



**PUBLIC SAFETY CENTER
PARKING LOT
RECONSTRUCTION AND
FENCING PROJECTS**

AUGUST 2023

Prepared By:  **JONES &
ASSOCIATES**
CONSULTING ENGINEERS

PROJECT MANUAL
for
BOX ELDER COUNTY
**PUBLIC SAFETY CENTER PARKING LOT
RECONSTRUCTION AND FENCING PROJECTS**



prepared by

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SUMMARY OVERVIEW (BRIEF)
PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCTION AND FENCING PROJECTS

**This page is intended to be a helpful reference for the Project and does not replace the information contained in the full Project Manual or from any subsequent Addenda. The Contractor is responsible to review and follow the requirements of the Project Manual.*

RECEIPT OF BIDS: August 8, 2023, *See Advertisement for more info*

DESCRIPTION OF WORK: Reconstruction of the parking lot for the Public Safety Center in Brigham City. Project also includes fencing projects in various location in the County, including the Public Safety Center, the landfill and the Elwood road shed. *This is not the full scope of work. See Bid Schedule and Drawings for additional info.*

LOCATION OF THE WORK: Public Safety Center: 52 South 1000 West, Brigham City, UT 84302

COMPLETION DATE: December 31, 2023, *See Agreement for more info.*

ENGINEER'S ESTIMATE: \$1,471,155.90

BONDS/INSURANCE: Bids shall be accompanied by a Bid Bond. The selected Contractor shall guarantee all work with a Performance Bond, Payment Bond, and Warranty Bond. *See Instructions to Bidders and Agreement for more info.*

WARRANTY: 1-year warranty on all work performed and materials installed is required.

PROJECT ENGINEER: Shane Taggart, shane@jonescivil.com, 801-476-9767

INTERNAL PROJECT DOCUMENT LINKS:

- Bid Schedule
- Measurement and Payment
- Project Specific Specifications (where applicable)
- Drawings

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Public Safety Center Parking Lot Reconstruction and Fencing Projects**

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COUNTY STANDARD SPECIFICATIONS

All provisions of the current adopted Public Works Standards, with all amendments and revisions, are made a part of the Technical Specifications by reference.

2017 MANUAL OF STANDARD SPECIFICATIONS (commonly known as APWA Specs)

Except for the General Conditions (Document 00 72 00), all provisions of the Manual of Standard Specifications, 2017 Edition, as published by the Utah LTAP Center, Utah State University, Logan, Utah, with all published amendments, are hereby made a part of the Technical Specifications by reference.

PART 5 – DRAWINGS

Box Elder County, Public Safety Center Parking Lot Reconstruction and Fencing Projects

Part 1: Bidding Requirements

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ADVERTISEMENT FOR BIDS FOR PUBLIC SAFETY CENTER PARKING LOT
RECONSTRUCTION AND FENCING PROJECTS

Sealed Bids for the construction of the **Public Safety Center Parking Lot Reconstruction and Fencing Projects** will be received by Box Elder County, at the office of the County Clerk, 1 South Main Street, Brigham City, UT, until 2:00pm local time on August 8, 2023, at which time the Bids received will be publicly opened and read. The Project consists of reconstruction the parking lot for the Public Safety Center (Box Elder Sheriff Department) and providing new fencing at a few locations around the County, including the Public Safety Center. Other fencing locations include the Little Mountain Landfill and the Elwood road shop. The projects are generally located at: Public Safety Center (52 S 1000 W, Brigham City), Little Mountain Landfill (9595 W 6800 N, Tremonton), and Elwood Road Shed (5730 W 8800 N, Elwood)

The project has an Engineer's Estimate of \$2,051,905.90.

Bid will be received for possible multiple contracts. Bids shall be on a unit price basis, as indicated in the Bid Form. All documents listed in paragraph 7.01 of the Bid Form must be submitted.

No pre-bid conference will be held.

The Issuing Office for the Bidding Documents is: Jones & Associates Consulting Engineers, 6080 Fashion Point Drive, South Ogden, Utah, (801) 476-9767. Questions related to the Bidding Documents are to be submitted in writing to Shane Taggart, shane@jonescivil.com no later than August 1, 2023.

Bidding Documents may be viewed and purchased online at www.jonescivil.com. Following registration and payment of \$20.00, complete sets of Bidding Documents may be downloaded from the Issuing Office's website as portable document format (PDF) files. Upon request, a printed copy of the Bidding Documents may be obtained from the Issuing Office for \$40 per copy. Costs related to obtaining Bidding Documents are non-refundable.

Bid security shall be furnished in accordance with the Instructions to Bidders.

Bidders shall submit proof of qualifications to perform the Work as described in the Instructions to Bidders.

Owner reserves the right to reject any or all Bids, to waive any informality in a Bid, and to make awards in the best interests of the Owner.

END OF ADVERTISEMENT FOR BIDS

Full notice of this Advertisement for Bids can also be obtained from:

- Office of the County Clerk, 1 South Main Street, Brigham City, UT
- www.boxeldercounty.org
- www.utah.gov/pmn

For a copy of the advertisement, please call 435-695-2580

DOCUMENT 00 21 13
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.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained from the Issuing Office in the number and format stated in the advertisement or invitation to bid.

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:

A. Bidder shall submit with its Bid those items listed in Paragraph 7.01 of the Bid Form; and

B. After submitting its Bid and within fourteen (14) days of Owner's request, Bidder shall submit those items listed in Paragraph 7.02 of the Bid Form.

C. When providing Subcontractor and Supplier qualification information; coordinate with provisions of Article 12 of these Instructions.

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

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

ARTICLE 4 – SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE

4.01 *Site and Other Areas*

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

B. Not Used.

4.02 *Existing Site Conditions*

- A. Subsurface and Physical Conditions; Hazardous Environmental Conditions
1. The Supplementary Conditions identify:
 - a. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site.
 - b. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).
 - c. reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site.
 - d. Technical Data contained in such reports and drawings.
 2. Owner will make copies of reports and drawings referenced above available to any Bidder on request. These reports and drawings are not part of the Contract Documents, but the Technical Data contained therein upon whose accuracy Bidder is entitled to rely, as provided in the General Conditions, has been identified and established in the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any Technical Data or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
 3. If the Supplementary Conditions do not identify Technical Data, the default definition of Technical Data set forth in Article 1 of the General Conditions will apply.
- B. Underground Facilities: Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or adjacent to the Site are set forth in the Contract Documents and are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.
- C. Adequacy of Data: 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 5.03, 5.04, and 5.05 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 5.06 of the General Conditions.

4.03 *Site Visit and Testing by Bidders*

- A. Bidder shall conduct the required Site visit during normal working hours, and shall not disturb any ongoing operations at the Site.

- B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.
- C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.
- D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.
- E. 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.

4.04 *Owner's Safety Program*

- A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.05 *Other Work at the Site*

- A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

ARTICLE 5 – BIDDER'S REPRESENTATIONS

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

- A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;
- B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;
- D. not used;

- E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and 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; and (3) Bidder's safety precautions and programs;
- F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid 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 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;
- 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;
- I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and
- J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – PRE-BID CONFERENCE

- 6.01 No pre-Bid conference will be held.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

- 7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing no later than 72 hours in advance of the opening of Bids. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than 72 hours 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, supplement, or change the Bidding Documents.

ARTICLE 8 – BID SECURITY

- 8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and

in the form of a certified check, bank money order, or a Bid bond (on the form included in the Bidding Documents) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions.

- 8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and 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 released. 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.
- 8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.
- 8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

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

ARTICLE 10 – LIQUIDATED DAMAGES

- 10.01 Provisions for liquidated damages, if any, for failure to timely attain a Milestone, Substantial Completion, or completion of the Work in readiness for final payment, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

- 11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, and those "or-equal" or substitute materials and equipment subsequently approved by Engineer prior to the submittal of Bids and identified by Addendum. No item of material or equipment will be considered by Engineer as an "or-equal" or substitute unless written request for approval has been submitted by Bidder and has been received by Engineer at least 72 hours prior to the date for receipt of Bids. Each such request shall comply with the requirements of Paragraphs 7.04 and 7.05 of the General Conditions. The burden of proof of the merit of the proposed item is upon Bidder. Engineer's decision of approval or disapproval of a proposed item will be final. If Engineer approves any such proposed item, such approval will be set forth in an Addendum issued to all prospective Bidders. Bidders shall not rely upon approvals made in any other manner.
- 11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as

supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of “or-equal” or substitution requests are made at Bidder’s sole risk.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

12.01 A Bidder shall be prepared to retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of the Work if required by the Bidding Documents (most commonly in the Specifications) to do so. If a prospective Bidder objects to retaining any such Subcontractor, Supplier, or other individual or entity, and the concern is not relieved by an Addendum, then the prospective Bidder should refrain from submitting a Bid.

12.02 After the submittal of the Bid, Owner may not require the Successful Bidder or Contractor to retain any Subcontractor, Supplier, or other individual or entity against which Contractor has reasonable objection.

12.03 The apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of the Subcontractors performing greater than 5% of the work (cost-based), as well any material suppliers, pipe and appurtenance suppliers, asphalt suppliers, concrete suppliers, and other suppliers as requested by Owner or Engineer.

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

12.04 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, or other individuals or entities. Declining to make requested substitutions will 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 subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents.

A. 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 section, Bid item, alternate, adjustment unit price item, and unit price item listed therein.

- B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."
- 13.02 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.
- 13.03 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 partnership's address for receiving notices shall be shown.
- 13.04 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the firm's address for receiving notices shall be shown.
- 13.05 A Bid by an individual shall show the Bidder's name and address for receiving notices.
- 13.06 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form. The joint venture's address for receiving notices shall be shown.
- 13.07 All names shall be printed in ink below the signatures.
- 13.08 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 13.09 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.
- 13.10 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

14.01 *Base Bid with Alternates*

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

14.02 *Sectional Bids*

- A. Bidders may submit a Bid on a unit price basis for any individual section or any combination of sections, as set forth in the Bid Form. When submitting a Bid for a section, a unit price shall be specified for each item of Work in that section.

- B. Submission of a Bid on any section signifies Bidder's willingness to enter into a Contract for that section alone at the price offered.
- C. If Bidder submits Bids on individual sections and a Bid based on a combination of those sections, such combined Bid need not be the sum of the Bids on the individual sections.
- D. Bidders offering a Bid on one or more sections shall be capable of completing the Work covered by those sections within the time period stated in the Agreement.

14.03 *Unit Price*

- A. The "Bid Price" (sometimes referred to as the extended price) for each unit price Bid item will be the product of the "Estimated Quantity" (which Owner or its representative has set forth in the Bid Form) for the item and the corresponding "Bid Unit Price" offered by the Bidder. The total of all unit price Bid items will be the sum of these "Bid Prices"; such total will be used by Owner for Bid comparison purposes. The final quantities and Contract Price will be determined in accordance with Paragraph 13.03 of the General Conditions. Unit Price shall be submitted as dollars and cents with no more than 2 decimal points given (e.g., \$2.50).
- B. 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.

14.04 *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 13.02.B of the General Conditions.

ARTICLE 15 – SUBMITTAL OF BID

- 15.01 The Bid Form is to be completed and submitted with the Bid Security and the other documents required to be submitted under the terms of Article 7 of the Bid Form.
- 15.02 A Bid shall be received 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 (and, if applicable, the designated portion of the Project for which the Bid is submitted), 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 the location of the opening of Bids as indicated in the Advertisement for Bids. It is the responsibility of the Bidder to verify receipt of the Bid.
- 15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

- 16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.
- 16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.
- 16.03 If, within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, 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 will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. If Bidder purports to add terms or conditions to its Bid, takes exception to any provision of the Bidding Documents, or attempts to alter the contents of the Contract Documents for purposes of the Bid, then the Owner will reject the Bid as nonresponsive; provided that Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.
- 19.02 If Owner awards the contract for the Work, such award shall be to the responsible Bidder submitting the lowest responsive Bid.
- 19.03 Evaluation of Bids
- A. 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.
 - B. When unit price bids are submitted, Bids will be compared on the basis of the total of the products of the estimated quantity of each item and unit price Bid for that item, together with any lump sum items. 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. Unit prices shall be rounded to the hundredth of a dollar (e.g. \$1.67, not \$1.666).

C. *Base Bid with Alternates*

In the comparison of Bids, alternates will be applied in the same order of priority as listed in the Bid Form. To determine the Bid prices for purposes of comparison, Owner shall announce to all bidders a "Base Bid plus alternates" budget after receiving all Bids, but prior to opening them. For comparison purposes, alternates will be accepted, following the order of priority established in the Bid Form, until doing so would cause the budget to be exceeded. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its base Bid and any combination of its additive alternate Bids for which Owner determines funds will be available at the time of award.

D. *Sectional Bids*

For determination of the apparent low Bidder(s), Bids will be compared on the basis of the aggregate of the Bids for separate sections and the Bids for combined sections that result in the lowest total amount for all of the Work.

- 19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.
- 19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors or Suppliers.

ARTICLE 20 – BONDS AND INSURANCE

- 20.01 Article 6 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 Agreement (executed by Successful Bidder) to Owner, it shall be accompanied by required bonds and insurance documentation.

ARTICLE 21 – SIGNING OF AGREEMENT

- 21.01 When Owner issues a Notice of Award to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Agreement along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement and any bonds and insurance documentation required to be delivered by the Contract Documents to Owner. Within ten (10) days thereafter, Owner shall deliver one (1) fully executed counterpart of the Agreement to

Successful Bidder, together with electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions.

END OF INSTRUCTIONS TO BIDDERS

**DOCUMENT 00 41 23
BID FORM**

PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCTION AND FENCING PROJECTS

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

***Box Elder County
1 South Main Street
Brigham City, UT 84302***

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

ARTICLE 2 – 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 60 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, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

<u>Addendum No.</u>	<u>Addendum, Date</u>
_____	_____
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfied itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and has satisfied itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.

- E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any 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; and (3) Bidder's safety precautions and programs.
- F. Bidder agrees, based on the information and observations referred to in the preceding paragraph, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price 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 confirms that 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 and furnishing of the Work.
- J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies 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 e execution of the Contract.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Bid Schedule on following page(s)

**BID SCHEDULE
BOX ELDER COUNTY
PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCTION AND FENCING PROJECTS**

CONTRACTOR: _____

SECTION A – PUBLIC SAFETY CENTER PARKING LOT

Item #	M&P Reference*	Bid Item Description	Estimated Quantity	Unit	Unit Price**	Bid Price
1A	MP001	Mobilization	1	ls	\$	\$
2A	MP002	SWPPP	1	ls	\$	\$
3A	MP600	Saw-cut Asphalt	215	lf	\$	\$
4A	MP605	Remove unsuitable material		cy	\$	\$
5A	MP609	Pre-lower electrical box	1	ea	\$	\$
6A	MP609	Pre-lower water valve	1	ea	\$	\$
7A	MP609	Pre-lower water meter	1	ea	\$	\$
8A	MP602	Remove & dispose of Asphalt	42,858	sf	\$	\$
9A	MP604	Remove & dispose of curb/gutter	1,063	lf	\$	\$
10A	MP603	Remove & dispose of flatwork	3,200	sf	\$	\$
11A	MP701	Remove sprinkler system	1	ls	\$	\$
12A	MP500	Remove existing landscape	6,500	sf	\$	\$
13A	MP500	Relocate landscape beds	200	sf	\$	\$
14A	MP811	Relocate existing parking light	1	ea	\$	\$
15A	MP812	New 2" PVC conduit	870	lf	\$	\$
16A	MP616	Import granular borrow	1,300	ton	\$	\$
17A	MP617	New road base (8" thick)	3,500	ton	\$	\$
18A	MP618	New asphalt pavement (3" thick)	950	ton	\$	\$
19A	MP633	New concrete flatwork (6" thick)	3,200	sf	\$	\$
20A	MP612	Asphalt patch	165	sf	\$	\$
21A	MP632	New 30" release curb/gutter	525	lf	\$	\$
22A	MP632	New 30" mountable curb/gutter	203	lf	\$	\$
23A	MP635	New waterway	110	sf	\$	\$
24A	MP705	Landscape top soil	15	cy	\$	\$
25A	MP708	New sod	1,300	sf	\$	\$
26A	MP613	Raise electrical box to grade	1	ea	\$	\$
27A	MP613	Raise water valve to grade	1	ea	\$	\$
28A	MP613	Raise water meter to grade	1	ea	\$	\$
29A	MP613	Raise fire hydrant to grade	1	ea	\$	\$
30A	MP626	New parking lot striping	2,200	lf	\$	\$

Total Section A: \$ _____

Section B – Fencing Projects

Item #	M&P Reference*	Bid Item Description	Estimated Quantity	Unit	Unit Price**	Bid Price
1B	MP001	Mobilization	1	ls	\$	\$
2B	MP002	SWPPP	1	ls	\$	\$
3B	MP600	Saw-cut Asphalt	215	lf	\$	\$
PUBLIC SAFETY CENTER						
4B	MP806	Remove existing fence	2,305	lf	\$	\$
5B	MP808	New 12' chain link fence w/ barbed coil	1,990	lf	\$	\$
6B	MP809	New 12' high, 25' wide manual slide chain link gate	1	ea	\$	\$
7B	MP808	New 10' high security fence (Wireworks Ant-Climb or approved equiv)	515	lf	\$	\$
8B	MP809	New 10' high single security gate	1	ea	\$	\$
9B	MP809	New access Liftmaster gate	2	ea	\$	\$
10B	MP875a	Electrical work and equipment	1	ls	\$	\$
LITTLE MOUNTAIN LANDFILL						
11B	MP806	Remove existing fence	1,340	lf	\$	\$
12B	MP808	New 7' wildlife fencing	2,250	lf	\$	\$
13B	MP809	New 25' solar powered gate	3	ea	\$	\$
14B	MP875a	Electrical work and equipment	1	ls	\$	\$
ELWOOD ROAD SHED SITE						
15B	MP808	New 6' chain link fence	105	lf	\$	\$
16B	MP809	New 30' wide, 6' high tilt-a-way gates	3	ea	\$	\$
17B	MP809	New single 6' chain link gate	1	ea	\$	\$
18B	MP875a	Electrical work and equipment	1	ls	\$	\$

TOTAL SECTION B: \$ _____

Additive Alternates – Section B

Item #	M&P Reference*	Bid Item Description	Estimated Quantity	Unit	Unit Price**	Bid Price
PUBLIC SAFETY CENTER						
AA1	MP808	New 8' Decorative Security, Non- Climbing Fence, Montage II Invincible or Equivalent	2	ea	\$	\$
AA2	MP809	New 8' security gate (Montage II)	1	ea	\$	\$

***To go directly to Measurement and Payment click here.**

****Unit Price shall contain no more than 2 decimal points (e.g., \$0.00)**

Bidder acknowledges that (1) each Bid Unit Price includes an amount considered by Bidder to be adequate to cover Contractor's overhead and profit for each separately identified item, and (2) estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all unit price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

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 15.06 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;
- B. List of Proposed Subcontractors (see Document 00 43 36 for form);
- C. Copy of current business license;
- D. Copy of current Utah contractor's license; and
- E. E-Verify Form¹ (see Document 00 45 39 for form).

7.02 The following documents shall be submitted upon request and made a condition of this Bid:

- A. List of Proposed Suppliers;
- B. List of Project References; and
- C. Required Bidder Qualification Statement with supporting data, upon request².

ARTICLE 8 – DEFINED TERMS

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

[CONTINUED ON NEXT PAGE]

¹ Required for those Bidders with 15 or more employees. If not applicable, write "NA" on the form and submit the form as an attachment to the Bid.

² Standard forms will be provided.

Bid SUBMITTAL

BIDDER: _____

Submittal Date: _____

(Indicate correct name of bidding entity)

License Number: _____

BY: _____

Signature: _____

Title: _____

ATTEST: _____

Signature: _____

Title: _____

(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Address for Giving Notices: _____

Phone: _____

POINT OF CONTACT FOR PROJECT

Name: _____

Title: _____

Email: _____

Phone: _____

Is the Point of Contact authorized to sign documents on behalf of the Bidding Entity? YES NO (If no, please complete information below)

AUTHORIZED SIGNATORY

(If different from the point of contact listed above)

Name: _____

Email: _____

Title: _____

END OF BID FORM

DOCUMENT 00 43 13
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*):

BID

Bid Due Date:

Description (*Public Safety Center Parking Lot Reconstruction and Fencing Projects— Include Location*):

BOND

Bond Number:

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

Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest:

Attest:

Signature

Signature

Title

Title

Note: Addresses are to be used for giving any required notice.

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

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.

1. 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.

2. This obligation shall be null and void if:

2.1 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

2.2 All Bids are rejected by Owner, or

2.3 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).

3. 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.

4. 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 the Bid due date without Surety's written consent.

5. 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 the Bid due date.

6. 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.

7. 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.

8. 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.

9. 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.

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

EJCDC® C-430, Bid Bond (Penal Sum Form). Published 2013.

Prepared by the Engineers Joint Contract Documents Committee.

DOCUMENT 00 43 36
LIST OF PROPOSED SUBCONTRACTORS

Subcontractor Company Name and Contact Person	Type of Work to be Performed	Estimated Percentage of Work

Additional information to be provided upon Owner's request.

