202

6" 6"-PVC2-WASTE-351 WASTE 351 N4.0 CITY SEWER

3" LCV-202 3" 3"-PVC2-EFF-401 EFF 401 N4.0 BOOSTER PUMPS

3" LCV-208 3" 3"-PVC2-WASTE-402 WASTE 402 N4.0 CITY SEWER

TO LAB

3" SV-202

TO AIT 101/201

AE 201

TO WASTE

EFFLUENT PUMP P-202

3" V-203

2" SV-210

2" V-207 | 2" V-205 | 2" V-206 | 2" V-208

PI 007 | PSH 007

PRV007

F007 AIR BLOWER # 2 B-006

BACKWASH 502 N3.2
TRI-MITE BACKWASH

4"-PVC2-BACKWASH-502

4" V-329

4"

3" HCV-010

LIMITS OF WESTECH SCOPE OF SUPPLY

PROFESSIONAL STRUCTURAL ENGINEER
NO. 6880006
G. Ryan Taylor
STATE OF UTAH
06/17/24

BOARDER SIZE	22X34
DESIGNED	JB
DRAWN	RK
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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

P&ID TRI-MITE SYSTEM II

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REV: ----
SHEET: N3.1

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PROCESS CONTROL PANEL

POWER PANEL

FI 009 A1

4-20mA (24 VDC)

120 VAC — FIT 009

4" V-334

4" V-335

4"-PVC2-BACKWASH-500

4"-PVC2-BACKWASH-501 — EJ-101 — BACKWASH 501 N3.0 — TRI-MITE UNIT #1

4"-PVC2-BACKWASH-502 — EJ-101 — BACKWASH 502 N3.1 — TRI-MITE UNIT #2

1W 320 N4.0 — BOOSTER PUMPS

4"-PVC2-1W-320

4" V-330

4" V-331

4"-PVC2-1W-320

1"x4"

1/2" V-332 — 1/2"-PVC2-PPMW-331 — PPMW 331 N2.0 — PPM CHEM DOSING

1/2" V-333 — 1/2"-PVC2-POLYW-332 — POLYW 332 N2.1 — POLYMER CHEM DOSING

1"-PVC2-SHOWER-333

3/4" V-336 — TO SHOWER

LIMITS OF WESTECH SCOPE OF SUPPLY

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STATE OF UTAH
06/17/24

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CHECKED	CH
APPROVED	CH

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GREEN HILLS COUNTRY ESTATES
WATER TREATMENT SYSTEM
WEBER COUNTY, UTAH

P&ID TRI-MITE BACKWASH

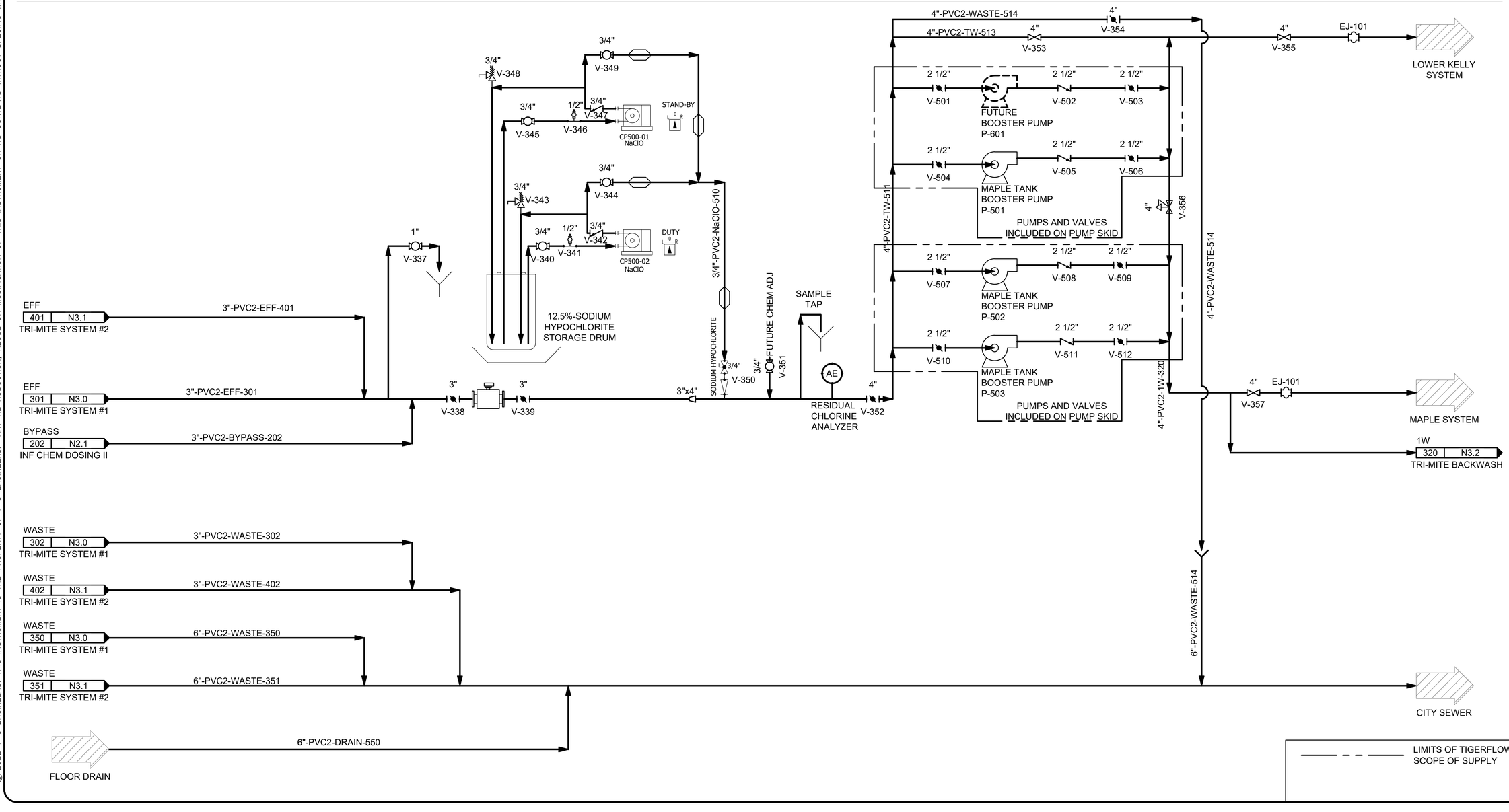
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SHEET: N3.2

ISSUE FOR CONSTRUCTION

PROCESS
CONTROL
PANEL

POWER
PANEL



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P:\220583-M223443_ACADDWG\SHEETS\P&IDN4.0 P&ID BOOSTER PUMPS.DWG, 6/17/2024

PROFESSIONAL STRUCTURAL ENGINEER
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WEBER COUNTY, UTAH

P&ID BOOSTER PUMPS

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