**DOCUMENT 00 45 39
E-VERIFY FORM**

COMPLETE IF COMPANY EMPLOYS OVER 15 EMPLOYEES

Private Employer Affidavit of Compliance Pursuant to Utah Code 63G-12-302

By executing this affidavit, the undersigned private employer verifies its compliance with Utah Code 63G-12-302, stating affirmatively that the individual, firm or corporation has registered with and utilizes the federal work authorization program commonly known as E-Verify, or other authorized Status Verification System, in accordance with the applicable provisions and deadlines established in Utah Code. Furthermore, the undersigned private employer hereby attests that its federal work authorization user identification number and date of authorization are as follows:

Federal Tax ID #

Name of Private Employer on File with E-Verify

I hereby declare under penalty of perjury that the foregoing is true and correct. I also acknowledge that the company will indemnify Box Elder County from all fines, penalties, and costs associated with the company's non-compliance with Utah Code 63G-12-302.

Signature of Authorized Officer or Agent

Date

Printed Name and Title of Authorized Officer or Agent

STATE OF UTAH)
):SS
County of _____)

On _____, _____, 20____, personally appeared before me

_____ the signer of the within instrument, who duly acknowledged to me that she executed the same.

Notary Public

Part 2: Contracting Requirements

**DOCUMENT 00 51 00
NOTICE OF AWARD**

Date of Issuance: _____

Owner: Box Elder County

Project: Public Safety Center Parking Lot Reconstruction and Fencing Projects

Engineer: Jones & Associates

Bidder:

Bidder Address:

TO BIDDER:

You are hereby notified that Owner has accepted your Bid dated August 8, 2023, for the above Contract, and that you are the Successful Bidder and are awarded a Contract for: *Section #*.

The Contract Price of the awarded Contract is: \$

[1] unexecuted counterparts of the Agreement accompany this Notice of Award.

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

1. Deliver to Owner the Contract security and insurance documentation as specified in the Instructions to Bidders; General Conditions, Articles 2 and 6; and Supplementary Conditions.
2. Deliver to Owner the Agreement, fully executed by Bidder (signed electronically or in person, as specified by Engineer)
3. Other conditions precedent (if any):

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 (1) fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner: Box Elder County

By: _____

Title:

Copy: Engineer

DOCUMENT 00 52 00
AGREEMENT
BETWEEN OWNER AND CONTRACTOR
FOR CONSTRUCTION CONTRACT

THIS AGREEMENT is by and between **Box Elder County** (“Owner”) and **Contractor Name** (“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: Reconstruction of the parking lot for the Public Safety Center in Brigham City. Project also includes fencing projects in various location in the County, including the Public Safety Center, the landfill and the Elwood road shed *and any other items required to render the project complete.*

ARTICLE 2 – THE PROJECT

2.01 The Project, of which the Work under the Contract Documents is a part, is generally described as follows: ***Public Safety Center Parking Lot Reconstruction and Fencing Projects***

ARTICLE 3 – ENGINEER

- 3.01 The part of the Project that pertains to the Work has been designed by Jones & Associates Consulting Engineers.
- 3.02 The Owner has retained Jones & Associates Consulting Engineers (“Engineer”) 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 Contract Times: Dates
- A. The Work will be substantially completed on or before **December 31, 2023** and completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions on or before 30 days following the date of Substantial Completion.
- 4.03 Liquidated Damages
- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial and other losses if the Work is not completed and Milestones not achieved within the times specified in Paragraph 4.02 above, plus any

extensions thereof allowed in accordance with the Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty):

1. Substantial Completion: Contractor shall pay Owner **\$1,000.00** for each day that expires after the time (as duly adjusted pursuant to the Contract) specified in Paragraph 4.02.A above for Substantial Completion until the Work is substantially complete.
2. Completion of Remaining Work: After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Times (as duly adjusted pursuant to the Contract) for completion and readiness for final payment, Contractor shall pay Owner **\$1,000.00** for each day that expires after such time until the Work is completed and ready for final payment.
3. Liquidated damages for failing to timely attain Substantial Completion and final completion are not additive and will not be imposed concurrently.

4.04 Warranty Period

- A. Work will be warranted by the Contractor for one (1) year following the date of the Certificate of Substantial Completion.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents the amounts that follow, subject to adjustment under the Contract:

- A. For all Work, 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 30th day of each month during performance of the Work as provided in Paragraph 6.02.A.1 below, provided that such Applications for Payment have been submitted in a timely manner and otherwise meet the requirements of the Contract. All such payments will be measured by the Schedule of Values established as provided in the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no Schedule of Values, as provided elsewhere in the Contract.

1. Prior to Final Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Owner may withhold, including but not limited to liquidated damages, in accordance with the Contract.
 - a. Ninety-five (95) percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
 - b. Ninety-five (95) percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).

6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 15.06 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 15.06.

ARTICLE 7 – NOT USED

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 To induce Owner to enter into this Contract, Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.
- B. Contractor has visited the Site, conducted a thorough, alert visual examination of the Site and adjacent areas, 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 Laws and Regulations that may affect cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions, especially with respect to Technical Data in such reports and drawings.
- E. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the 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; and (3) Contractor's safety precautions and programs.

- F. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
- 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 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.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
- J. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that without exception all prices in the Agreement are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement.
 - 2. Performance bond.
 - 3. Payment bond.
 - 4. Warranty bond.
 - 5. General Conditions (pages 1 to 73, inclusive).
 - 6. Supplementary Conditions.
 - 7. Specifications as listed in the table of contents of the Project Manual.
 - 8. Drawings (not attached but incorporated by reference) consisting of 35 sheets with each sheet bearing the following general title: Public Safety Center Parking Lot Redesign and Fencing Projects
 - 9. Addenda (numbers ___ to ___, inclusive).
 - 10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid.
 - 11. The following which may be delivered or issued on or after the Effective Date of the Contract and are not attached hereto:
 - a. Notice to Proceed.

- b. 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.

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. Unless expressly agreed to elsewhere in the Contract, 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, money that may become due and money that is due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

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

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.

10.06 Other Provisions

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

[continued on next page]

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement.

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

OWNER: BOX ELDER COUNTY

CONTRACTOR:

By: _____

By: _____

Title: _____

Title: _____

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

Attest: _____

Attest: _____

Title: _____

Title: _____

Address for giving notices:

Address for giving notices:

Box Elder County

1 South Main Street

Brigham City, UT 84302

License No.: _____
(where applicable)

(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.)

NOTE TO USER: *Use in those states or other jurisdictions where applicable or required.*

**DOCUMENT 00 55 00
NOTICE TO PROCEED**

Project: Public Safety Center Parking Lot Reconstruction and Fencing Projects

Effective Date:

Owner: Box Elder County

Engineer: Jones & Associates

Contractor:

TO CONTRACTOR:

Owner hereby notifies Contractor that the Contract Times under the above Contract will commence to run on _____ . *[see Paragraph 4.01 of the General Conditions]*

On that date, Contractor shall start performing its obligations under the Contract Documents. No Work shall be done at the Site prior to such date. In accordance with the Agreement, the date of Substantial Completion is **December 31, 2023** , and the date of readiness for final payment is January 30, 2024.

Before starting any Work at the Site, Contractor must comply with the following:

[Note any access limitations, security procedures, or other restrictions (e.g. NOI, bldg permit, TCP)]

Owner: Box Elder County

By: _____

Title:

Date Issued: _____

Copy: Engineer

EJCDC® C-550, Notice to Proceed.
Prepared and published 2013 by the Engineers Joint Contract Documents Committee.

DOCUMENT 00 61 13.13
PERFORMANCE BOND

CONTRACTOR (name and address):

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (name and location):

BOND

Bond Number:

Date (not earlier than the Effective Date of the Agreement of the Construction Contract):

Amount:

Modifications to this Bond Form: [] None [] See Paragraph 16

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

Contractor's Name and Corporate Seal (seal) Surety's Name and Corporate Seal (seal)

By: Signature Signature (attach power of attorney)

Print Name Print Name

Title Title

Attest: Signature Signature

Title Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.
2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:
 - 3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
 - 3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
 - 3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.
4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.
5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:
 - 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;
 - 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;
 - 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in occurs first. If the provisions of this paragraph are void or excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or
- 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
 - 5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.
6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.
7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:
 - 7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
 - 7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and
 - 7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.
8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.
9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
11. Any proceeding, legal or equitable, under this Bond 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 a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever

prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

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

14. Definitions

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

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

EJCDC® C-610, Performance Bond

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DOCUMENT 00 61 13.16
PAYMENT BOND

CONTRACTOR (name and address):

SURETY (name and address of principal place of business):

OWNER (name and address):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (name and location):

BOND

Bond Number:

Date (not earlier than the Effective Date of the Agreement of the Construction Contract):

Amount:

Modifications to this Bond Form: [] None [] See Paragraph 18

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.

SURETY

CONTRACTOR AS PRINCIPAL

Contractor's Name and Corporate Seal (seal) Surety's Name and Corporate Seal (seal)

By: Signature Signature (attach power of attorney)

Print Name Print Name

Title Title

Attest: Signature Signature

Title Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.
2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.
3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.
4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.
5. The Surety's obligations to a Claimant under this Bond shall arise after the following:
 - 5.1 Claimants who do not have a direct contract with the Contractor,
 - 5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).
 - 5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).
6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:
 - 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and
 - 7.2 Pay or arrange for payment of any undisputed amounts.
 - 7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.
8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.
11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.
12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.
14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.
16. **Definitions**
- 16.1 **Claim:** A written statement by the Claimant including at a minimum:
1. The name of the Claimant;
 2. The name of the person for whom the labor was done, or materials or equipment furnished;
 3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
 4. A brief description of the labor, materials, or equipment furnished;
 5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
 6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;
 7. The total amount of previous payments received by the Claimant; and
- suit shall be applicable.
- 8 The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.
- 16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
- 16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.
- 16.4 **Owner Default:** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.
- 16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.
17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.
18. Modifications to this Bond are as follows:

EJCDC® C-615, Payment Bond

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**Document 00 61 13.19
WARRANTY BOND**

<p>Contractor</p> <p>Name: _____</p> <p>Address (<i>principal place of business</i>): _____</p>	<p>Surety</p> <p>Name: _____</p> <p>Address (<i>principal place of business</i>): _____</p>
<p>Owner</p> <p>Name: _____</p> <p>Address (<i>principal place of business</i>): _____</p>	<p>Construction Contract</p> <p>Description (<i>name and location</i>): _____</p> <p>Contract Price: _____</p> <p>Effective Date of Contract: _____</p> <p>Contract's Date of Substantial Completion: _____</p>
<p>Bond</p> <p>Bond Amount: _____ Bond Period: Commencing on the date of</p> <p>Date of Bond: _____ Substantial Completion of the Work under the</p> <p>Modifications to this Bond form: Construction Contract and continuing until 1 year</p> <p>after such Substantial Completion.</p> <p><input type="checkbox"/> None <input type="checkbox"/> See Item 8</p>	
<p>Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth herein, do each cause this Warranty Bond to be duly executed by an authorized officer, agent, or representative.</p>	
<p>Contractor as Principal</p>	<p>Surety</p>
<p>By: _____</p> <p align="center"><i>(Signature)</i></p>	<p>By: _____</p> <p align="center"><i>(Signature) (Attach Power of Attorney)</i></p>
<p>Name: _____</p>	<p>Name: _____</p>
<p>Title: _____</p>	<p>Title: _____</p>
<p>Attest: _____</p> <p align="center"><i>(Signature)</i></p>	<p>Attest: _____</p> <p align="center"><i>(Signature)</i></p>
<p>Name: _____</p>	<p>Name: _____</p>
<p>Title: _____</p>	<p>Title: _____</p>

The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract's Correction Period Obligations. The Construction Contract is incorporated herein by reference.

1. If the Contractor performs the Correction Period Obligations, the Surety and the Contractor shall have no obligation under this Warranty Bond.
2. If Owner gives written notice to Contractor and Surety during the Bond Period of Contractor's obligation under the Correction Period Obligations, and Contractor does not fulfill such obligation, then Surety shall be responsible for fulfillment of such Correction Period Obligations. Surety shall either fulfill the Correction Period Obligations itself, through its agents or contractors, or, in the alternative, Surety may waive the right to fulfill the Correction Period Obligations itself, and reimburse the Owner for all resulting costs incurred by Owner in performing Contractor's Correction Period Obligations, including but not limited to correction, removal, replacement, and repair costs.
3. The Surety's liability is limited to the amount of this Warranty Bond. Renewal or continuation of the Warranty Bond will not modify such amount, unless expressly agreed to by Surety in writing.
4. The Surety shall have no liability under this Warranty Bond for obligations of the Contractor that are unrelated to the Construction Contract. No right of action will accrue on this Warranty Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.
5. Any proceeding, legal or equitable, under this Warranty 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 must be instituted within two years after the Surety refuses or fails to perform its obligations under this Warranty Bond.
6. Written notice to the Surety, the Owner, or the Contractor must be mailed or delivered to the address shown in this Warranty Bond.
7. Definitions
 - 7.1. *Construction Contract*—The agreement between the Owner and Contractor identified on the cover page of this Warranty Bond, including all Contract Documents and changes made to the agreement and the Contract Documents.
 - 7.2. *Contract Documents*—All the documents that comprise the agreement between the Owner and Contractor.
 - 7.3. *Correction Period Obligations*—The duties, responsibilities, commitments, and obligations of the Contractor with respect to correction or replacement of defective Work, as set forth in the Construction Contract's Correction Period clause, EJCDC® C-700, Standard General Conditions of the Construction Contract (2018), Paragraph 15.08, as duly modified.
 - 7.4. *Substantial Completion*—As defined in the Construction Contract.
 - 7.5. *Work*—As defined in the Construction Contract.
8. Modifications to this Bond are as follows:

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DOCUMENT 00 62 16
CERTIFICATE OF INSURANCE

PART 1 GENERAL

1.1 PROCEDURE

- A. For filing purposes, add Certificate of Insurance to the Contract Documents following this page.

END OF DOCUMENT

Part 3: Conditions of the Contract

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by



Issued and Published Jointly by



Endorsed by



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(703) 684-2882
www.nspe.org

American Council of Engineering Companies
1015 15th Street N.W., Washington, DC 20005
(202) 347-7474
www.acec.org

American Society of Civil Engineers
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CONSTRUCTION CONTRACT**

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

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

under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

11. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5101 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.
12. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.
13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.
14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .
15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.
16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.
17. *Cost of the Work*—See Paragraph 13.01 for definition.
18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.
19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.
20. *Engineer*—The individual or entity named as such in the Agreement.
21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.
23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.
25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.
26. *Notice of Award*—The written notice by Owner to a Bidder of Owner’s acceptance of the Bid.
27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.
28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.
29. *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.
30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.
31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.
32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or “RPR” includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.
34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer’s review of the submittals and the performance of related construction activities.
35. *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.
36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.
37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.
38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.
39. *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.
40. *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.
41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.
42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.
43. *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 a Subcontractor.
44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site.

If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *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 but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
46. *Unit Price Work*—Work to be paid for on the basis of unit prices.
47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.
48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

- A. The words and terms discussed in the following paragraphs 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 Article 10 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.

D. *Defective:*

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 15.03 or 15.04).

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. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words “furnish,” “install,” “perform,” or “provide,” then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

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

ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

- A. *Bonds:* 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 Contractor's Insurance:* When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.
- C. *Evidence of Owner's Insurance:* After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

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

2.03 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing

Applications for Payment, electronic or digital transmittals, and maintaining required records.

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

2.05 *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 2.03.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 the component parts of the Work.

2.06 *Electronic Transmittals*

- A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.
- B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.
- C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, 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.
- C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.
- D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.
- E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

- A. Standards Specifications, Codes, Laws and Regulations
 - 1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 - 2. No provision of any such standard specification, manual, reference standard, or code, 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 part of the Contract Documents prepared by or for Engineer. 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 part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

- A. *Reporting Discrepancies:*
 - 1. *Contractor's Verification of Figures and Field Measurements:* Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to

applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

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

B. *Resolving Discrepancies:*

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

3.04 *Requirements of the Contract Documents*

- A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.
- B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and

binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

- C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

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

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

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

4.02 *Starting the Work*

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

4.03 *Reference Points*

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

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

4.04 *Progress Schedule*

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

4.05 *Delays in Contractor's Progress*

- A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. 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.
- B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.
- C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. 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. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:
 - 1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;

2. abnormal weather conditions;
 3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
 4. acts of war or terrorism.
- D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.
- E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.
- F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.
- G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *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.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner’s interest therein as necessary for giving notice of or filing a mechanic’s or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

- A. *Limitation on Use of Site and Other Areas:*
 1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas permitted by Laws and Regulations, and shall not

unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris 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 and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
 - D. *Loading of Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

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

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;
2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and
3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

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

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site 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 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; 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 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such

condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

- B. *Engineer's Review:* After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.
- C. *Owner's Statement to Contractor Regarding Site Condition:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.
- D. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,
 - c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
 2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:
 - a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or
 - b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements

or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

- c. Contractor failed to give the written notice as required by Paragraph 5.04.A.
3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

- A. *Contractor's Responsibilities:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent 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 do not warrant or guarantee 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 information and data regarding existing Underground Facilities at the Site;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;
 - c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and
 - d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.
- B. *Notice by Contractor:* If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.
- C. *Engineer's Review:* Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or

schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

- D. *Owner's Statement to Contractor Regarding Underground Facility:* After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.
- E. *Possible Price and Times Adjustments:*
1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;
 - b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;
 - c. 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; and
 - d. Contractor gave the notice required in Paragraph 5.05.B.
 2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.
 3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

- A. *Reports and Drawings*: The Supplementary Conditions identify:
1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and
 2. Technical Data contained in such reports and drawings.
- B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; 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 removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.
- D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.
- E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take

corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

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

by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

- K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.
- B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.
- C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.
- D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then 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 bond and surety requirements above.
- E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.
- F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 Insurance—General Provisions

- A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.
- B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.
- C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance, including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.
- F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.
- G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.
- H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other

party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

- I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.
- J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

- A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.
 - 2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).
 - 3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).
 - 4. Foreign voluntary worker compensation (if applicable).
- B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:
 - 1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
 - 2. claims for damages insured by reasonably available personal injury liability coverage.
 - 3. 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.
- C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:
 - 1. Products and completed operations coverage:
 - a. Such insurance shall be maintained for three years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
 - 2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.

3. Broad form property damage coverage.
 4. Severability of interest.
 5. Underground, explosion, and collapse coverage.
 6. Personal injury coverage.
 7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
 8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.
- D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against 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. The automobile liability policy shall be written on an occurrence basis.
- E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.
- F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.
- G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.
- H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after

Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

- I. *General provisions:* The policies of insurance required by this Paragraph 6.03 shall:
 1. include at least the specific coverages provided in this Article.
 2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.
 3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.
 4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.
 5. be appropriate for the Work being performed and provide protection from claims that 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.
- J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, 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.
- B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

6.05 *Property Insurance*

- A. *Builder's Risk:* Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable 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:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."
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, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; 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. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.
3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.
4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).
5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).
6. extend to cover damage or loss to insured property while in transit.
7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.
 10. not include a co-insurance clause.
 11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.
 12. include performance/hot testing and start-up.
 13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.
- B. *Notice of Cancellation or Change:* All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.
- C. *Deductibles:* The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.
- D. *Partial Occupancy or Use by Owner:* If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.
- E. *Additional Insurance:* If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.
- F. *Insurance of Other Property:* If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

- A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, 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 insureds thereunder, or

against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. 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 or Contractor as trustee or fiduciary, 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 occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.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, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.
- D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

- A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.
- B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.
- C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *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.
- 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.

7.02 *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, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *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, whether or not such items are specifically called for in the Contract Documents.
- B. All materials and equipment incorporated into the Work 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.
- 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.

7.04 *“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 Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or “or equal” item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.
 - 1. If Engineer in its sole discretion determines that 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, Engineer shall deem it an “or equal” item. For the purposes of this paragraph, 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;
 - 3) it has a proven record of performance and availability of responsive service; and
 - 4) it is not objectionable to Owner.

- 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.
- B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.
- C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.
- D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.
- E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

- A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.
 - 1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.
 - 2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

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

the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

- E. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute at Contractor's expense.
- F. *Effect of Engineer's Determination:* If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.
- B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.
- C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.
- D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.
- E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.
- F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the

replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

- G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.
- H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.
- I. Contractor shall be 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.
- J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.
- K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.
- L. 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.
- M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.
- N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.
- O. 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 money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *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.

7.08 *Permits*

- A. Unless otherwise provided in the Contract Documents, 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 the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

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

7.10 *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 or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

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

7.12 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- 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 Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.
 - 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 7.12.A.2 or 7.12.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 at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
 - F. Contractor's duties and responsibilities for safety and protection 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 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).
 - G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

7.13 *Safety Representative*

- 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.

7.14 *Hazard Communication Programs*

- 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.

7.15 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused 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.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements:*

1. Before submitting a Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated the 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 and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - 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 of that submittal, and that Contractor approves the 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 set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

- B. *Submittal Procedures for Shop Drawings and Samples:* Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.
1. *Shop Drawings:*
 - a. Contractor shall submit the number of copies required in the Specifications.
 - 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 7.16.D.
 2. *Samples:*
 - a. Contractor shall submit the number of Samples required in the Specifications.
 - b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.
 3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. *Other Submittals:* Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.
- 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 or to safety precautions or programs incident thereto.
 3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
 4. Engineer's review and approval of a Shop Drawing or Sample 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

7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

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

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.
2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.
3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on 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;
 - 6. the issuance of a notice of acceptability by Engineer;
 - 7. any inspection, test, or approval by others; or
 - 8. any correction of defective Work by Owner.
- D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the 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 7.18.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 7.18.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.

7.19 *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 Laws and Regulations.
- 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, 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.
- 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, 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 7.16.D.1.

- E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

- A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.
- B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.
- C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. 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.
- D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:
 - 1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;

2. an itemization of the specific matters to be covered by such authority and responsibility; and
 3. the extent of such authority and responsibilities.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

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

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

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

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

9.02 *Replacement of Engineer*

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

9.03 *Furnish Data*

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

9.04 *Pay When Due*

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

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

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

9.06 *Insurance*

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

9.07 *Change Orders*

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

9.08 *Inspections, Tests, and Approvals*

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

9.09 *Limitations on Owner's Responsibilities*

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

9.10 *Undisclosed Hazardous Environmental Condition*

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

9.11 *Evidence of Financial Arrangements*

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

9.12 *Safety Programs*

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

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

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

10.02 *Visits to Site*

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

required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

- A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. 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.

10.04 *Rejecting Defective Work*

- A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

- A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.
- B. 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, are set forth in Paragraph 7.19.
- C. Engineer's authority as to Change Orders is set forth in Article 11.
- D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

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

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

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

10.08 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, 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 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

10.09 *Compliance with Safety Program*

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

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders:*

- a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.
- b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives:* A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

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

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other

engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

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

11.04 *Change of Contract Price*

- A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.
- B. An adjustment in the Contract Price will be determined as follows:
 - 1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or
 - 2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or
 - 3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).
- C. *Contractor's Fee*: When applicable, 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 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

- b. for costs incurred under Paragraph 13.01.B.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 11.04.C.2.a and 11.04.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;
- d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;
- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost 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 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.
- B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

- A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.
 - 1. *Procedures:* Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the

proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action:* Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.
 3. *Binding Decision:* Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.
- B. *Resolution of Certain Change Proposals:* If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders covering:
1. 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;
 2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;
 3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and
 4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

- B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

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

ARTICLE 12 – CLAIMS

12.01 *Claims*

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

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

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

13.01 Cost of the Work

- A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:
1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or
 2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.
- B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work 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 13.01.C, 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, and 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 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 13.01.
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 6.05), 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.
- h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded:* The term Cost of the Work 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, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.
- 2. 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 Paragraph 13.01.B.
- D. *Contractor's Fee*: When the Work as a whole 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, Change Proposal, Claim, set-off, or other 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 11.04.C.
- E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, 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.

13.02 Allowances

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

13.03 Unit Price Work

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

- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.
- E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:
 - 1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;
 - 2. there is no corresponding adjustment with respect to any other item of Work; and
 - 3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

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

14.01 *Access to Work*

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction 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.

14.02 *Tests, Inspections, and Approvals*

- A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.
- B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs

incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:
 - 1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;
 - 2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;
 - 3. by manufacturers of equipment furnished under the Contract Documents;
 - 4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and
 - 5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

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

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

14.03 *Defective Work*

- A. *Contractor's Obligation:* It is Contractor's obligation to assure that the Work is not defective.
- B. *Engineer's Authority:* Engineer has the authority to determine whether Work is defective, and to reject defective Work.
- C. *Notice of Defects:* Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.
- D. *Correction, or Removal and Replacement:* Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated,

installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

- E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.
- F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

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

14.05 *Uncovering Work*

- A. Engineer has the authority to require additional inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.
- B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.
- C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.
2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, 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, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work 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.

14.07 *Owner May Correct Defective Work*

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

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

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

15.01 Progress Payments

- A. *Basis for Progress Payments:* The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.
- B. *Applications for Payments:*
 - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. 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, a warehouse bond, 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.
- C. *Review of Applications:*
 - 1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
 - 2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design

professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
- a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
- a. to supervise, direct, or control the Work, 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 money paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

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

D. *Payment Becomes Due:*

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

E. *Reductions in Payment by Owner:*

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

- i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;
 - j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;
 - k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - l. there are other items entitling Owner to a set off against the amount recommended.
2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.
 3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

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

15.03 *Substantial Completion*

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

corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

- D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.
- E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.
- F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

15.04 *Partial Use or Occupancy*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:
 - 1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

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

15.06 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents;
 - b. consent of the surety, if any, to final payment;
 - c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.
 - d. a list of all disputes that Contractor believes are unsettled; and
 - e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of 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 have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. 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 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work:* The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due:* Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

- A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special

guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

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

15.08 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the 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 Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
 - 1. correct the defective repairs to the Site or such other adjacent areas;
 - 2. correct such defective Work;
 - 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 to 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. 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 repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).
- 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, 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.
- E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

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

16.02 *Owner May Terminate for Cause*

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

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

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

16.03 *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; and
 - 3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.
- B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

- A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon 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 16.03.

- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, 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 are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

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

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

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

18.03 *Cumulative Remedies*

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

18.04 *Limitation of Damages*

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

18.05 *No Waiver*

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

18.06 *Survival of Obligations*

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

18.07 *Controlling Law*

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

18.08 *Headings*

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

DOCUMENT 00 73 00

SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract, EJCDC® C-700 (2013 Edition). All provisions that are not so amended or supplemented remain in full force and effect.

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

The address system used in these Supplementary Conditions is the same as the address system used in the General Conditions, with the prefix "SC" added thereto.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY**1.01** *Defined Terms.*

Add the following term after number 48.

49. Written Notice – Paper or electronic communication.

ARTICLE 2 – PRELIMINARY MATTERS**2.01** *Delivery of Bonds and Evidence of Insurance*

A. Paragraph 2.01.B of the General Conditions requires that Contractor furnish certificates of insurance. Paragraph 6.02.C states that upon request by Owner or other named or additional insureds, Contractor must provide evidence of insurance such as copies of required policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Parallel provisions apply to Owner and the insurance that Owner is required to provide. Rather than relying on this two-step process (delivery of certificates of insurance at the outset; subsequent requests for additional evidence of insurance), some contract drafters may elect to require from the outset that copies of the insurance policies, rather than certificates of insurance, be delivered to the other party. If exchange of copies of insurance policies is required, the following should be used:

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

- B. Evidence of Contractor's Insurance: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies of insurance (including all endorsements, and identification of applicable self-insured retentions and deductibles) required to be provided by Contractor in Article 6. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.
- C. Evidence of Owner's Insurance: After receipt from Contractor of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor copies of the policies of insurance to be provided by Owner under Article 6 (if any). Owner may block

out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

2.02 Copies of Documents

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

Owner shall furnish to Contractor an electronic portable document format (PDF) copy of the Contract Documents (including one fully executed counterpart of the Agreement).

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

SC-3.03 Reporting and Resolving Discrepancies:

SC-3.03 Add the following new paragraphs after Paragraph 3.03.B.1:

2. The following reports of explorations and tests of subsurface conditions at or adjacent to the Site are known to Owner:
 1. No Known Reports

Add the following new section following Section 3.05:

SC-3.06 Order of Precedence

- A. The order of the Technical Specifications as listed in the Document 00 01 10 Table of Contents shall be deemed the order of precedence of such documents.

ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.03 Reference Points

SC- 4.03 Add the following new paragraph after 4.03.A:

- B. Construction Staking shall be the responsibility of the Contractor.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

SC-5.03 Subsurface and Physical Conditions

SC 5.03 Delete Paragraphs 5.03.A and 5.03.B in their entirety and insert the following:

- A. No reports of explorations or tests of subsurface conditions at or adjacent to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

5.06 Hazardous Environmental Conditions

SC 5.06 Delete Paragraphs 5.06.A and 5.06.B in their entirety and insert the following:

- A. No reports or drawings related to Hazardous Environmental Conditions at the Site are known to Owner.

B. Not Used.

ARTICLE 6 – BONDS AND INSURANCE

SC-6.01 Performance, Payment, and Other Bonds

SC 6.01 Add the following new paragraph immediately after Paragraph 6.01.F:

G. Warranty Bond: Contractor shall furnish a warranty bond in an amount at least equal to the Contract Price, as security that Contractor will meet the contractual correction period obligations during a specified period of time after construction has been completed. This bond shall remain in effect until one (1) year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract.

SC-6.03 Contractor’s Insurance

SC 6.03 Amend Paragraph 6.03.G to read as follows:

G: Additional insureds: The Contractor’s commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional insureds the Owner and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

SC 6.03 Add the following new paragraph immediately after Paragraph 6.03.J:

K. The limits of liability for the insurance required by Paragraph 6.03 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

1. Workers’ Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions:

State:	Statutory
Federal, if applicable (e.g., Longshoreman’s):	Statutory
Employer’s Liability:	
Bodily injury/disease aggregate	\$ 1,000,000

2. Contractor’s Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions:

Each Occurrence (Bodily Injury and Property Damage)	\$ 1,000,000
Personal and Advertising Injury	\$ 1,000,000
General Aggregate	\$ 2,000,000
Products - Completed Operations Aggregate	\$ 1,000,000
3. Automobile Liability under Paragraph 6.03.D. of the General Conditions:	
Combined Single Limit of	\$ 1,000,000
<i>[or]</i>	
Bodily Injury:	
Each person	\$ 500,000
Each accident	\$ 1,000,000
Property Damage:	
Each accident	\$ 1,000,000
4. Excess or Umbrella Liability:	
Per Occurrence	\$ 2,000,000
General Aggregate	\$ 2,000,000
5. Not Used.	
6. Additional Insureds: In addition to Owner, include as additional insureds the following: none	

SC 6.05 Add the following new paragraph immediately after Paragraph 6.05.F:

G. *Builder’s Risk Insurance Requirement:* Builder’s Risk insurance shall only apply to those Projects involving construction of or modification to an Owner-owned building or as otherwise required by the Owner and expressly stated in the Agreement.

ARTICLE 7 – CONTRACTOR’S RESPONSIBILITIES

SC-7.02 Labor; Working Hours

SC-7.02.A Amend Paragraph 7.02.A to read as follows:

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, construction staking, start up, and

completion of the Work, whether or not such items are specifically called for in the Contract Documents.

SC-7.02.B Add the following new paragraph immediately after Paragraph 7.02.B:

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

SC-7.02.C Add the following new subparagraph immediately after Paragraph 7.02.C:

1. For purposes of administering the foregoing requirement, additional overtime costs are defined as the difference between regular hourly rates and overtime hourly rates.

SC-7.06 Concerning Subcontractors, Supplier, and Others

SC-7.06.A Add the following sentence immediately after the second sentence:

Contractor shall not subcontract for more than 50% of the contract price without express, written approval from Owner.

ARTICLE 8 – [NO CHANGES]

ARTICLE 9 – [NO CHANGES]

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

SC-10.03 Project Representative

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

- B. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.
 1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
 2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
 3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other

- Project-related meetings, and prepare and circulate copies of minutes thereof.
4. Liaison:
 - a. Serve as Engineer's liaison with Contractor. Working principally through Contractor's authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
 - b. Assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-Site operations.
 - c. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
 5. 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.
 6. Shop Drawings and Samples:
 - a. Record date of receipt of Samples and Contractor-approved Shop Drawings.
 - b. Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
 - c. Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.
 7. Modifications: Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR's recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
 8. Review of Work and Rejection of Defective Work:
 - a. Conduct on-Site observations of Contractor's work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer whenever RPR believes that any part of Contractor's work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil 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 that part of work in progress that RPR believes should be corrected or rejected or should be

uncovered for observation, or requires special testing, inspection or approval.

9. Inspections, Tests, and System Start-ups:
 - a. Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
 - b. Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
10. Records:
 - a. Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, 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.
 - b. Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
 - c. Maintain records for use in preparing Project documentation.
11. Reports:
 - a. 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.
 - b. Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
 - c. Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.
12. 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 Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.

13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
 14. Completion:
 - a. Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
 - b. Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.
 - c. Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.
- C. The RPR shall not:
1. Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
 2. Exceed limitations of Engineer's authority as set forth in the Contract Documents.
 3. Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
 4. Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.
 5. Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
 6. Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
 7. Accept Shop Drawing or Sample submittals from anyone other than Contractor.
 8. Authorize Owner to occupy the Project in whole or in part.

ARTICLE 11 – [NO CHANGES]

ARTICLE 12 – [NO CHANGES]

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK*SC-13.01 Cost of the Work***SC 13.01.B.5.c Delete Paragraph 13.01.B.5.c in its entirety and insert the following in its place:**

- c. Construction Equipment and Machinery:
 - 1) Rentals of all construction equipment and machinery, and the parts thereof, 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.
 - 2) Costs for equipment and machinery owned by Contractor will be paid at a rate shown for such equipment in the *Rental Rate Blue Book For Construction Equipment (edition current at time of bid opening)*. An hourly rate will be computed by dividing the monthly rates by 176. These computed rates will include all operating costs. Costs will include the time the equipment or machinery is in use on the changed Work and the costs of transportation, loading, unloading, assembly, dismantling, and removal when directly attributable to the changed Work. The cost of any such equipment or machinery, or parts thereof, shall cease to accrue when the use thereof is no longer necessary for the changed Work. Equipment or machinery with a value of less than \$1,000 will be considered small tools.

*SC-13.03 Unit Price Work***SC 13.03.E Delete Paragraph 13.03.E in its entirety and insert the following in its place:**

- E. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
 - 1. if the extended price of a particular item of Unit Price Work amounts to 10 percent or more of the Contract Price (based on estimated quantities at the time of Contract formation) and the variation in the quantity of that particular item of Unit Price Work actually furnished or performed by Contractor differs by more than 50 percent 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, Contractor may submit a Change Proposal, or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, Owner may make a Claim, seeking an adjustment in the Contract Price.

ARTICLE 14 – [NO CHANGES]**ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD****SC 15.03.B Add the following new subparagraph to Paragraph 15.03.B:**

1. If some or all of the Work has been determined not to be at a point of Substantial Completion and will require re-inspection or re-testing by Engineer, the cost of such re-inspection or re-testing, including the cost of time, travel and living expenses, shall be paid by Contractor to Owner. If Contractor does not pay, or the parties are unable to agree as to the amount owed, then Owner may impose a reasonable set-off against payments due under Article 15.

ARTICLE 16 – [NO CHANGES]**ARTICLE 17 – FINAL RESOLUTION OF DISPUTES****SC-17.02 Add the following new paragraph immediately after Paragraph 17.01.**

SC-17.02 Arbitration

- A. All matters subject to final resolution under this Article will be decided by arbitration in accordance with the rules of an arbitration agency as agreed upon by the Parties, subject to the conditions and limitations of this paragraph. This agreement to arbitrate and any other agreement or consent to arbitrate entered into will be specifically enforceable under the prevailing law of any court having jurisdiction.
- B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitrator or arbitration provider, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in this Article, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations. The demand for arbitration should include specific reference to Paragraph SC-17.02.D below.
- C. No arbitration arising out of or relating to the Contract shall include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:
 1. the inclusion of such other individual or entity is necessary if complete relief is to be afforded among those who are already parties to the arbitration; and
 2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration and which will arise in such proceedings.

- D. The award rendered by the arbitrator(s) shall be consistent with the agreement of the parties, in writing, and include a concise breakdown of the award, and a written explanation of the award specifically citing the Contract provisions deemed applicable and relied on in making the award.
- E. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.
- F. The fees and expenses of the arbitrators and any arbitration service shall be shared equally by Owner and Contractor.

ARTICLE 18 – [NO CHANGES]

END OF DOCUMENT

DOCUMENT 00 91 13
ADDENDA

PART 1 GENERAL

1.1 PROCEDURE

- A. For filing purposes, add Addenda to the Contract Documents following this page.

END OF DOCUMENT

Part 4: Technical Specifications

**SECTION 01 11 01
MEASUREMENT AND PAYMENT**

PART 1 GENERAL

1.1 SCOPE

- A. Payment for the various items of the Bid Schedule, shall include all compensation to be received by Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the Work all in accordance with the requirements of the Contract Documents, including all appurtenances thereto, and including all costs of compliance with the regulations of Owner and public agencies having jurisdiction, including Safety and Health Requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA). No separate payment will be made for any item that is not specifically set forth in the Bid Schedule, and all costs therefore shall be included in the prices named in the Bid Schedule for the various appurtenant items of work.
- B. Contractor shall provide a breakdown of all lump sum bid items into the individual line items relating to the lump sum task, as specified by Engineer, prior to Notice to Proceed.
- C. No additional payment will be made for rock excavation.

1.2 SECTION INCLUDES

- A. Measurement and payment criteria applicable to portions of the Work performed under a unit price payment method.
- B. Defect assessment and non-payment for rejected work.

1.3 AUTHORITY

- A. Engineer will take all measurements and compute quantities accordingly.
- B. Assist by providing necessary equipment, workers, and survey personnel as required.

1.4 UNIT QUANTITIES SPECIFIED

- A. Quantities and measurements indicated in the Contract Documents are for bidding and Contract purposes only. Quantities and measurements supplied or placed in the Work and verified by Engineer shall determine payment.
- B. If the actual Work requires more or fewer quantities than those quantities indicated, Contractor shall provide the required quantities at the unit sum/prices contained within the Bid Schedule.

1.5 MEASUREMENT OF QUANTITIES

- A. Measurements, unless specified otherwise, shall be interpreted to mean:

- 1. Lump Sum (ls): Completion of the item as a whole. Measurement of quantities in the field is not required. Payment will be based on the percentage of work completed.

2. Each (ea): Completion of item individually. Measurement of quantities in the field.
3. Weight (ton):
By Weight: Verification of tonnage shall be documented by delivery tickets supplied by the Contractor to the County. All tickets shall indicate the Owner's name, date, type material, truck number, project location, project number, gross weight and net weight of each material. Delivery tickets are to be turned in with all applicable pay requests. Weigh Scales: Inspected, tested and certified by the applicable State Weights and Measures department within the past year. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle. Metering Devices: Inspected, tested and certified by the applicable State department within the past year. Measurement by Weight: Concrete reinforcing steel, rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
4. Length
lineal feet (lf): Measured along the centerline or mean chord in the field, top back of curb for curb and gutter or unless otherwise indicated. For pipe measurements there will be no deduction in length for structures.
5. Volume
cubic foot (cf), cubic yard (cy): Measured by cubic dimension using mean length, width and height or thickness.

Measurement shall be based upon the establishment of a known quantity agreed upon by the County (eg. known cubic yardage of a dump truck), use of the same measuring device established throughout the work performed, filled to the same location and counted thereafter. Verification of quantity shall be documented by the Contractor to the County inspection representative. Documentation shall indicate the Owner's name, date, type material excavated, truck number, project location, project number and percent filled based upon full capacity.
6. Area
Measurement by Area: Measured by square dimension

- B. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by Engineer multiplied by the unit sum/price for Work which is incorporated in or made necessary by the Work.

1.8 **ACRONYMS**

- A. The following is a list of the most used acronyms related to bid items. This is not meant to be an exhaustive list.
1. UTBC Untreated Base Course
 2. HMA Hot Mix Asphalt
 3. TBC Top back of Curb
 4. GB Granular Borrow
 5. ADA Americans with Disabilities Act
 6. HVAC Heating/Ventilation/Air Conditioning
 7. SCADA Supervisory Control and Data Acquisition
 8. UPDES Utah Pollutant Discharge Elimination System

1.9 DESCRIPTION OF BID ITEM

M&P Reference	Bid Item	Unit	Payment Includes	Notes
MP001	Mobilization	Is	<p>All costs associated with mobilizing and demobilizing equipment and materials to and from the project site, mobilization, demobilization, establishment of offices, buildings, all OSHA required safety measures, sanitation, and other facilities necessary for the Work, bonds, snow removal, dust control, fees, permits (not specified as paid for elsewhere), administrative services, construction notifications, identifying and marking of construction limits and all costs associated with the Work that are not included in other bid items.</p> <p>Payment shall be as follows:</p> <p>Percent of Original Contract Amount (Completed) --> Percent of Mobilization to be (Paid): 5% --> 50%, 25% --> 25%, 75% --> 25%</p>	
MP002	UPDES Storm Water Regulations Compliance (Over One Acre)	Is	<p>Compliance with the requirements of the Utah Pollutant Discharge Elimination System (UPDES) program including the Construction General Permit. Compliance includes the preparation of, and amendments to, a Storm Water Pollution Prevention Plan (SWPPP) by the Contractor, or authorized representative. Preparing a complete SWPPP including filing a Notice of Intent (NOI) to begin the project and filing a Notice of Termination (NOT) at the conclusion of the project, maintenance, inspections, and any other work necessary to comply with the SWPPP. Best management practices such as storm water gravel inlet sediment filters, silt fencing, erosion control mats, wash down pads, containment pads, dust abatement, regular clean-up, street sweeping, etc. Includes applications, permits, notifications, and other correspondence associated with the permit process. This item shall cover all aspects of construction.</p>	<p><i>A recommended SWPPP template can be found on the State's Department of Environmental Quality website.</i></p>

MP500	Clear and Grub Site	sf	Clearing and grubbing of area as shown on the Drawings. Includes removal and lawful disposal of vegetation and organic material including sod, weeds, grasses, bushes, stumps, shrubs and small trees including the root ball; dust control, removal, haul and disposal of any garbage and debris.	<i>Small trees are defined as 6" or less in diameter as measured at 3' above the adjacent ground surface.</i>
MP600	Saw Cut Asphalt	lf	Saw cutting existing asphalt up to 6" thick as shown on the Drawings. Includes utility locating and protection, saw cutting, and water.	<i>Thicknesses greater than 6" shall be paid based on proportional thickness, calculated by dividing the unit price by 6" to get a \$/in depth cost, then multiplying by the actual thickness cut.</i>
MP602	Remove Asphalt	sf	Asphalt removal as shown on the Drawings. Includes removal of asphalt including concrete collars where present, loading, haul, and lawful disposal.	<i>See Bidding Schedule and/or Drawings for approximate thickness. Saw cutting is paid for under a separate item.</i>
MP603	Remove Concrete Flatwork	sf	Concrete flatwork removal as shown on the Drawings. Includes removal of concrete, loading, haul, and lawful disposal.	
MP604	Remove Curb and Gutter	lf	Concrete curb and gutter removal as shown on the Drawings. Includes removal of curb and gutter sections, loading, haul, and lawful disposal.	

MP605	Remove Unsuitable Material	cy	Removal and disposal of unsuitable subgrade material. No classification of excavated materials shall be made. Includes loading and unloading, hauling, and lawful disposal of excavated materials.	
MP609	Pre-Lower Manhole / Valve / Utility Box / Monument	ea	Pre-lowering of manholes, valves, boxes and/or monuments as shown on the Drawings. Includes preconstruction location of monuments by a licensed surveyor, excavation, removal and lawful disposal of existing concrete or asphalt pavement around the item, storage of removed items, lowering, covering, placement of material over the item once it is lowered, marking of item, and locating of pre-lowered item following construction.	
MP612	Asphalt Patch (3" HMA, 8" UTBC)	sf	Patching of removed asphalt areas as shown on the Drawings or as directed by an authorized Owner representative. Includes preparation, grading, and compaction of underlying subgrade, application of tack coat on a clean asphalt edge, loading, haul, installation and compaction of UTBC and HMA.	<i>Saw cutting and removal of asphalt and road base is paid for under a separate item.</i>
MP613	Raise Manhole / Valve / Utility Box / Monument to Grade with Concrete Collar	ea	Raising manholes, valves, boxes and/or monuments to grade as shown on the Drawings. Includes removal and lawful disposal of asphalt and cover material, excavation, cleaning out of any excess material inside manhole, valve, box, or monument; backfill, compaction, saw cutting edge of asphalt for concrete collar, grade rings, replacement of removed items to finished grade, constructing concrete collar, protection, and traffic control until concrete has had suitable time to cure. Monuments to be reestablished by a licensed surveyor including any recordation fees.	
MP616	Granular Borrow	ton	Importing and placement of granular borrow to the thicknesses specified in the Bidding Schedule and as shown on the Drawings. Includes loading and unloading, hauling, stockpiling, grade controls, grading, compaction, and dust control.	

MP617	Untreated Base Course	ton	Importing and placement of untreated base course to the thicknesses specified in the Bidding Schedule and as shown on the Drawings. Includes loading and unloading, hauling, stockpiling, grade controls, rough and fine grading, rolling, compaction, and dust control.	<i>UTBC removed for final paving shall be salvaged to the Owner unless otherwise authorized.</i>
MP618	Hot Mix Asphalt	ton	Importing and placement of hot mix asphalt to the thicknesses specified in the Bidding Schedule and as shown on the Drawings. Includes cleaning of areas adjacent to paving prior to placement of asphalt, required tack along the edge of the adjacent asphalt and concrete, fine grading of base material prior to placement of pavement, loading and unloading, hauling, grade controls, providing smooth paving surface and transitions for vehicular traffic, rolling, and compaction.	
MP626	New Traffic Striping	lf	Installation and placement of permanent traffic striping paint of the width specified in the Bidding Schedule and shown in the Drawings. Includes installing control points or markings to relocate previous striping or locate new striping at the locations specified in the Drawings, and reflective beads.	<i>Includes two applications a minimum of 14 days apart. All work must conform to the current edition of the MUTCD Standards.</i>

MP632	New Concrete Curb and Gutter	lf	Installation and placement of concrete curb and gutter as specified in the Bidding Schedule and shown in the Drawings. Includes excavation, forming, expansion and control joints, fiber reinforcement if required, drop-downs for driveways and pedestrian ramps, finishing, protection of concrete while curing, curing compound, backfill behind curb, landscape restoration, and repair of any damaged improvements.	<i>Measured in the field along the top back of curb following construction. Engineer must be allowed to inspect curb string line or forms before casting of curb and gutter. UTBC is paid for under a separate item.</i>
MP633	New Concrete Flatwork	sf	Installation and placement of concrete flatwork with thickness as specified in the Bidding Schedule and shown in the Drawings. Includes excavation, forming, expansion and control joints, fiber reinforcement if required, finishing, protection of concrete while curing, curing compound, backfill, landscape restoration, and repair of any damaged improvements.	<i>UTBC is paid for under a separate item. Sidewalk through pedestrian access ramps will be paid for under a separate item.</i>
MP635	New Concrete Waterway	sf	Installation and placement of concrete waterway as specified in the Bidding Schedule and shown in the Drawings. Includes excavation, forming, steel reinforcement, expansion and control joints, fiber reinforcement if required, finishing, protection of concrete while curing, curing compound, backfill, and repair of any damaged improvements.	<i>UTBC is paid for under a separate item.</i>
MP701	Remove Existing Sprinkler System	ls	Removal of existing sprinkler system as specified in the Drawings. Includes cutting, removal, and lawful disposal of existing sprinkler lines, heads, valves, fittings, wire, and boxes, protection of lines to remain, temporary plugs or connections to keep remaining sprinkler system functioning until permanent connections are made and the system is complete.	<i>Salvage existing system components as specified.</i>

MP705	Topsoil	cy	Importing and placement of top soil to grade at site as shown on the Drawings. Includes loading and unloading, hauling, stockpiling, site preparation, grade controls, grading, compaction, and dust control.	<i>Thickness will be verified by the City's authorized inspection representative.</i>
MP708	Sod	sf	Turf sod installed on properly prepared topsoil, fertilization, and watering of sod until established. Includes compliance with the planting maintenance specification.	<i>Sod that is determined to have died and will not recover (prior to the owner taking responsibility for the sod), will be replaced by the contractor at their cost.</i>
MP806	Remove Existing Fence	lf	Removal of existing fence as listed in the Bidding Schedule and shown on the Drawings. Includes lawful removal and disposal of fencing wire, fabric, webbing, slats, panels, rails, framing, posts, gates, foundation concrete, excavation, backfill, installation of post (if necessary) at the end of the removed section leaving the remaining fencing in good, functioning condition, and surface restoration.	<i>Contractor to coordinate fencing installation with property owner(s) and provide adequate temporary fencing to protect and contain livestock (if present).</i>

MP808	New Fence	lf	Supplying and installation of new fence of the type and size listed in the Bidding Schedule and shown on the Drawings. Includes excavation, new fence installation, wire, fabric, webbing, slats, panels, rails, framing, posts, foundation concrete, aesthetically and structurally sound connection(s) to existing fencing, backfill, and surface restoration.	<p><i>Gates are paid under a separate bid item.</i></p> <p><i>Contractor to coordinate fencing installation with property owner(s) and provide adequate temporary fencing to protect and contain livestock (if present).</i></p>
MP809	New Gate	ea	Supplying and installation of new fence gate of the type and size listed in the Bidding Schedule and shown on the Drawings. Includes excavation, new gate installation, wire, fabric, webbing, slats, panels, frame, posts, foundation concrete, aesthetically and structurally sound connection(s) to existing fencing, backfill, and surface restoration.	<p><i>Contractor to coordinate gate installation with property owner(s) and provide adequate temporary fencing to protect and contain livestock (if present).</i></p>
MP811	Streetlight	ea	Streetlight installation of the type listed in the Bidding Schedule and shown on the Drawings. Includes excavation, reinforced concrete foundation, grounding rod, concrete finishing, unloading and handling of light pole, installation of light pole, anchor bolts, backfill and cleanup following construction.	<p><i>Anchor bolts and pattern to be provided by Owner. Contractor shall coordinate power source location and connection with power provider.</i></p>

MP812	Conduit (Open Cut)	If	Conduit of the type, size and class listed in the Bidding Schedule and shown on the Drawings. No classification of excavated materials shall be made, and excavation shall include the removal and subsequent handling of all water, earth, shale, loose or cemented gravel, loose rock, solid rock, or other materials of whatever nature excavated or otherwise removed in the performance of the project work, dewatering, trench safety measures, lawful disposal of excess material, backfill to grade, compaction, foundation sand, pipe bedding, fittings, fusing, corrosion protection, marking tape, tracer wire when required, grade controls, all necessary pothole investigation of existing utilities to predetermine any conflicts with other utilities or structures (horizontal or vertical), coordination with Engineer for resolution of predetermined conflicts, cleaning, correction of any material or installation-related defect, and restoration of miscellaneous improvements damaged as a result of completing this item.	<i>Removal of pavement, installation of imported backfill (if required), and installation of new pavement section is paid for under separate items.</i>
MP875a	Provide Electrical Work and Materials	Is	Full compensation for labor and materials to furnish and install all electrical equipment required at each site, includes coordinate all work with the general contractor, the SCADA contractor (if needed), Box Elder County representatives. Required equipment, as found on the Electrical plans, include (but may not be limited to): gate key pad, intercom panel, connection to existing electrical panels, security cameras, safety loops, bollards, detection loops, wires, solar control panels and all other component indicated on the Electrical Plans and Specifications.	<i>Conduit to be paid for under a separate bid item.</i>

END OF SECTION

SECTION 260000 – GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. General requirements which apply to all electrical aspects of the work.

B. Related Sections

1. The Contract Documents are a single integrated document. As such, all Divisions and Sections are applicable. The Contractor and its Subcontractors are responsible to review all parts of the Contract Documents in order to provide a complete and coordinated project.

1.2 REFERENCES

A. The installation and commissioning of the Electrical System shall conform to all applicable codes, regulations, standards and specifications, including, but not limited to those listed below. These publications are referenced to by designation but not by edition. The latest edition accepted by the Authority Having Jurisdiction in effect at the time of bid shall govern.

1. State and Local Codes and Authority Having Jurisdiction (AHJ)
2. National Electric Code (NEC).
3. National Fire Protection Association (NFPA)
4. Institute of Electrical and Electronic Engineers (IEEE)
5. American National Standards Institute (ANSI)
6. American Society for Testing and Materials (ASTM)
7. Insulated Cable Engineers Association (ICEA)
8. National Electrical Manufacturers Association (NEMA)
9. Federal Occupational Safety and Health Act (OSHA)
10. Underwriters Laboratories, Inc. (UL)
11. International Society of Automation (ISA)

1.3 DEFINITIONS

A. Refer to the Contract Drawings sheet E001 for a list of abbreviations associated with the Electrical System. In addition, the following definitions are used in this section:

1. AHJ – Authority Having Jurisdiction
2. I&C – Instrumentation and Controls
3. IS – Instrumentation Supplier
4. NEC – National Electric Code
5. VFD – Variable Frequency Drive
6. UL - Underwriters Laboratories, Inc.

1.4 ELECTRICAL SYSTEMS REQUIREMENTS

- A. The Work is to provide all labor and materials necessary for erecting a complete and operational Electrical System, tested and ready for continuous use as described by the Contract Documents. The Electrical System shall be constructed in accordance with the Contract Documents, and Federal, State, and Local codes and regulations. In addition, the Work shall adhere to the following general provisions:
1. The Electrical Contractor shall obtain all necessary permits required by the AHJ. In addition, the Electrical Contractor shall ensure that all inspections required by the AHJ are coordinated, conducted and documented.
 2. All work shall be completed in a neat, workmanlike manner in accordance with the latest NEC standards of installation under competent supervision.
 3. The Electrical Contractor shall visit the job site prior to bidding to become familiar with existing conditions and other factors, which may affect the execution of the work. Include all related costs in the initial bid proposal.
 4. Coordinate work with the utilities providing services on this project. This may include but is not limited to the electric utility, telephone utility, cable TV/Internet utility. All electrical work associated with utilities shall be provided and installed per the utility requirements.
 5. All materials shall be new and of the best quality, manufactured in accordance with the requirements listed in part 1.2 of this section. The Contractor shall furnish and install the parts and pieces necessary to the installation of equipment, in accordance with the best practice of the trade, and in conformance with the requirements of these Contract Documents.
 6. Protect all electrical material and equipment that is being stored or has been installed against damage by other trades, weather conditions, or any other preventable causes. Equipment damaged during shipping, storage or construction, prior to acceptance by the engineer or the owner, will be rejected as defective.
 7. Leave the site clean. Remove all debris, empty cartons, tools, conduit, wire scraps and all miscellaneous spare equipment and materials used in the work during construction. All components shall be free of dust, grit and foreign materials, left as new before final acceptance of work. Damaged paint and finishes shall be touched up or repainted with matching color paint and finish.
 8. Electrical equipment shall be capable of operating successfully at full-rated load, without failure, at an ambient air temperature of 40 degrees C, and specifically rated for the altitude indicated on the Plans. Electrical equipment not rated for operation at that temperature shall be provided with air conditioning to meet the manufacturers' operating temperature.
 9. If any contradictions, contrasts, non-homogeneity, or inconsistency appears, the strictest criteria noted and the collective requirements in any and all of the Contract Documents shall apply.
 10. The Electrical Contractor shall perform necessary saw cutting, core drilling, excavating, removal, shoring, backfilling, and other work required for the proper installation of

conduits, whether inside, or outside of the buildings and structures. The Electrical Contractor shall repair and patch where demolition has taken place in a manner to match existing original structure.

- B. Oversee and coordinate with all equipment and services being provided by the Contractor but outside of the Electrical Contractor's scope.
 - 1. Inform all vendors and suppliers providing equipment related to the Electrical System the requirements of Division 26.
 - 2. The Owner is not responsible for any additional costs incurred by requiring vendors and/or subcontractors to meet the requirements of Division 26.
 - 3. If a vendor or supplier is unable to meet the requirements of Division 26, the Contractor may submit in writing to the Engineer the reasons for non-compliance. The Engineer will then evaluate the reasons and determine whether a solution may be determined or if a different vendor or supplier is required.
- C. Prepare Electrical System Submittals as required by Division 26 and Section 013300.
- D. Oversee the installation of the Electrical System.
- E. Maintain record drawings.
 - 1. Maintain on the construction site a set of the Electrical Drawings that shall be continuously marked up during construction.
 - a. The drawings should be updated at least weekly and will be checked monthly by the Owner's representative.
 - b. Upon completion of startup, submit the marked-up drawings to the Engineer for review and for drafting.
- F. Prepare O&M manuals.
 - 1. Provide O&M manuals in accordance with Section 017823.
- G. Provide training on electrical equipment that has been installed.

1.5 ACTION SUBMITTALS

- A. General
 - 1. Submittals for Division 26 shall meet the requirements of Section 013300 Contractor Submittals. In addition, the following requirements shall be met:
 - a. Submittals shall include bills of materials with quantities, makes, models, exact part numbers and descriptions.
 - b. Edit all submittals such that only pertinent information is submitted. Neatly cross out information that does not apply, options that are not being supplied, etc.
 - c. Show product dimensions, construction and installation details, wiring diagrams, and specifications.
 - d. If there are exceptions to the Contract Drawings and Specifications, provide a list of exceptions with detailed explanations for the exceptions. The Engineer will review

the list of exceptions and determine whether a solution may be determined or if the exception(s) will not be allowed.

2. Furnish submittals required by each Section within Division 26.
3. When submitting on equipment, use the equipment and instrumentation tags depicted in the Contract Drawings.

B. Recommended Spare Parts Submittal

1. Submit a list of spare parts for all of the equipment associated with the Electrical System. The list of spare parts shall include list pricing for each item.
2. Provide the name, address and phone number for each manufacturer and manufacturer's local sales representative.
3. Indicate whether or not the spare parts are being provided under this contract or not.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.7 QUALITY ASSURANCE

- A. All equipment supplied for this project shall meet the requirements of the NEC and shall be listed by and bearing the label of the UL.
- B. The Electrical Contractor shall be a company that has been actively involved in the installation and commissioning of Electrical Systems for a minimum period of five years.
- C. The Electrical Contractor shall have adequate facilities, manpower and technical expertise to perform the Work associated with the Electrical System and as outlined by the Contract Documents.
- D. The Electrical Contractor shall have similar project experience of at least four successfully completed projects for a similar wastewater system. The Electrical Contractor company must have performed similar work for these projects as required herein.

PART 2 - PRODUCTS

2.1 MATERIALS AND METHODS

- A. Materials, equipment, and parts comprising any unit, or part thereof, specified or indicated on the Plans, shall be new and unused, of current manufacture, and of highest grade consistent with the state of the art. Damaged or dirty materials, equipment, and parts are not considered to be new and unused and will not be accepted.
- B. Field verification of scale dimensions on Plans is directed, since actual locations, distances, and levels will be governed by actual field conditions. The Contractor shall also review architectural, structural, yard, mechanical, and other Plans, and the accepted electrical and mechanical shop drawings, and shall adjust their work to conform to the conditions indicated therein.

- C. The fabricator of major components, such as distribution panelboards, switchgear, and motor control centers, shall also be the manufacturer of the major devices therein. Where possible, the major components shall be manufactured and supplied by the same fabricator.

2.2 MANUFACTURERS

- A. All equipment provided for the Electrical System shall be the most recent field-proven models marketed by their manufacturers at the time of submittal of the Shop Drawings unless otherwise required to match existing equipment.
- B. Refer to various Division sections for individual equipment manufacturers. Indicated manufacturers are subject to strict compliance with the specifications and complete project documents. The reference to a particular manufacturer does not relieve the Electrical Contractor from conforming to the specified requirements.
- C. When providing like electrical components they shall be furnished by a single manufacturer and shall be consistent throughout the project. For example, a 20A 2-way light switch in one building should match a 20A 2-way light switch in another building in both make, model and features.

2.3 EQUIPMENT ASSEMBLIES

- A. Equipment assemblies, such as Service Entrance Sections, Switchgear, Switchboards, Control and Distribution Panels, and other custom fabricated electrical enclosures shall bear a UL label as a complete assembly. The UL label on the individual components making up the assembly will not be considered sufficient to meet the present requirement. Whenever a generic UL label does not apply for the assembly, a serialized UL label shall be affixed to the assembly, and the serial number shall be submitted with the assembly record shop drawings.
- B. Custom fabricated electrical control panels, and enclosures shall bear a serialized UL label affixed by a local inspector, and the serial number shall be submitted with the assembly record shop drawings.

2.4 OPERATING CONDITIONS

- A. The Electrical System shall be designed and constructed for satisfactory operation and long, low maintenance service under the following conditions:
 - 1. Environment: Sewer Lift Stations
 - 2. Temperature Extremes: -4°F to 110°F (Outdoors); 40°F to 104°F (Indoors).
 - 3. Relative Humidity: 20% to 90%, non-condensing.
- B. Indoor and outdoor electrical equipment shall be suitable for operation in the ambient conditions associated with the locations designated in the Contract Documents. Heating, cooling, and dehumidifying devices shall be provided in order to maintain electrical devices 20 percent within the minimums and maximums of their rated environmental operating ranges. The Contractor shall provide power wiring for these devices. Enclosures suitable for the environment shall be furnished. Electrical equipment in hazardous areas shall be suitable for and rated for use in the particular hazardous or classified location in which it is to be installed.

2.5 SEISMIC RESTRAINT

- A. The construction area is classified by the International Building Code (IBC) as Seismic Class C. The Code requires that not only the structures, but also major electrical components be designed and installed in a manner which will preclude damage during a seismic event. All electrical equipment shall be securely anchored and seismic braced in accordance with regulations contained in the most recent adopted edition of the IBC, and the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) "Guidelines for Seismic Restraints of Electrical Systems".
- B. Units mounted and secured directly to structure shall be provided with connectors of sufficient strength to meet the restraining criteria.
- C. All electrical equipment which is securely anchored (hard mounted) to the building or structure shall have supports designed to withstand lateral and vertical "G" loadings equal to or greater than IBC requirements and SMACNA guidelines.
- D. Shop drawings are required for all equipment anchors, supports and seismic restraints. Submittals shall include weights, dimensions, load/deflection data, center of gravity, standard connections, manufacturer's recommendations, and behavior problems (vibration, thermal, expansion, etc.) associated with equipment.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE AND HANDLING

- A. After completion of shop assembly, factory test, and approval, equipment, cabinets, panels, and consoles shall be packed in protective crates and enclosed in heavy duty polyethylene envelopes or secured sheeting to provide complete protection from damage, dust, and moisture. Dehumidifiers shall be placed inside the polyethylene coverings. The equipment shall then be skid-mounted for final transport. Lifting rings shall be provided for moving without removing protective covering. Boxed weight shall be shown on shipping tags together with instructions for unloading, transporting, storing, and handling at the Site.
- B. Special instructions for proper field handling, storage, and installation required by the manufacturer shall be securely attached to each piece of equipment prior to packaging and shipment.
- C. Each component shall be tagged to identify its location, instrument tag number, and function in the system. A permanent stainless steel or other non-corrosive material tag firmly attached and permanently and indelibly marked with the instrument tag number, as given in the tabulation, shall be provided on each piece of equipment in the PCIS. Identification shall be prominently displayed on the outside of the package.
- D. Equipment shall not be stored outdoors. Equipment shall be stored in dry permanent shelters, including in-line equipment, and shall be adequately protected against mechanical injury. If any apparatus has been damaged, such damage shall be repaired by the Contractor. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through tests as directed by the Engineer. If such tests reveal defects, the equipment shall be replaced.

3.2 MANUFACTURER'S SERVICES

- A. Manufacturer's services shall be furnished for the following equipment:
 - 1. Vendor supplied equipment that contain programmable controllers, operator interfaces and/or instrumentation that requires site calibration.
 - 2. Electrical generation equipment

3.3 INSTALLATION

- A. The Electrical System indicated throughout the design is diagrammatic and therefore locations of equipment are approximate. The exact locations and routing of wiring and cables shall be governed by structural conditions and physical interferences and by the location of electrical terminations on equipment. Equipment shall be located and installed so that it will be readily accessible for operation and maintenance. Installation of systems and equipment is subject to clarification as indicated in reviewed shop drawings and field coordination. Where job conditions require reasonable changes in approximated locations and arrangements, or when the Owner exercises the right to require changes in location of equipment which do not impact material quantities or cause material rework, the Contractor shall make such changes without additional cost to the Owner.
- B. Discrepancies indicated on different Plans, between Plans and actual field conditions, or between Plans and Contract Documents shall be promptly brought to the attention of the Engineer for clarification, prior to purchasing and installing equipment.
- C. The alignment of equipment and conduit shall be adjusted to accommodate architectural changes, or to avoid work of other trades, without extra expense to the Owner.
- D. Items not specifically mentioned in these Contract Documents, or noted on the Plans, or indicated on reviewed shop drawings, but which are obviously necessary to make a complete working installation, shall be deemed to be included herein.
- E. The Electrical Contractor shall layout and install electrical work prior to placing floors and walls. Furnish and install sleeves and openings through floors and walls, required for installation of conduits. Sleeves shall be rigidly supported and suitably packed, or sealed, to prevent ingress of wet concrete. Spacers shall be installed in order to prevent conduit movement. Dimensions indicated for electrical equipment and their installation are restrictive dimensions.
- F. The Electrical Contractor shall furnish and install inserts and hangers required to support conduits and other electrical equipment. If the inserts, hangers, sleeves, or other mounting hardware are improperly placed, or installed, the Contractor shall do necessary work, at their own expense, to rectify the errors.
- G. The Electrical System is integrally connected to I&C, mechanical and structural systems. Coordinate with these other disciplines the installation of these related components.
- H. Electrical equipment shall be anchored by methods that comply with seismic requirements applicable to the Site.
- I. The Contract Documents show necessary conduit and instruments required to make a complete instrumentation system. The Contractor shall be responsible for providing any additional or

different type connections as required by the instruments and specific installation requirements. Such additions and such changes, including the proposed method of installation, shall be submitted to the Engineer for approval prior to commencing that Work. Such changes shall not be a basis of claims for extra Work or delay.

- J. Instrumentation, control panels, wiring and all other I&C equipment shall be properly tagged and/or labeled per the requirements of Section 260553.
- K. Installation of the I&C System shall be according to the finalized Loop Drawings

3.4 FACTORY ACCEPTANCE TESTING (FAT)

- A. The IS shall arrange for the manufacturers of the equipment and fabricators of panels and cabinets supplied under this Section to allow the Engineer and Owner to inspect and witness the testing of the equipment at the site of fabrication. Equipment shall include the cabinets, special control systems, and other pertinent systems and devices. A minimum of 10 days notification shall be furnished to the Engineer prior to testing. No shipments shall be made without the Engineer's approval.
- B. For each FAT, the IS shall develop and submit a FAT Plan and Procedure Document within 10 days of the FAT. The FAT Plan and Procedure shall as a minimum shall have the following:
 - 1. Descriptions of test methods to be performed during the FAT.
 - 2. FAT Schedule and Procedure
 - 3. FAT Checklists that allow for sign-off and comments for each test method and procedure.
- C. Control Panel Completion Test Methods: The following test methods should be performed during the FAT for each control panel:
 - 1. Completed Shop Drawings: Demonstrate that the control panel has been built according to the shop drawings and that the shop drawings are accurate.
 - 2. Panel Layout: Demonstrate that the control panel has been laid out as designed and as required by Division 40.
 - 3. Power Distribution: Demonstrate all power distribution circuits, including but not limited to AC power circuits, UPS operation, signals and circuits and DC circuits.
 - 4. Control Circuits: Demonstrate the correct installation of each control circuit. Using a signal generator or multi-meter, show the correct operation of each input, output, relay, barrier, buttons, switches, or any other control device. Demonstrate the proper functionality of any hard-wired interlocks that may be associated with each control circuit.
 - 5. Panel Networking/Communications: If any form of communications is associated with the control panel, verify the proper operation of each communication port and link.
- D. Control Loop Test Methods: In order to demonstrate that the control panel will provide its function as intended, provide the following control loop test methods. If programming for the control panel is provided by others, coordinate with the programmer to have all programming completed and tested prior to the FAT. If needed, coordinate to have the programmer present for the FAT.
 - 1. Alarm Functions: Verify and/or simulate each alarm condition associated with each control loop.
 - 2. Local Manual and Auto Functions: Verify and/or simulate each Local Manual and/or Auto function associated with each control loop.

3. SCADA Manual and Auto Functions: Verify and/or simulate each SCADA Manual and/or Auto function associated with each control loop.
 4. Control Loop Interlocks: Demonstrate the functionality of any software interlocks that may be associated with each control loop.
- E. If the FAT does not pass and needs to be repeated, the IS shall be responsible for additional per diem costs incurred by the Engineer and Owner.
- F. All changes and/or corrections made during the FAT shall be noted on the checklists.
- G. Following completion and approval of all FAT, provide the finalized checklists to the Engineer and as part of the equipment shop drawings.

3.5 FIELD QUALITY CONTROL

- A. Allow for inspections by the Engineer and/or Owner of the I&C System at any time during the construction. Inspections shall be conducted to verify that the installation is per the requirements of the Contract Documents.

3.6 CALIBRATION

- A. Devices provided under Division 40 shall be calibrated according to the manufacturer's recommended procedures to verify operational readiness and ability to meet the indicated functional and tolerance requirements.
- B. Each instrument shall be calibrated at 0, 25, 50, 75, and 100 percent of span using test instruments to simulate inputs. The test instruments shall have accuracies traceable to National Institute of Standards and Testing.
- C. Instruments that have been bench-calibrated shall be examined in the field to determine whether any of the calibrations are in need of adjustment. Such adjustments, if required, shall be made only after consultation with the Engineer.
- D. Instruments which were not bench-calibrated shall be calibrated in the field to ensure proper operation in accordance with the instrument loop diagrams or specification data sheets.
- E. Each analyzer system shall be calibrated and tested as a workable system after installation. Testing procedures shall be directed by the manufacturers' technical representatives. Samples and sample gases shall be furnished by the manufacturers.
- F. For each instrument calibration, provide a calibration sheet and update the corresponding TR20 Instrument Form with the new calibration data. The Calibration sheet shall include the following as a minimum:
1. Date of calibration
 2. Project Name.
 3. Tag Number.
 4. Manufacturer, model and serial number.
 5. Calibration data including range, input, output and measurement at each calibration point.
 6. Space for comments.

7. Space for sign-off by party performing calibration.
- G. A calibration and testing tag shall be attached to each piece of equipment or system at a location determined by the Engineer. The IS shall sign the tag when calibration is complete. The Engineer will sign the tag when the calibration and testing has been accepted.

3.7 LOOP TESTING

- A. Each control loop shall have been installed according to the finalized loop drawing. Prior to the commencement of loop testing, the following pre-requisites should have been met:
 1. All associated equipment, conduit and wire has been permanently installed, terminated and inspected.
 2. All wiring has been properly pulled, terminated and labeled.
 3. Each wire has been tested with a point-to-point test.
 4. All control panels and electrical equipment have been checked out and tested as required by Division 26.
 5. All instrumentation has been appropriately installed and calibrated.
 6. Loop Test Forms for each loop to be tested have been created and will be available during the loop testing.
- B. Each loop test shall have a Loop Test Form prepared and ready prior to each loop test. The loop test form shall have the following:
 1. Loop Number and Description
 2. Check-Off List with room for sign-off and dated by the IS, Programmer, and Owner's Witness as well as room for comments. The list of items to be checked off for each loop should include but is not limited to the following:
 - a. Each power distribution circuit.
 - b. Each control circuit.
 - c. Each alarm circuit.
 - d. Each PLC input/output point.
 - e. Each Local Manual, Local Auto, SCADA Manual & SCADA Auto function.
 - f. Each hard-wired and software interlock.
- C. Upon completion of the above pre-requisites for loop testing, the IS shall oversee and coordinate each loop test. The IS is responsible to be present for all loop testing, whether the equipment was supplied by the IS or not. The IS is responsible to have all responsible parties associated with each loop present. This includes but is not limited to manufacturer representatives, vendor technicians, electrical installers, mechanical installers, and programmer. The IS shall coordinate with the Owner and Engineer to allow for witnessing of loop testing as deemed necessary by the Owner and Engineer.
- D. Issues that arise during loop testing should be addressed and fixed immediately. If it is not feasible to immediately fix the issues, the loop testing should be re-scheduled as soon as possible to avoid delays. Any costs associated with re-testing and requiring all parties to return to the site shall in no way be incurred to the Owner.
- E. Following a successful loop test, the appropriate parties should sign and date the Loop Test Forms. All Forms shall be certified and submitted to the Engineer as part of the O&M Manuals.

- F. Following loop testing, in no way should any parts of the loop be modified. In no way shall any wiring be re-routed or re-terminated. If any such work occurs, all affected loops shall be re-tested at no expense to the Owner.

3.8 COMMISSIONING

- A. The IS shall oversee, coordinate and be present during all commissioning activities. The IS shall be responsible for obtaining the assistance of the Contractor and Subcontractors as may be required for commissioning activities.
- B. Commissioning shall commence after acceptance of wire test, calibration tests and loop tests, and inspections have demonstrated that the instrumentation and control system complies with Contract requirements. Pre-commissioning shall demonstrate proper operation of every system with process equipment operating over full operating ranges under conditions as closely resembling actual operating conditions as possible.
- C. Commissioning and test activities shall follow detailed test procedures and check lists accepted by the Engineer. Test data shall be acquired using equipment as required and shall be recorded on test forms accepted by the Engineer, which include calculated tolerance limits for each step. Completion of system commissioning and test activities shall be documented by a certified report, including test forms with test data entered, delivered to the Engineer with a clear and unequivocal statement that system commissioning and test requirements have been satisfied.
- D. Where feasible, system commissioning activities shall include the use of water to establish service conditions that simulate, to the greatest extent possible, normal final control element operating conditions in terms of applied process loads, operating ranges, and environmental conditions. Final control elements, control panels, and ancillary equipment shall be tested under startup and steady state operating conditions to verify that proper and stable control is achieved using motor control center and local field mounted control circuits. Hardwired and software control circuit interlocks and alarms shall be operational. The control of final control elements and ancillary equipment shall be tested using both manual and automatic (where provided) control circuits. The stable steady state operation of final control elements running under the control of field mounted automatic analog controllers or software-based controllers shall be assured by adjusting the controllers as required to eliminate oscillatory final control element operation. The transient stability of final control elements operating under the control of field mounted, and software-based automatic analog controllers shall be verified by applying control signal disturbances, monitoring the amplitude and decay rate of control parameter oscillations (if any), and making necessary controller adjustments as required to eliminate excessive oscillatory amplitudes and decay rates.
- E. Electronic control stations incorporating proportional, integral or differential control circuits shall be optimally tuned, experimentally, by applying control signal disturbances and adjusting the gain, reset, or rate settings as required to achieve a proper response. Measured final control element variable position/speed setpoint settings shall be compared to measured final control element position/speed values at 0, 25, 50, 75, and 100 percent of span and the results checked against indicated accuracy tolerances.

3.9 TRAINING

- A. Provide training in accordance with Section 260000.
- B. Develop a Training Plan for the training requirements of Division 40 and submit it to the Engineer for approval. Coordinate with the Engineer and Owner the time and locations of each training session. Schedule the trainings for after the equipment has been pre-commissioned.
- C. As part of the Training Plan, submit a résumé for each individual to be providing training. Training shall be performed by qualified representatives of the equipment manufacturers and shall be specific to each piece of equipment.
- D. Each training session shall include a written agenda.
- E. The Contractor shall train the Owner's personnel on the maintenance, calibration and repair of instruments provided.
- F. Within 10 days after the completion of each session, the Contractor shall submit the following:
 - 1. A list of Owner personnel who attended the training.
 - 2. A copy of the training materials used during the session with notes, diagrams and comments.

END OF SECTION 260000

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control test reports.

1.4 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 NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. All conductors, conductor insulation and multiconductor cables shall comply with NEMA WC 70.
- B. Wire sizes shall be American Wire Gauge (AWG) sizes with Class B stranded construction. Number 2 AWG and smaller shall be factory color coded with a separate color for each phase and neutral, which shall be used consistently throughout the system. Larger cables shall be coded by the use of colored tape. Conductors #6 AWG or smaller shall be THWN-2 or XHHW-2. Number 4 and larger shall be XHHW-2.
- C. Individual or multiple conductor cables for power, control, and alarm circuits of 480 volts or less shall be insulated for not less than 600V.

- D. Where wire size is not indicated, they shall be of the size required by the NEC, except that no wire external to panels and motor control centers shall be less than #12 AWG, unless specifically noted on the Plans. Control wires shall be allowed to be #14 so long as there is appropriate protection (fuse or circuit breaker sized at 15A or less).
- E. Multi-conductor tray cables shall be rated 600 volts, listed by UL as Type TC cable or ITC for instrumentation cable only per Article 340 of the NEC. The individual conductors shall be UL listed as Type XHHW, with a sunlight-resistant overall jacket. Conductor sizes shall be the same as for power and lighting wire and control wire above. Connectors/Terminators shall be watertight and manufactured of the same material as the cabling system referenced elsewhere in division 26.
- F. Multi-conductor tray cables to be installed in classified areas shall be armored, rated 600 volts, listed by UL as Type MC-HL cable per Article 340 of the NEC. The individual conductors shall be UL listed as Type XHHW, with a sunlight-resistant overall jacket. Conductor sizes shall be the same as for power and lighting wire and control wire above. Connectors/terminators shall be rated for classified areas and submitted upon accordingly.
- G. All wiring shall be as indicated on the Plans. Wires shall be new and shall be soft drawn copper with not less than 97 percent conductivity. The wire and cable shall have size, grade of insulation, voltage, and manufacturer's name permanently marked on the outer covering at not more than 2-foot intervals. All wires shall conform to the latest Standards of the ASTM, and ICEA, and shall be tested for their full length by these Standards. Insulation thickness shall be not less than that specified by the National Electrical Code.
- H. VFD Cable:
 - 1. Comply with UL 1277, UL 1685, and NFPA 70 for Type TC-ER cable.
 - 2. Type TC-ER with oversized crosslinked polyethylene insulation, spiral-wrapped foil plus 85 percent coverage braided shields and insulated full-size ground wire, and sunlight- and oil-resistant outer PVC jacket.
 - 3. Comply with UL requirements for cables in direct burial or Classes I and II, Division 2 hazardous location applications.
- I. The following table describes the conductor color code that shall be followed:

	120/208VAC	480VAC	12VDC	24VDC	24VAC
Phase 1	Black	Brown			
Phase 2	Red	Orange			
Phase 3	Blue	Yellow			
Neutrals/Commons	White	White	Orange/White	Blue/White	Yellow/White
Ground	Green	Green	Green	Green	Green
Control	Red		Orange	Blue	Yellow

- J. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. American Insulated Wire Corporation
 - 2. Cablec Corporation

3. Okonite Company
4. Southwire Company
5. Or Approved Equal

2.2 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.
- B. Connectors and splices shall be rated at not less than 600 volts. Splicing shall join conductors mechanically and electrically to provide a complete circuit prior to installation of insulation.
- C. Splices in wires No. 10 AWG and smaller shall be made with an insulated, solderless, pressure type connector, Type I, Class 1, Grade B, Style G, or Type II, Class 1 of FS W-S-610 and conforming to the applicable requirements of UL 486A.
- D. Splices in wires No. 8 AWG and larger shall be made with noninsulated, solderless, pressure type connector, Type II, Class 2 of FS W-S-610, conforming to the applicable requirements of UL 486A and UL 486B. They shall then be covered with an insulation and jacket material equivalent to the conductor insulation and jacket.
- E. Insulated conductor splices below grade or in wet locations shall be sealed type conforming to ANSI C119.1 or shall be waterproofed by a sealant-filled, thick wall, heat shrinkable, thermosetting tubing or by pouring a thermosetting resin into a mold that surrounds the joined conductors.
- F. Bare conductor splices in wet locations or below grade shall be of the exothermic type.
- G. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Hubbell Power Systems, Inc.
 2. O-Z/Gedney; EGS Electrical Group LLC.
 3. 3M; Electrical Products Division.
 4. Or Approved Equal

2.3 PULLING LUBRICANT

- A. All cables shall be properly coated with a water-based (wax-based is not acceptable) pulling compound before being pulled into conduits so as to prevent mechanical damage to the cables during installation. Lubricants shall be approved by the cable manufacturer for use with the cable being installed.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Polywater
 2. Ideal Aqua-Gel
 3. Or Approved Equal

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Stranded for all sizes.
- B. Branch Circuits: Copper. Stranded for all sizes.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type XHHW-2, single conductors in raceway
- B. Exposed Feeders and Branch Circuits: Type THWN-2 or XHHW-2 based on wire size requirements described in Part 2, single conductors in raceway. Multiconductor Tray Cable type TC shall be used where runs are to be in cable trays as shown on the drawings.
- C. Feeders and Branch Circuits Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THWN-2 or XHHW-2 based on wire size requirements described in Part 2, single conductors in raceway. Metal-clad cable, Type MC shall be allowed in ceilings that are considered dry and non-corrosive areas.
- D. Feeders and Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THWN-2 or XHHW-2 based on wire size requirements described in Part 2, single conductors in raceway.
- E. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- F. Class 1 Control Circuits: Type THWN-2, in raceway. Multiconductor Tray Cable type TC shall be used where runs are to be in cable trays as shown on the drawings.
- G. Class 2 Control Circuits: Type THWN-2, in raceway. Power-limited tray cable shall be used where runs are to be in cable tray as shown on the drawings.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. As far as practical, all circuits shall be continuous from origin to termination without splices in intermediate pull boxes. Sufficient slack shall be left at the termination to make proper connections. In no case shall a splice be pulled into the conduit. Conductor splicing shall not be permitted without the Engineer's approval. Conductor splices shall not be made in underground junction boxes or manholes unless specifically noted on the plans.
- C. Each feeder and branch circuit shall be installed in its own individual conduit unless combining feeder and branch circuits is permitted as defined in the following:
 - 1. As specifically indicated on the Plans.

2. For lighting, multiple branch circuits may be installed in a conduit as allowed by the NEC and with the wire ampacity de-rated in accordance with the requirements of the NEC. Conduit fill shall not exceed the limits established by the NEC.
 3. When field conditions dictate, and written permission is obtained from the Engineer.
- D. Use manufacturer-approved pulling compound or lubricant when pulling conductors; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
 - E. Feeder and branch circuits shall be isolated from each other and from all instrumentation and control circuits.
 - F. Control circuits shall be isolated from all other feeder, branch and instrumentation circuits, except as noted above. 12VDC, 24VDC and 48VDC control circuits may be combined into one conduit. 120/208/240VAC control circuits shall be isolated from all DC control circuits. 277/480VAC circuits shall be isolated from all other voltages.
 - G. Single conductor cable in cable trays shall be No. 1/0 or larger and shall be of a type listed and marked for use in cable trays. Tray cable smaller than 1/0 shall be multi-conductor, with outer jacket.
 - H. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
 - I. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.
 - J. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."
 - K. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
 - L. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
 - M. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
 - N. Wiring at Outlets and Switches: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.
- 3.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS
- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.5 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
 - a. All conductors with voltages at 277V or higher and corresponding neutrals and grounds.
 - b. All conductors #8 and larger.
 - c. All motor leads and corresponding grounds.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
 - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
 - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
 - 1. Test procedures used.
 - 2. Test results that comply with requirements.
 - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Instrumentation cabling.
2. Low-voltage control cabling.
3. Control-circuit conductors.
4. Identification products.

B. Related Sections

1. For structured cabling systems, including fiber optic cabling and CAT6 cabling refer to Section 409533.

1.2 DEFINITIONS

- ##### A. Low Voltage:
- As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.

1.3 ACTION SUBMITTALS

- ##### A. Product Data:
- For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

- ##### A. Field quality-control reports.

1.5 QUALITY ASSURANCE

- ##### A. Testing Agency Qualifications:
- Member company of an NRTL.

- ##### B. Surface-Burning Characteristics:
- As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

- ##### C. 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.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
- B. Test each pair of each cable for open and short circuits.

PART 2 - PRODUCTS

2.1 PATHWAYS

- A. Conduit and Boxes: Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems."
 - 1. Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

2.2 INSTRUMENTATION CABLE

- A. Instrument cable shall be Type TC, and have the number of individually shielded twisted pairs indicated on the Plans and shall be insulated for not less than 600 volts. Unless otherwise indicated, conductor size shall be No. 18 AWG minimum. Shielded, grounded instrumentation cable shall be used for all analog and low voltage digital signals.
- B. The jacket shall be flame retardant with 90 degrees C temperature rating. The cable shield shall be a minimum of 2.3 mil aluminum or copper tape overlapped to provide 100 percent coverage and a tinned copper drain wire.
- C. The conductors shall be bare soft annealed copper, Class B, 7 strand minimum concentric lay with 15 mils nominal thickness, nylon jacket, 4 mil nominal thickness, 90 degrees C temperature rating. One conductor within each pair shall be numerically identified.
- D. Pairs shall be assembled with a nominal 2-inch lay and shall then be group shielded with a minimum of 1.3 mil aluminum or copper tape overlapped to provide 100 percent coverage. All group shields shall be completely isolated from each other.
- E. Pairs installed in a cable tray shall have a UV resistant jacket, and shall have a jacket intended for cable tray use.

2.3 RS-232 CABLE

- A. Standard Cable: NFPA 70, Type CM.
 - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - 2. Polypropylene insulation.
 - 3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - 4. PVC jacket.
 - 5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
 - 6. Flame Resistance: Comply with UL 1581.

- B. Plenum-Rated Cable: NFPA 70, Type CMP.
 - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - 2. Plastic insulation.
 - 3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
 - 4. Plastic jacket.
 - 5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
 - 6. Flame Resistance: Comply with NFPA 262.

2.4 RS-485 CABLE

- A. Standard Cable: NFPA 70, Type CM.
 - 1. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - 2. PVC insulation.
 - 3. Unshielded.
 - 4. PVC jacket.
 - 5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated Cable: NFPA 70, Type CMP.
 - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
 - 2. Fluorinated ethylene propylene insulation.
 - 3. Unshielded.
 - 4. Fluorinated ethylene propylene jacket.
 - 5. Flame Resistance: NFPA 262, Flame Test.

2.5 LOW-VOLTAGE CONTROL CABLE

- A. Paired Cable: NFPA 70, Type CMG.
 - 1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
 - 2. PVC insulation.
 - 3. Unshielded.
 - 4. PVC jacket.
 - 5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
 - 1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
 - 2. PVC insulation.
 - 3. Unshielded.
 - 4. PVC jacket.
 - 5. Flame Resistance: Comply with NFPA 262.
- C. Paired Cable: NFPA 70, Type CMG.
 - 1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.

2. PVC insulation.
3. Unshielded.
4. PVC jacket.
5. Flame Resistance: Comply with UL 1581.

D. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.

1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
2. Fluorinated ethylene propylene insulation.
3. Unshielded.
4. Plastic jacket.
5. Flame Resistance: NFPA 262, Flame Test.

2.6 CONTROL-CIRCUIT CONDUCTORS

- A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway, complying with UL 83.
- B. Class 2 Control Circuits: Stranded copper, Type THHN-THWN, in raceway, complying with UL 83.
- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF, complying with UL 83.

2.7 IDENTIFICATION PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Brady Corporation.
 2. Panduit Corp.
 3. Or Approved Equal.
- B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- C. Comply with requirements in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 INSTALLATION OF PATHWAYS

- A. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- B. Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems" for installation of conduits and wireways.

- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Pathway Installation in Equipment Rooms:
 1. Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed or in the corner of room if multiple sheets of plywood are installed around perimeter walls of room.
 2. Install cable trays to route cables if conduits cannot be located in these positions.
 3. Secure conduits to backboard if entering room from overhead.
 4. Extend conduits 3 inches above finished floor.
 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.
- E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
 1. Comply with TIA/EIA-568-B.1.
 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
 5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
 6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
 7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
 8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- C. Installation of Control-Circuit Conductors:
 1. Install wiring in raceways. Comply with requirements specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Open-Cable Installation:
 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 12 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 24 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 48 inches.
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 6 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
 - a. Electrical Equipment Rating Less Than 2 kVA: 3 inches.
 - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
 - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
5. Separation between Cables and Electrical Motors and Transformers: A minimum of 48 inches.
6. Separation between Cables and Fluorescent Fixtures: A minimum of 6 inches.

3.3 REMOVAL OF CONDUCTORS AND CABLES

- A. Remove abandoned conductors and cables.

3.4 CONTROL-CIRCUIT CONDUCTORS

A. Minimum Conductor Sizes:

1. Class 1 remote-control and signal circuits, No. 14 AWG.
2. Class 2 low-energy, remote-control, and signal circuits, No. 16 AWG.
3. Class 3 low-energy, remote-control, alarm, and signal circuits, No 12 AWG.

3.5 FIRESTOPPING

- A. Comply with requirements in Section 078413 "Penetration Firestopping."
- B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."
- C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.6 GROUNDING

- A. For data communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. For low-voltage wiring and cabling, comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.7 IDENTIFICATION

- A. Identify system components, wiring, and cabling according to TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
- B. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- C. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

END OF SECTION 260523

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Grounding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Tinned-copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Stranded Conductors: ASTM B 8.
 - 2. Tinned Conductors: ASTM B 33.
 - 3. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
 - 4. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 5. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
 - 6. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad; 3/4 inch in diameter and 10 feet long.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install stranded conductors all conductor sizes.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor, No. 4/0 AWG minimum. Bury at least 24 inches below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded or approved compression connectors except at test wells and as otherwise indicated.
 - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
 - 4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.

4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.
 7. Armored and metal-clad cable runs.
 8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
 9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
 10. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
 2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch grounding bus.
 3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- E. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.

2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems", and shall be at least 12 inches deep, with cover.
1. Test Wells: Install at least two test wells for each service unless otherwise indicated. Install at the ground rods electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 LABELING

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems" for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer.
1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
 - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
 - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
 - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Make tests at ground rods before any conductors are connected.

- B. Report measured ground resistances that exceed the following values:
 - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
 - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
 - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
 - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).

- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Engineer promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.2 PERFORMANCE 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, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

1.3 ACTION SUBMITTALS

- A. Product Data: For steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
 - 1. Trapeze hangers. Include Product Data for components.
 - 2. Steel slotted channel systems. Include Product Data for components.
 - 3. Equipment supports.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 2. 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.
 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 6. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. 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. Body shall be malleable iron.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) MKT Fastening, LLC.
 - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
- a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) Hilti Inc.
 - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 5) MKT Fastening, LLC.
- 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

- 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 EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.

7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base.
 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.5 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 (0.05 mm).
- B. Touchup: Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" 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 paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Furnish and install conduits as required, and as shown on the Plans. Materials employed shall be as shown on the Plans.

1.2 SUBMITTALS

- A. Submit product literature including manufacturer part number, model number, material, size, and specifications. Material shall not be installed until the Engineer has reviewed the submittal data.
- B. If changes from the Plan are proposed, shop drawings shall be submitted for review and acceptance showing routing, conduit size, and number and size of wires in each conduit before installation of conduit and any related work.
- C. Proposed routing of conduits buried under floor slabs-on-grade.
- D. Identify conduit by tag number of equipment served or by circuit schedule number.
- E. Proposed routing and details of construction including conduit and rebar embedded in floor slabs, columns, etc.
- F. Proposed location and details of construction for openings in slabs and walls for raceway runs.
- G. Refer to Section 26000 "General Electrical Requirements" for further submittal requirements.

1.3 REFERENCES

- A. American National Standards Institute (ANSI): C80.1, Rigid Steel Conduit - Zinc-Coated.
- B. National Electric Manufacturers Association (NEMA): RN-1, Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit.
- C. Underwriters Laboratories Inc. (UL):
 - 1. 1, Flexible Metal Conduit.
 - 2. 6, Rigid Metal Conduit.
 - 3. 360, Liquid-Tight Flexible Steel Conduit.
 - 4. 467, Grounding and Bonding Equipment.
 - 5. 514, Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers.
 - 6. 651, Schedule 40 and 80 Rigid PVC Conduit.
 - 7. 870, Wireways, Auxiliary Gutters, and Associated Fittings.
 - 8. 884, Underfloor Raceways and Fittings.
 - 9. 886, Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

PART 2 - PRODUCTS

2.1 RACEWAYS

- A. Exposed conduits in an unclassified or non-hazardous area shall be Galvanized Rigid Steel (GRS) unless specifically indicated otherwise on the Plans. Conduits in corrosive, hazardous, or damp areas shall be PVC coated GRS unless otherwise indicated. Underground and/or concrete encased conduits shall be PVC, unless otherwise indicated. All conduits concealed in block walls or steel framing shall be EMT with compression fittings unless otherwise indicated. Set screw type fittings in EMT conduit will not be accepted. All wiring, except as otherwise noted, shall be in conduit. Conduit size shall not be less than the National Electrical Code (NEC) size required for the conductors therein and shall not be smaller than 3/4-inch. No underground conduit shall be less than one inch.
- B. Condulets type fittings shall be Crouse-Hinds, Appleton, or equal with wedge nut covers. All condulets located outdoors, damp or wet locations shall be weather tight.
- C. In unclassified areas, flexible conduit shall be grounding type, weatherproof, corrosion resistant, and watertight.
- D. Couplings, connectors, and fittings shall be standard types specifically designed and manufactured for the purpose. They shall be installed to provide a firm mechanical assembly and electrical conductivity throughout. Conduit systems shall be water tight.
- E. Expansion fittings shall be OZ type AX with jumper for exposed locations and type DX at structural expansion joints, Spring City, or equal. Conduits shall have expansion fittings in accordance with NEC.
- F. The conduits and fittings shall be supported per NEC requirements as a minimum.
- G. Sealing fittings shall be provided for classified areas per the NEC requirements in hazardous or corrosive areas. Fittings shall be poured after the final walk-thru unless otherwise directed in writing by the engineer.

2.2 GALVANIZED RIGID STEEL (GRS)

- A. Conduits and couplings shall be hot-dipped galvanized with zinc coated threads and outer coating of zinc bichromate, in accordance with ANSI C80.1 standards, as manufactured by Jones & Laughlin Steel Corporation, Allied Tube & Conduit Corporation, Triangle PWC, or equal.
- B. Steel conduit shall not be buried in earth without concrete encasement and additional corrosion protection. Instead buried steel conduit shall be PVC coated.

2.3 PVC COATED GALVANIZED RIGID STEEL (PVC-GRS)

- A. PVC coated GRS conduit shall be installed where shown on the Plans or elsewhere specified and shall conform to NEMA RN-1 and ANSI C80.1 standards.

- B. The zinc surface of the conduit shall remain intact and undisturbed on both the inside and the outside of the conduit throughout the preparation and application processing. A Polyvinyl Chloride (PVC) coating shall be bonded to the galvanized outer surface of the conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of 0.040-inch (40 mil).
- C. A loose coupling shall be furnished with each length of conduit. A PVC coating shall be bonded to the outer surface of the coupling and a PVC sleeve equal to the outside diameter of the uncoated conduit shall extend beyond both ends of the coupling approximately one pipe diameter or 1-1/2 inches, whichever is smaller. The wall thickness of the coating on the coupling and the sleeve shall be a minimum of 0.055-inch (55 mil).
- D. A PVC coating shall be bonded to the inner and outer surface of all conduit bodies and fittings and a PVC sleeve shall extend from all hubs. The wall thickness of the coating on conduit bodies and fittings and the sleeve walls shall be identical to those on couplings in length and thickness. The covers on all conduit bodies shall be coated on both sides and shall be designed to be completely interchangeable. The inside of conduit bodies shall remain undisturbed in the processing.
- E. Type 304 stainless steel screws shall be furnished and used to attach the cover to the conduit body. All coated material shall be installed and patched according to the manufacturer's recommended installation and patching instructions.
- F. Conduit straps shall be PVC coated or stainless steel.
- G. PVC coated conduits and fittings shall be as manufactured by Kor Kap Corporation, Occidental Coating Company, Rob-Roy, or equal.
- H. PVC coated flexible conduits shall be liquid and vapor-tight and manufactured in accordance with UL 360 standards.

2.4 RIGID NONMETALLIC – PVC

- A. Where specifically indicated on the Plans, or elsewhere specified, conduit may be high density Schedule 40, 90 degrees C, heavy-duty PVC. The conduit shall be manufactured from virgin polyvinyl chloride compound which meets ASTM D1784, NEMA TC-2, ANSI C33.91, and UL 651 standards. Smoke emissions shall be limited to less than 6 grams per 100 grams of material tested.
- B. Where conduit concrete encasement is indicated on the Plans, conduit supports shall be installed at five-foot intervals. PVC conduit shall be manufactured by Carlon, Triangle Conduit & Cable, or equal.

2.5 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Liquidtight flexible metal conduit shall be liquid and vapor-tight, oil and ultraviolet ray resistant and manufactured in accordance with UL 360 standards. Liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, galvanized steel core with an extruded PVC jacket. The PVC jacket shall be rated for high ambient heat applications, 90 degrees Celsius.

- B. For corrosive locations, liquidtight flexible metal conduit shall be formed of a continuous, spiral wound, aluminum core with an extruded PVC jacket. The PVC jacket shall be impervious to corrosive liquids and vapors and PVC coated fittings shall be utilized.
- C. An external bonding conductor shall be required for flexible conduit connections containing circuits rated at 60 amps or greater and for sizes 1 1/2 " or larger. Flexible conduits and connectors for 1 1/4 " and smaller shall be listed for grounding.
- D. For non-corrosive locations, connectors for liquidtight flexible conduit shall be galvanized, furnished with a sealing ring and locknut, and suitable for wet locations. For corrosive locations, connectors shall be galvanized PVC coated.

2.6 ELECTRICAL METALLIC TUBING (EMT)

- A. Per UL Standard for Electrical Metallic Tubing No. 797. Galvanized mild steel with interior coat of enamel.
- B. Fittings shall be steel set-screw type. Cast type, indenter type or compression steel fittings are not acceptable.
- C. Approved for plan specified locations only. Approved for conduits concealed in block walls and concealed in steel framed walls. Not approved for process areas where wash down or high humidity conditions exist.

2.7 ALUMINUM CONDUIT

- A. Aluminum conduit is approved for wet and corrosive areas only. Prior approval from the engineer must be obtained when substituting for PVC coated.
- B. Aluminum hardware and conduit shall be isolated from all dissimilar materials as appropriate.
 1. Isolation from dissimilar metals in channel or support by a single layer of scotch #33+ or approved equal.
 2. Isolation from concrete shall be by neoprene gaskets.
 3. Aluminum shall not be used for concrete penetrations.
- C. Aluminum conduit shall contain less than 0.4% copper.

2.8 STAINLESS STEEL CONDUIT

- A. Stainless Steel Conduit conduit is approved for all exposed conduit locations. Prior approval from the engineer must be obtained when substituting for PVC coated.
- B. Stainless Steel conduit and all fittings and support hardware shall be 316 SS.

2.9 CABLE TRAY SYSTEM

- A. Provide cable tray systems composed of straight sections, fittings, and accessories as defined in the latest NEMA Standards publication VE-1 - Ventilated Cable Tray.
1. Provide cable trays and fittings shall constructed of materials suited for the area classification as noted below.
 2. Provide cable trays shall be of the ladder type with availability of 6, 9, and 12-inch spacing.
 3. Provide tray sizes with a 3, 4, 5, or 6-inch minimum usable load depth, as indicated on the drawings.
 4. Provide loading capacities that meet the NEMA weight classification with a safety factor of 1.5.
 5. In corrosive, damp, or Hazardous locations, provide cable trays manufactured of aluminum.
 6. In non-classified areas provide cable trays manufactured of Hot Dipped galvanized materials. All cuts and welds shall be touched up with cold galvanizing spray per the raceway specification.
 7. Separate power, control, signal and communications cables by grounded metallic dividers or run in separate trays.
 8. Manufacturer, or Approved Equal
 - a. Husky
 - b. B-Line
 - c. T.J. Cope

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Conduit runs are schematic only, and shall be modified as required to suit field conditions, subject to review and acceptance by the Engineer.
- B. Conduit shall run continuously between outlets and shall be provided with junction boxes where connections are made. Couplings, connectors, and fittings shall be acceptable types designed and manufactured for the purpose, and shall provide a firm mechanical assembly, and electrical conductivity throughout.
- C. Conduit runs shall be straight and true. Elbows, offsets, and bends shall be uniform and symmetrical. Changes in direction shall be made with long radius bends, or with fittings of the conduit type.
- D. Conduit runs in buildings and structures shall be concealed where possible except as specifically noted, or accepted by the Engineer.
- E. Conduit runs shall not interfere with the proper and safe operation of equipment, and shall not block or interfere with ingress or egress, including equipment removal hatches.
- F. Exposed conduits shall be securely fastened with clamps, or straps, intended for conduit use. All exposed conduit shall be run on the walls and ceiling only and shall be parallel to the planes of

the walls or ceiling. No diagonal runs will be permitted. Flexible conduit shall be used only for short lengths required to facilitate connections between rigid conduit to vibrating equipment such as motors, fans, and transformers. The maximum length of flexible conduit shall be 3 feet, unless approved in writing by engineer. Flexible conduit shall not be used for electrician's convenience where rigid conduit could be used.

- G. Conduit runs on water-bearing walls shall be supported one inch away from the wall on an accepted channel. When channel galvanizing, or other coating, is cut or otherwise damaged, it shall be field coated to original condition. No conduit shall be run in water-bearing walls, unless specifically designated otherwise.
- H. Conduit shall be thoroughly reamed to remove burrs. IMC or GRS shall be reamed during the threading process, and Rigid Nonmetallic PVC shall be reamed before applying fittings. A zinc rich cold galvanizing shall be used to restore corrosion protection on field cut threads.
- I. Bushings and lock nuts or hubs shall be used at conduit terminations. Conduit, bushings, locknuts, and enclosures shall be fastened to the conduit system prior to pulling wire. Splitting the bushings for installation will not be accepted. Hubs shall be used in all process areas outside of electrical rooms unless otherwise specified. The total number of bends in any run between pull points shall not exceed 360 degrees. Junction boxes and pull boxes shall be installed at points acceptable to the Engineer. Conduit ends shall be plugged to prevent the entrance of moisture or debris during construction. All spare conduits shall be adequately capped and shall contain a suitable pull string. Splices shall be made in junction boxes only. Splices in conduit bodies will not be accepted.
- J. Joints shall be set up tight. Hangers and fastenings shall be secure, and of a type appropriate in design, and dimensions, for the particular application.
- K. Conduit runs shall be cleaned and internally sized (obstruction tested) so that no foreign objects, or obstructions remain in the conduit prior to pulling in conductors.
- L. After installation of complete conduit runs 2 inches and larger, conduits shall be snaked with a conduit cleaner equipped with a cylindrical mandrel of a diameter not less than 85 percent of the nominal diameter of the conduit. Conduits through which the mandrel will not pass shall not be used. Test results should be submitted to the engineer.
- M. Expansion fittings shall be installed across all expansion joints and at other locations where necessary to compensate for thermal expansion and contraction.
- N. Provide trenching, backfill, and compaction for conduits installed underground.
- O. Raceways running parallel to hot water or steam piping shall maintain a distance of 6 inches from the piping.
- P. Raceways crossing steam or liquid filling piping shall cross above the piping.
- Q. In slab conduits, shall be covered by a minimum of 2 inches of concrete.
- R. Conduits of the same duty (480V Power, 120V Power, 120V Controls and signals) shall have a minimum separation of 2 inches between conduits.

- S. Conduits and raceways carrying signal wiring shall have a minimum separation of 12 inches from 480V power raceways, 6 inches from 120V power raceways, and 4 inches from 120V control raceways.
- T. Raceways with 120V Control shall maintain a distance of 12 inches from 480V power raceways, 6 inches from 120V power raceways.
- U. Raceways with 120V power shall maintain a distance of 6 inches from 480V power raceways.

3.2 CABLE TRAYS

- A. Provide cable trays in strict accordance with the manufacturer's printed instructions.
- B. Allowable cable fill areas shall meet NEC Article 392 - Cable Trays requirements.
- C. Verify cable tray fills prior to installation based on cables and trays actually provided.
- D. Maintain continuous grounding of cable trays including bonding jumpers in accordance with the requirements of NEC Article 392.
- E. Install cable trays using hangers and supports on 8-foot centers, maximum.
- F. Install cable trays to walls as the primary method of support where possible.
- G. If support from the ceiling is the only alternative, use hangers and supports on 6-foot centers, maximum.
- H. Ensure that proper separation between duties as detailed in 3.1.

END OF SECTION 260533

SECTION 260534 - ENCLOSURES

PART 1 – GENERAL

1.1 SCOPE OF WORK

- A. This specification includes enclosures to house electrical controls, instruments, terminal blocks, and serve as junction boxes where shown on the Drawings.

1.2 RELATED SECTIONS

- A. For Raceways and Boxes for Electrical Systems see Section 260533 “Raceways and Boxes for Electrical Systems”.

1.3 SUBMITTALS

- A. Products shall be submitted in accordance with Section 26000 “General Electrical Requirements”, and elsewhere in the Contract Documents, prior to installation.

1.4 MANUFACTURERS

- A. Enclosures shall be manufactured by Hoffman, Rittal, or equal.

PART 2 - PRODUCTS

2.1 STEEL

- A. Enclosures shall be fabricated from 14-gauge steel with seams that are continuously welded. Doors shall have full length piano hinges with the door removable by pulling the hinge pin.
- B. A rolled lip shall be provided around three sides of the door and around all sides of the enclosure opening. The gasket shall be attached with oil-resistant adhesive and held in place with steel retaining strips. Exterior hardware, such as clamps, screws, and hinge pins, shall be of stainless steel for outdoor installations. A hasp and staple shall be provided for padlocking. Each enclosure shall have a print pocket. All wires entering or leaving the enclosure shall terminate on terminal strips. All wires and terminals shall be clearly identified as specified elsewhere in these specifications.
- C. Finish shall be white enamel interior, light gray enamel, ANSI 61 exterior, over phosphatized surfaces. Special finishes and colors shall be furnished for wet locations. Plans should be checked for special conditions.

2.2 NEMA RATING

- A. Unless otherwise indicated on the Plans, enclosures shall be NEMA 12 for indoors, NEMA 4X for corrosive areas, and NEMA 4 for outdoor installations. NEMA 4X enclosures shall be stainless steel, unless noted otherwise. NEMA 4X enclosures shall also be used in wet, or wash down areas.
- B. All enclosures used in classified areas shall be NEMA 7.
- C. In Waste Water facilities, all enclosures in process areas shall be NEMA 4X stainless steel. Enclosures in electrical rooms, meeting rooms, offices and shops shall be NEMA 12 unless otherwise specified.
- D. Areas not specified in Water Treatment, Wastewater, or other water related facilities shall be approved by the engineer for NEMA type prior to installation.

2.3 FIBERGLASS

- A. Enclosures shall be heavy-duty, compression molded, fiberglass reinforced polyester, high impact, heat resistant, NEMA 4X.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Enclosures shall be installed as indicated on the Plans, and according to manufacturer's instructions.
- B. Enclosures shall be properly grounded, and shall include ground straps connected to hinged doors and accessories.

END OF SECTION 260534

SECTION 260543 – UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduit, ducts, and duct accessories for concrete-encased duct banks.
2. Handholes and boxes.
3. Manholes.

B. Related Requirements:

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

1.2 ACTION SUBMITTALS

A. Product Data: For accessories for handholes and boxes.

B. Shop Drawings for Factory-Fabricated Handholes and Boxes: Include dimensioned plans, sections, elevations, and fabrication and installation details, including the following:

1. Duct entry provisions, including locations and duct sizes.
2. Cover design.
3. Grounding details.
4. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.4 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Rigid Steel Conduit: Galvanized. Comply with ANSI C80.1.

- B. RNC: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

2.2 NONMETALLIC DUCTS AND DUCT ACCESSORIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ARNCO Corp.
2. Beck Manufacturing.
3. Cantex, Inc.
4. CertainTeed Corp.; Pipe & Plastics Group.
5. Condux International, Inc.
6. ElecSys, Inc.
7. Electri-Flex Company.
8. IPEX Inc.
9. Lamson & Sessions; Carlon Electrical Products.
10. Manhattan/CDT; a division of Cable Design Technologies.
11. Spiraduct/AFC Cable Systems, Inc.

- B. Underground Plastic Utilities Duct: NEMA TC 2, Type EPC-40-PVC, UL 651, with matching fittings by the same manufacturer as the conduit, complying with NEMA TC 3 and UL 514B.

- C. Duct Accessories:

1. Duct Separators: Factory-fabricated rigid PVC interlocking spacers, sized for type and sizes of ducts with which used, and selected to provide minimum duct spacings indicated while supporting ducts during concreting or backfilling.
2. Warning Tape: Underground-line warning tape specified in Section 260553 "Identification for Electrical Systems."
3. Concrete Warning Planks: Nominal 12 by 24 by 3 inches (300 by 600 by 76 mm) in size, manufactured from 6000-psi (41-MPa) concrete.
 - a. Color: Red dye added to concrete during batching.
 - b. Mark each plank with "ELECTRIC" in 2-inch- (50-mm-) high, 3/8-inch- (10-mm-) deep letters.

2.3 HANDHOLES AND BOXES

- A. Description: Comply with SCTE 77.

1. Color: Gray or Green, depending on location.
2. Configuration: Units shall be designed for flush burial and have open bottom, unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.
4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
5. Cover Legend: Molded lettering, "ELECTRIC."

6. Handholes 12 inches wide by 24 inches long and larger shall have inserts for cable racks and pulling-in irons installed before concrete is poured.
- B. Fiberglass Handholes and Boxes with Polymer Concrete Frame and Cover: Sheet-molded, fiberglass-reinforced, polyester resin enclosure joined to polymer concrete top ring or frame.
1. Basis-of-Design Product: Subject to compliance with requirements, provide the product indicated on Drawings or a comparable product by one of the following:
 - a. Armorcast Products Company.
 - b. Carson Industries LLC.
 - c. Christy Concrete Products.
 - d. Synertech Moulded Products, Inc.; a division of Oldcastle Precast.

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Excavation and Backfill: Comply with Section 312000 "General Earthwork," but do not use heavy-duty, hydraulic-operated, compaction equipment.
- B. Restore surface features at areas disturbed by excavation and reestablish original grades, unless otherwise indicated. Replace removed sod immediately after backfilling is completed.
- C. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work. Resto-vegetation and include necessary top-soiling, fertilizing, liming, seeding, sodding, sprigging, and mulching. Comply with Section 329200 "Turf and Grasses" and Section 329300 "Plants and Planting."
- D. Cut and patch existing pavement in the path of underground ducts and utility structures.

3.2 DUCT INSTALLATION

- A. Slope: Pitch ducts a minimum slope of 1:300 down toward handholes and away from buildings and equipment.
- B. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of 48 inches, both horizontally and vertically, at other locations, unless otherwise indicated.
- C. Joints: Use solvent-cemented joints in ducts and fittings and make watertight according to manufacturer's written instructions. Stagger couplings so those of adjacent ducts do not lie in same plane.
- D. Duct Entrances to Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 10 inches (250 mm) o.c. for 5-inch (125-mm) ducts, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell without reducing duct line slope and without forming a trap in the line.
 2. Direct-Buried Duct Banks: Install an expansion and deflection fitting in each conduit in the area of disturbed earth adjacent to handhole.
 3. Grout end bells into structure walls from both sides to provide watertight entrances.
- E. Building Wall Penetrations: Make a transition from underground duct to rigid steel conduit at least 10 feet (3 m) outside the building wall without reducing duct line slope away from the building, and without forming a trap in the line. Use fittings manufactured for duct-to-conduit transition. Install conduit penetrations of building walls as specified in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."
- F. Sealing: Provide temporary closure at terminations of ducts that have cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.
- G. Pulling Cord: Install 100-lbf- (445-N-) test nylon cord in ducts, including spares.
- H. Concrete-Encased Ducts: Support ducts on duct separators.
1. Separator Installation: Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet (6 m) of duct. Secure separators to earth and to ducts to prevent floating during concreting. Stagger separators approximately 6 inches (150 mm) between tiers. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around ducts or duct groups.
 2. Concreting Sequence: Pour each run of envelope between terminations in one continuous operation.
 - a. Start at one end and finish at the other, allowing for expansion and contraction of ducts as their temperature changes during and after the pour. Use expansion fittings installed according to manufacturer's written recommendations or use other specific measures to prevent expansion-contraction damage.
 - b. If more than one pour is necessary, terminate each pour in a vertical plane and install 3/4-inch (19-mm) reinforcing rod dowels extending 18 inches (450 mm) into concrete on both sides of joint near corners of envelope.
 3. Pouring Concrete: Spade concrete carefully during pours to prevent voids under and between conduits and at exterior surface of envelope. Do not allow a heavy mass of concrete to fall directly onto ducts. Use a plank to direct concrete down sides of bank assembly to trench bottom. Allow concrete to flow to center of bank and rise up in middle, uniformly filling all open spaces. Do not use power-driven agitating equipment unless specifically designed for duct-bank application.
 4. Reinforcement: Reinforce concrete-encased duct banks where they cross disturbed earth and where indicated. Arrange reinforcing rods and ties without forming conductive or magnetic loops around ducts or duct groups.
 5. Forms: Use walls of trench to form side walls of duct bank where soil is self-supporting and concrete envelope can be poured without soil inclusions; otherwise, use forms.
 6. Minimum Space between Ducts: 3 inches between ducts and exterior envelope wall, 3 inches between ducts for like services, and 6 inches between power and signal ducts.

7. Depth: Install top of duct bank at least 24 inches below finished grade in areas not subject to deliberate traffic, and at least 24 inches below finished grade in deliberate traffic paths for vehicles, unless otherwise indicated.
8. Stub-Ups: Use manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Extend concrete encasement throughout the length of the elbow.
9. Stub-Ups: Use manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete.
 - b. Stub-Ups to Equipment: For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of base. Install insulated grounding bushings on terminations at equipment.
10. Warning Tape: Bury warning tape approximately 12 inches above all concrete-encased ducts and duct banks. Align tape parallel to and within 3 inches of the centerline of duct bank. Provide an additional warning tape for each 12-inch increment of duct bank width over a nominal 18 inches. Space additional tapes 12 inches apart, horizontally.

I. Direct-Buried Duct Banks:

1. Support ducts on duct separators coordinated with duct size, duct spacing, and outdoor temperature.
2. Space separators close enough to prevent sagging and deforming of ducts, with not less than 5 spacers per 20 feet of duct. Secure separators to earth and to ducts to prevent displacement during backfill and yet permit linear duct movement due to expansion and contraction as temperature changes. Stagger spacers approximately 6 inches between tiers.
3. Excavate trench bottom to provide firm and uniform support for duct bank. Prepare trench bottoms as specified in Section 312000 "General Earthwork" for pipes less than 6 inches in nominal diameter.
4. Install backfill as specified in Section 312000 "General Earthwork."
5. After installing first tier of ducts, backfill and compact. Start at tie-in point and work toward end of duct run, leaving ducts at end of run free to move with expansion and contraction as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand-place backfill to 4 inches over ducts and hand tamp. Firmly tamp backfill around ducts to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction as specified in Section 312000 "General Earthwork."
6. Install ducts with a minimum of 3 inches between ducts for like services and 6 inches between power and signal ducts.
7. Depth: Install top of duct bank at least 24 inches below finished grade, unless otherwise indicated.
8. Set elevation of bottom of duct bank below the frost line.
9. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
10. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.

- a. Couple steel conduits to ducts with adapters designed for this purpose and encase coupling with 3 inches of concrete.
 - b. For equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
11. Warning Planks: Bury warning planks approximately 12 inches above direct-buried ducts and duct banks, placing them 24 inches o.c. Align planks along the width and along the centerline of duct bank. Provide an additional plank for each 12-inch increment of duct bank width over a nominal 18 inches. Space additional planks 12 inches apart, horizontally.

3.3 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting ducts to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of ducts, and seal joint between box and extension as recommended by the manufacturer.
- B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.7-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas and trafficways, set so cover surface will be flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.
- D. Install handholes and boxes with bottom below the frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in the enclosure.
- F. Field-cut openings for ducts and conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.4 GROUNDING

- A. Ground underground ducts and utility structures according to Section 260526 "Grounding and Bonding for Electrical Systems."

3.5 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
 - 1. Demonstrate capability and compliance with requirements on completion of installation of underground ducts and utility structures.

2. Pull aluminum or wood test mandrel through duct to prove joint integrity and test for out-of-round duct. Provide mandrel equal to 80 percent fill of duct. If obstructions are indicated, remove obstructions and retest.
3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.6 CLEANING

- A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of ducts. Follow with rubber duct swab for final cleaning and to assist in spreading lubricant throughout ducts.

END OF SECTION 260543

SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Sleeve-seal systems.
3. Sleeve-seal fittings.
4. Grout.
5. Silicone sealants.

B. Related Requirements:

1. Section 078413 "Penetration Firestopping" for penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. LEED Submittals:

1. Product Data for Credit EQ 4.1: For sealants, documentation including printed statement of VOC content.
2. Laboratory Test Reports for Credit EQ 4: For sealants, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. Sleeves for Rectangular Openings:
 - 1. Material: Galvanized sheet steel.
 - 2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Advance Products & Systems, Inc.
 - b. CALPICO, Inc.
 - c. Metraflex Company (The).
 - d. Pipeline Seal and Insulator, Inc.
 - e. Proco Products, Inc.
 - 3. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 4. Pressure Plates: Stainless steel.
 - 5. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
 - a. Presealed Systems.

2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

2.5 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
 - 2. Sealant shall have VOC content of 100 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - 3. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."

- b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require different clearance.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
- 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using **steel** pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.

D. Using grout, seal the space around outside of sleeve-seal fittings.

END OF SECTION 260544

SECTION 260548 - VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
1. Channel support systems.
 2. Restraint cables.
 3. Hanger rod stiffeners.
 4. Anchorage bushings and washers.

1.2 PERFORMANCE REQUIREMENTS

- A. Seismic-Restraint Loading:
1. Site class, building code and Design Spectral Response Acceleration as defined on the Contract Drawings.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
 2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
 - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
 - b. Annotate to indicate application of each product submitted and compliance with requirements.
 3. Restrained-Isolation Devices: Include ratings for horizontal, vertical, and combined loads.
- B. Delegated-Design Submittal: For seismic-restraint details indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
 - a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.

2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.
3. Field-fabricated supports.
4. Seismic-Restraint Details:
 - a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
 - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events.
 - c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.
- D. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Amber/Booth Company, Inc.

2. California Dynamics Corporation.
 3. Cooper B-Line, Inc.; a division of Cooper Industries.
 4. Hilti Inc.
 5. Loos & Co.; Seismic Earthquake Division.
 6. Mason Industries.
 7. TOLCO Incorporated; a brand of NIBCO INC.
 8. Unistrut; Tyco International, Ltd.
- B. General Requirements for Restraint Components: Rated strengths, features, and application requirements shall be as defined in reports by an agency acceptable to authorities having jurisdiction.
1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
- C. Channel Support System: MFMA-3, shop- or field-fabricated support assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; and rated in tension, compression, and torsion forces.
- D. Hanger Rod Stiffener: Reinforcing steel angle clamped to hanger rod. Do not weld stiffeners to rods.
- E. Bushings for Floor-Mounted Equipment Anchor: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchors and studs.
- F. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices.
- G. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.
- H. Mechanical Anchor: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchors with strength required for anchor and as tested according to ASTM E 488. Minimum length of eight times diameter.
- I. Adhesive Anchor: Drilled-in and capsule anchor system containing polyvinyl or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Multiple Raceways or Cables: Secure raceways and cables to trapeze member with clamps approved for application by an agency acceptable to authorities having jurisdiction.
- B. Hanger Rod Stiffeners: Install hanger rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static and seismic loads within specified loading limits.

3.2 SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Equipment and Hanger Restraints:
 - 1. Install restrained isolators on electrical equipment.
 - 2. Install resilient, bolt-isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch (3.2 mm).
 - 3. Install seismic-restraint devices using methods approved by an agency acceptable to authorities having jurisdiction providing required submittals for component.
- B. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
- C. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- D. Drilled-in Anchors:
 - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
 - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
 - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
 - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
 - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

3.3 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

- A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Obtain Engineer's approval before transmitting test loads to structure. Provide temporary load-spreading members.
 - 2. Test at least four of each type and size of installed anchors and fasteners selected by Engineer.
 - 3. Test to 90 percent of rated proof load of device.
 - 4. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.
- B. Remove and replace malfunctioning units and retest as specified above.
- C. Prepare test and inspection reports.

3.5 ADJUSTING

- A. Adjust isolators after isolated equipment is at operating weight.
- B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.
- C. Adjust active height of spring isolators.
- D. Adjust restraints to permit free movement of equipment within normal mode of operation.

END OF SECTION 260548

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Underground-line warning tape.
 - 5. Warning labels and signs.
 - 6. Instruction signs.
 - 7. Equipment identification labels.
 - 8. Miscellaneous identification products.

1.2 ACTION SUBMITTALS

- A. Product Data: For each electrical identification product indicated.
- B. Samples of each color, lettering style and other graphic representation required for each identification material or system.
- C. Table or list of equipment, panel and disconnect switch labels.

1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.

- B. Colors for Raceways Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Write-On Tags shall not be allowed.

2.2 ARMORED AND METAL-CLAD CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Colors for Raceways Carrying Circuits at 600 V and Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- C. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; 2 inches wide; compounded for outdoor use.

2.3 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label. Heat shrink tubing, or sleeve type wire markers are also acceptable.
- A. Write-On Tags shall not be allowed.

- B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- C. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.

2.4 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label. Heat shrink tubing, or sleeve type wire markers are also acceptable.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- D. Write-On Tags shall not be allowed.

2.5 FLOOR MARKING TAPE

- A. 2-inch-wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

2.6 UNDERGROUND-LINE WARNING TAPE

- A. Tape:
 - 1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - 2. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - 3. Tape material and ink shall be chemically inert, and not subject to degrading when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- B. Color and Printing:
 - 1. Comply with ANSI Z535.1 through ANSI Z535.5.
 - 2. Inscriptions for Red-Colored Tapes: ELECTRIC LINE, HIGH VOLTAGE.
 - 3. Inscriptions for Orange-Colored Tapes: TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE.
- C. Tag: Type I:
 - 1. Pigmented polyolefin, bright-colored, compounded for direct-burial service.
 - 2. Thickness: 4 mils.

3. Weight: 18.5 lb/1000 sq. ft.
4. 3-Inch Tensile According to ASTM D 882: 30 lbf, and 2500 psi.

D. Tag: Type ID:

1. Detectable three-layer laminate, consisting of a printed pigmented polyolefin film, a solid aluminum-foil core, and a clear protective film that allows inspection of the continuity of the conductive core, bright-colored, compounded for direct-burial service.
2. Overall Thickness: 5 mils.
3. Foil Core Thickness: 0.35 mil.
4. Weight: 28 lb/1000 sq. ft.
5. 3-Inch Tensile According to ASTM D 882: 70 lbf, and 4600 psi.

2.7 WARNING LABELS AND SIGNS

A. Comply with NFPA 70 and 29 CFR 1910.145.

B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.8 INSTRUCTION SIGNS

A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.

1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

- 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

2.9 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- C. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

2.10 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 CONDUCTOR LABELING SCHEME

- A. All control and instrumentation conductors shall be labeled with a “To/From” labeling scheme. Each conductor label shall have two lines of text. The first line of text shall indicate the enclosure and terminal where the wire is to terminate on the other end. The second line of text shall indicate the enclosure and terminal where the wire is to terminate on this end. The following example illustrates the “To/From” labeling scheme:
 - 1. A wire is connected between a VFD and an LCP. The VFD equipment tag is VFD-100 and the LCP equipment tag is LCP-100. The connecting terminal at the VFD enclosure is terminal “5”. The connecting terminal at the LCP is terminal “7”. This wire would have the following labels:
 - a. The wire label at the VFD end:
 - Top Line: “LCP-100 : 7”
 - Bottom Line: “VFD-100 : 5”
 - b. The wire label at the LCP end:

Top Line: "VFD-100 : 5"
Bottom Line: "LCP-100 : 7"

3.2 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Underground-Line Warning Tape: During backfilling of trenches install continuous underground-line warning tape directly above line at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
- G. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.3 IDENTIFICATION SCHEDULE

- A. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30A, and 120V to ground: Install labels at 10-foot maximum intervals.
- B. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. Emergency Power.
 - 2. Power.
 - 3. UPS.
- C. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase Identification, 600 V or Less: Use colors listed below for ungrounded service, feeder and branch-circuit conductors.
 - a. Colors for 208/120-V Circuits:

- 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
- b. Colors for 480/277-V Circuits:
- 1) Phase A: Brown.
 - 2) Phase B: Orange.
 - 3) Phase C: Yellow.
- c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- D. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- E. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- F. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- G. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
1. Limit use of underground-line warning tape to direct-buried cables.
 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- H. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
1. Comply with 29 CFR 1910.145.
 2. Identify system voltage with black letters on an orange background.
 3. Apply to exterior of door, cover, or other access.
 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.

- b. Controls with external control power connections.
- J. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- K. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment used for power transfer.
- L. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1-1/2-inch-high label; where two lines of text are required, use labels 2 inches high.
 - b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
 - c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

END OF SECTION 260553

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. This section covers electrical panelboards.

1.2 SUBMITTALS

- A. Products shall be submitted in accordance with Section 26 00 00, and the Contract Documents, prior to installation.
- B. Panel layout with alphanumeric designation, branch circuit breaker sizes and types, AIC rating, bus sizes, bus material and other characteristics.

1.3 QUALITY ASSURANCE

- A. NEMA PB-1, Panelboards
- B. NEC
- C. UL67, Panelboards

PART 2 - PRODUCTS

2.1 PANELBOARDS

- A. Dead-front panelboards, including lighting distribution and control panels, shall be furnished and installed as indicated on the Plans. Buses shall be tin-plated copper. If shown on the drawings as 4 wire, neutral shall be 100% rated. Mounting and type of enclosures shall be as indicated on the Plans. Where not indicated, indoor enclosures shall be NEMA 12 and outdoor enclosures shall be NEMA 4. The minimum interrupting capacity of any device shall be 22 KAIC unless otherwise indicated on the Plans.
- B. All lighting panels shall have surge protection devices.
- C. Protective devices shall be replaceable without disturbing adjacent units and shall be of the bolt-on type. Snap in protective devices will not be accepted. Wire connectors shall be suitable for wire sizes indicated. Branch circuits shall be numbered as indicated on the Plans, and a complete typed circuit schedule shall be furnished under a transparent cover and affixed to the inside of the panel access door. Phase busing shall be full height without reduction. Full size neutral and ground bars shall be included and shall have suitable lugs for each outgoing circuit requiring connection. Spaces for future protective devices provided in lighting panels shall be used for the maximum device that can be fitted into them.
- D. Panelboards shall be finished with a primer, rust resistant phosphate undercoat and two coats of oven baked enamel with finish ANSI grey. They shall be sized to provide a minimum of 4 inches of gutter space on all sides. Doors shall not uncover any live parts and shall be hinged

and have latches that require no tool to operate. Panelboard doors shall be lockable. Lock and two keys shall be furnished.

- E. Each panelboard shall have, on the outside of the door, a lamicoid nameplate with ¾-inch letters as specified elsewhere in these Contract Documents.
- F. Panelboards shall be as manufactured by Square D, General Electric, Eaton / Cutler Hammer, or equal.
- G. Panelboards shall be service entrance rated where required, and as shown on the Plans.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Panelboards shall be installed as indicated on the plans and according to manufacturer's instructions.
- B. Provide grounding per NEC, and Section 260526.
- C. Contractor shall verify all NEC clearance requirements prior to installation.

END OF SECTION 262416

SECTION 265000 - LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.

1.2 SCOPE OF WORK

- ##### A.
- The Contractor shall provide all labor, materials, equipment and incidentals as shown, specified and required to furnish and install lighting fixtures.

1.3 QUALITY ASSURANCE

A. Reference Standards:

1. National Electrical Code (NEC)
2. UL Standard #57, Electric Lighting Fixtures
3. UL Standard #844, Electric Lighting Fixtures for Use in Hazardous Location
4. UL Standard #1570, Fluorescent Lighting Fixtures
5. UL Standard #1571, Incandescent Lighting Fixtures
6. UL Standard #1572, High Intensity Discharge Lighting Fixtures
7. Illuminating Engineering Society (IES)
8. All applicable local lighting ordinances

B. Miscellaneous:

1. Lamps are identified for each luminaire in the Lighting Fixture Schedule on the Plans.
2. Lighting fixtures and electrical components:
 - a. UL labeled, complete with lamps.
 - b. Rated for area classification as indicated.
 - 1) All lighting in classified areas are to be of the T3 temperature class unless otherwise indicated, refer to Table 500.8(B) of the NEC.
 - c. Lighting shall meet OSHA requirements.
3. On the Plans, the location of lighting fixtures is intended to be used as a guide.
 - a. Field conditions may affect actual locations.
 - b. Coordinate with other trades to avoid conflicts in mounting of fixtures and other equipment.
4. The quality standard is established by the fixture listed in the Lighting Fixture Schedule.
 - a. This quality standard includes, but is not necessarily limited to construction features, materials of construction, finish, and photometrics.

1.4 SUBMITTALS

- A. The following shall be submitted to the Engineer for review:
1. Acknowledgment that products submitted meet requirements of standards referenced.
 2. Manufacturer's technical information on products to be used including photometric performance curves for the fixture and ballast data.
 3. Acknowledgment that products submitted are UL listed.
 4. When general data sheets constitute part of the submittal, identify the products to be used on this project.
 5. Manufacturer's installation instructions.
 6. Identification of fixtures by Lighting Fixture Schedule.
 7. UL nameplate data (Voltage, wattage, etc.).
 8. Finishes, colors, and mounting type.
 9. Pole, fixture, and accessories.
 10. Pole wind loading.
- B. Contractor shall submit shop drawings, manufacturer's data sheets, and a complete wiring diagram detailing all connections to the electrical system in accordance with Section 013300 "Contractor Submittals" and Section 260000 "General Electrical Requirements."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Lamps shall be manufactured by:
1. General Electric
 2. North American/Phillips
 3. Sylvania
 4. Approved equal.
- B. Lighting fixtures shall be provided as indicated on the Lighting Fixture Schedule on the Plans.
- C. Lighting ballasts shall be manufactured by:
1. General Electric
 2. Advance
 3. Jefferson
 4. Universal
 5. Bodine
 6. Lithonia
 7. Approved equal
- D. Light poles shall be as indicated on the Plans. Include base template, anchor bolts, cadmium-plated hardware and pole grounding lug, hand-hole, anchor base and bolt covers. Pole foundations shall be as indicated on the Plans.

2.2 MATERIALS

A. General:

1. Lamps:
 - a. See lighting fixture schedule on Plans for wattage, voltage and number required.
2. All Fixtures:
 - a. There shall be no live parts normally exposed to contact.
 - b. When intended for use in wet area:
 - 1) Mark fixtures "suitable for wet locations."
 - c. When intended for use in damp areas:
 - 1) Mark fixtures "suitable for damp locations" or "suitable for wet locations."
 - d. In wet or damp area, install fixtures so that water cannot enter or accumulate in the wiring compartment, lamp-holder, or other electrical parts.
 - e. Gasket seals: Urethane foam
 - f. Diffusers: UV stabilized acrylic plastic
3. Underground wiring:
 - a. Provide all wiring runs with separate green grounding conductor.
 - b. Ground all pole bases.
4. Pole wiring from base to ballast:
 - a. No. 12 type XHHW.
 - b. Each phase shall be protected by a 30A, 600V, type Tron waterproof fuse-holder, Bussman "Limitron" type fuse, size rating 3-times load current.

B. Incandescent Lamps:

1. No incandescent lamps shall be allowed.

C. Fluorescent Lamps:

1. Rapid start
2. Cool white (F32T8/41K-85CRI and F96T12/41K-70CRI/HO/ES)
3. Energy efficient or standard as noted on the lighting fixture schedule.

D. High-Pressure Sodium Lamps:

1. No High-Pressure Sodium Lamps shall be allowed.

E. Metal Halide Lamps:

1. No Metal Halide Lamps shall be allowed.

F. LED:

1. Lifespan: 50,000 hour
2. Minimum CRI: 70 outdoors, 80 indoors
3. Color Temperature: 3500K outdoors, 4000K indoors

G. Furnish a minimum of 2 lamps, or ten percent spare lamps of each type and wattage, whichever is greater.

2.3 FIXTURES

A. Fluorescent Lighting Fixtures:

1. Ballast:
 - a. Rapid start, high power factor type
 - b. CBM/ETL certified
 - c. Sound rating A
 - d. Two internal automatic-resetting thermal switch devices for coil and capacitor
2. Internal wiring: AWM, TFN or THHN
3. Channel and end plates: 22 GA steel
4. Steel door frame and socket track: 20 GA steel
5. Channel cover: 24 GA steel
6. Emergency ballast:
 - a. Integral rechargeable nickel-cadmium battery, battery charger, and automatic transfer circuitry.
 - b. Charging indicator light.
 - c. Test Switch.
 - d. Provide a minimum of 900 lumen output for 90 minutes upon loss of normal power.
 - e. Mounted integral to the fixture.
 - f. UL 924 listed.
7. Provide fixtures with emergency ballasts with permanent caution labels warning that the fixture is fed from an un-switched source
 - a. Provide emergency ballast also with a similar caution label.

B. LED Lighting Fixtures:

1. Heavy duty two piece, die cast aluminum housing.
2. Silicon gasketing for moisture protection
3. Polyester powder finish for impact, corrosion and UV resistance
4. Cast-in aluminum hinges for tool-less lens removal.
5. Thermal and shock resistant clear borosilicate glass refractor.
6. Field replaceable LED light engine and driver.

2.4 EMERGENCY FLUORESCENT POWER UNIT

1. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.
 - a. Emergency Connection: Operate one fluorescent lamp(s) continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.
2. Nightlight Connection: Operate one fluorescent lamp continuously.
3. Test Push Button and Indicator Light: Visible and accessible without opening fixture or entering ceiling space.
 - a. Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - b. Indicator Light: LED indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
4. Battery: Sealed, maintenance-free, nickel-cadmium type.

5. Charger: Fully automatic, solid-state, constant-current type with sealed power transfer relay.
6. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.5 EXIT SIGNS

- A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Signs:
 1. Lamps for AC Operation: Fluorescent, two for each fixture, 20,000 hours of rated lamp life.
 2. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
 3. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
 - a. Battery: Sealed, maintenance-free, nickel-cadmium type.
 - b. Charger: Fully automatic, solid-state type with sealed transfer relay.
 - c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 - d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 - e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.6 EMERGENCY LIGHTING UNITS

- A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.
 1. Battery: Sealed, maintenance-free, lead-acid type.
 2. Charger: Fully automatic, solid-state type with sealed transfer relay.
 3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
 4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
 5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
 6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
 7. Integral Time-Delay Relay: Holds unit on for fixed interval of 15 minutes when power is restored after an outage.

2.7 MISCELLANEOUS ELECTRIC DEVICES

- A. PHOTOELECTRIC CONTROL UNITS shall meet the following requirements:
1. Cadmium sulfide photocell
 2. Aluminum weatherproof enclosure
 3. 30 amp rated contacts
 4. 120-volt AC power
 5. The Photoelectric control unit shall be Tork Model 2100, or equal.
- B. MOTION SENSORS shall meet the following requirements:
1. 110° field of view, 60-foot range
 2. Adjustable time setting from 15 seconds to 15 minutes
 3. Operating temperature of -20 to + 130 °F.
 4. Complete outdoor, weatherproof sensor with complete mounting hardware
 5. UL listed
 6. The motion sensor(s) shall be manufactured by Leviton Model 50500-H or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.
- B. Comply with NFPA 70 for minimum fixture supports.
- C. Install lamps in all luminaires.
- D. Replace all failed fluorescent, incandescent, metal halide, mercury vapor, high pressure sodium and LED lamps with new lamps prior to final acceptance by Owner.
- E. Surface and flush mounted fixtures shall be solidly connected to a junction box. Suspended fixtures shall be hung utilizing pendant mounting or stainless-steel chains and hooks. Each suspended fixture shall be electrically connected by a length of Type SO flexible cord. 3 conductor No. 14 AWG, minimum, with a twist-lock receptacle mounted in an individual junction box. Plugs and receptacles shall be as manufactured by Hubbell, General Electric Company, or equal.
- F. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- G. Install with approved mounting hardware following manufacturer's recommendations.
- H. Comply with Section 260529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports, and nonmetallic channel and angle supports.

1. Do not support fixture from conduit system.
2. Do not support fixture from outlet boxes.

- I. Pole mounted fixtures shall be mounted on steel or aluminum poles as indicated on the Plans. All metal poles shall be bonded to the facility ground system. Poles shall have adequate handholes and weatherproof receptacles where indicated.
- J. All anchor bolts and nuts shall be stainless steel. Contractor shall paint all steel poles with aluminum paint or other color in accordance with these Contract Documents.
- K. Fixture mounting heights and locations indicated on the Plans are approximate and are subject to revision in the field where necessary to avoid conflicts and obstructions.

3.2 ADJUSTING AND CLEANING

- A. Wipe all lighting fixture reflectors, lenses, lamps, and trims clean after installation and prior to acceptance of Project by Owner.

3.3 FIELD QUALITY CONTROL

- A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

END OF SECTION 265000

SECTION 262200 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following types of dry-type transformers rated 600 V and less, with capacities up to 1000 kVA:
 - 1. Distribution transformers.
 - 2. Buck-boost transformers.

1.2 ACTION SUBMITTALS

- A. Product Data: For each product indicated.
- B. Shop Drawings: Indicate dimensions and weights.
 - 1. Wiring Diagrams: Power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that transformers, accessories, and components will withstand seismic forces defined in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."
- B. Field quality-control test reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 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 IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. ACME Electric Corporation; Power Distribution Products Division.
 - 2. Challenger Electrical Equipment Corp.; a division of Eaton Corp.
 - 3. Controlled Power Company.
 - 4. Eaton Electrical Inc.; Cutler-Hammer Products.
 - 5. Federal Pacific Transformer Company; Division of Electro-Mechanical Corp.
 - 6. General Electric Company.
 - 7. Hammond Co.; Matra Electric, Inc.
 - 8. Magnetek Power Electronics Group.
 - 9. Micron Industries Corp.
 - 10. Myers Power Products, Inc.
 - 11. Siemens Energy & Automation, Inc.
 - 12. Sola/Hevi-Duty.
 - 13. Square D; Schneider Electric.

2.2 GENERAL TRANSFORMER REQUIREMENTS

- A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.
- B. Cores: Grain-oriented, non-aging silicon steel.
- C. Coils: Continuous windings without splices except for taps.
 - 1. Internal Coil Connections: Brazed or pressure type.
 - 2. Coil Material: Copper.

2.3 DISTRIBUTION TRANSFORMERS

- A. Comply with NEMA ST 20, and list and label as complying with UL 1561.
- B. Provide transformers that are constructed to withstand seismic forces specified in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."
- C. Cores: One leg per phase.
- D. Enclosure: Ventilated, NEMA 250, Type 2.
 - 1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- E. Enclosure: Ventilated, NEMA 250, Type 3R.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.
- F. Transformer Enclosure Finish: Comply with NEMA 250.
1. Finish Color: Gray.
- G. Taps for Transformers 7.5 to 24 kVA: One 5 percent tap above and one 5 percent tap below normal full capacity
- H. Taps for Transformers 25 kVA and Larger: Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity
- I. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of 150 deg C rise above 40 deg C ambient temperature.
- J. Energy Efficiency for Transformers Rated 15 kVA and Larger:
1. Complying with NEMA TP 1, Class 1 efficiency levels.
 2. Tested according to NEMA TP 2.
- K. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.
1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor.
 2. Indicate value of K-factor on transformer nameplate.
- L. Electrostatic Shielding: Each winding shall have an independent, single, full-width copper electrostatic shield arranged to minimize interwinding capacitance.
- M. Wall Brackets: Manufacturer's standard brackets.

2.4 BUCK-BOOST TRANSFORMERS

- A. Description: Self-cooled, two-winding dry type, rated for continuous duty and with wiring terminals suitable for connection as autotransformer. Transformers shall comply with NEMA ST 1 and shall be listed and labeled as complying with UL 506 or UL 1561.
- B. Enclosure: Ventilated, NEMA 250, Type 2.
1. Finish Color: Gray.

2.5 IDENTIFICATION DEVICES

- A. Nameplates: Engraved, laminated-plastic or metal nameplate. Nameplates are specified in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.
 - 1. Brace wall-mounting transformers as specified in Section 26 05 48 "Vibration and Seismic Controls for Electrical Systems."
- B. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions, seismic codes applicable to Project, and requirements in Section 26 05 29 "Hangers and Supports for Electrical Systems."

3.2 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2. Infrared Scanning: Two months after Substantial Completion, perform an infrared scan of transformer connections.
 - a. Use an infrared-scanning device designed to measure temperature or detect significant deviations from normal values. Provide documentation of device calibration.
 - b. Perform 2 follow-up infrared scans of transformers, one at 4 months and the other at 11 months after Substantial Completion.
 - c. Prepare a certified report identifying transformer checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken, and scanning observations after remedial action.

3.3 ADJUSTING

- A. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.
- B. Connect buck-boost transformers to provide nameplate voltage of equipment being served, plus or minus 5 percent, at secondary terminals.
- C. Output Settings Report: Prepare a written report recording output voltages and tap settings.

END OF SECTION 262200

SECTION 02825 - MODEL HYJG HYDRAULIC VERTICAL PIVOT GATE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vertical pivot gate system including gates and special Tilt-A-Way hydraulic operator, with accessories as required for complete operational installation. Tilt-A-Way vertical pivot gate systems are UL 325, and CSA C22.2#247 listed.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:

Safety Devices: Provide manufacturer's standard safety devices including following features.

- a. Provide pressure relief valve to avoid crushing obstruction encountered in either direction of travel.
- b. Provide shut off power device if balance system fails.

2. Power Failure: Provide manual bypass system, which allows barrier to be opened and to be closed in event of power failure.

3. Operation: Design system to allow for minimum 2900 open and close operations per day.

[Note: Gate heights up to eight feet, use a standard operator model HYJG. Contact manufacture for gate heights above nine for gate length restrictions.]

B. Gate Height: As indicated on Drawings.

[Note: Gate widths from 25 feet wide or up to 50 feet total width for two vertical pivot gate operators are possible with aluminum barriers, up to 40 feet total width for steel barriers, with no center posts, overhead supports, tracks, or special framing required.]

C. Gate Width: As indicated on Drawings.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for gate and operator and each manufactured accessory to be provided for Project.

1. Wiring Diagrams: Furnish manufacturer's wiring diagrams for gate operator.
2. Maintenance Data: Furnish manufacturer's operators and parts manual.

B. Shop Drawings: Show location of vertical pivot gates system in relationship with adjacent fencing and paving, details of installation, hardware locations, and accessories.

1. Templates: Provide drawings or templates for installation of anchor bolts in support slab.

C. Certificates: Furnish manufacturer's certification indicating system provided complies with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Firm approved by manufacturer or with minimum five years successful experience completing vertical pivot gate installation similar to that required.

B. Pre-installation Conference: Conduct meeting at site prior to commencing work related to vertical pivot gate system installation.

1. Require attendance of parties directly affecting vertical pivot gate installation.
2. Review site conditions, procedures, and coordination required with related work.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions and component layout by field measurements prior to beginning installation.

1.6 WARRANTY

A. Provide manufacturer's standard limited warranty for system and system components against failure resulting from normal use based on manufacturer's literature.

1. Failure shall be defined as any defect in manufacturing, which prevents gate from operating as intended.

B. Warranty Period: Three years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Ideal Manufacturing, Inc., 2011 Harnish Blvd., Billings, MT 59101;
Telephone 800-523-3888 or 406-656-4360; Fax 406-656-4363;
Web address: www.tilt-a-way.com; E-mail: info@tilt-a-way.com

2.2 MANUFACTURED UNIT

A. Vertical Pivot Gate System: Ideal Mfg., Inc. /TILT-A-WAY Model HYJG.

2.3 COMPONENTS

B. Hydraulic Power Unit: 1 HP TEFC motor, 1725 RPM, 220 VAC Single Phase Spencer Hydraulic power unit capable of delivering 4 GPM at 385 PSI, with external adjustment relief valve and 4-way solenoid operated 3-position manual override valve.

1. Hydraulic pump, motor, and reservoir will be all as one unit with fluid thermometer and fluid level sight gauge.

2. The hydraulic system will be designed to keep the gate locked in the closed position, keeping any person from lifting the gate open when it is in the closed position.
3. Pedestal Frame: Welded construction with removable outer skin of cross break corrosion resistant painted gray .063 aluminum plate panels.
4. Inspection Door Hardware: Stainless steel continuous hinges and heavy-duty lockable pull down catches to hold inspection door shut.
5. Power: 208 / 230 VAC Single Phase 3 Wire.

Total gate system requires 20-amp service, with no more than 3% drop in voltage, while gate is in operation.

C. Hydraulic System: 3000-psi hydraulic cylinder.

1. Cylinder: 2-1/2" by 38" stroke hydraulic cylinder with 1-3/8" diameter rod, limit switches and cushioned slow down on each end of travel, and adjustable stops with lock down in any position.
Hydraulic Fluid: Manufacturer's standard, factory checked, filled, and tested.

D. Balance System: System designed to allow barrier to be hand raised and to be hand lowered with 12 to 15 pounds of pressure, consisting of manufacturer's standard cables, sheaves, sealed cam yoke roller bearings, and tension spring pulled in a straight line.

1. Safety Control Switch: Provide built-in safety control switch capable of stopping barrier in any position should balance system fail.
2. Testing: Factory test and adjust balance system to ensure gate may be manually raised and lowered with specified pressure.
3. Signage: Signage to be added to the gate barrier must be declared at the time of order so the manufacturer can add the signs on the barrier, to ensure Ideal Mfg. balances the operator correctly at the time of manufacturing.

E. Electrical System: Oversized rain tight enclosure housing electrical components except limit switches, safety switches, and motor.

1. Wire: Oil and gasoline resistant.
2. Overload Protection: Allen Bradley type overload protection relay to protect motor.
3. Reversing Controller: Provide as required to operate motor and solenoid valves.
4. Overrun Delay Timers: Integral to board capable of shutting down system in case motor runs longer than 30 seconds.
5. Limit Switches: Adjustable snap action style limit switches capable of stopping barrier at each end of travel.
6. Logic Board: Programmable logic board with manufacturer's full range of available functions.
7. All gates are equipped with a dry contactor to accommodate all types of access equipment.

Loop Detectors: Provide detector system (except loop) to allow free exit/safety, safety or close gate operation; system to be factory wired inside electrical box and tested.

Synchronizing Box: Master slave system for paired gate system (required only when 2 gates operate in conjunction with each other).

Stainless steel fasteners.

- 1) Proximity card readers.
- 2) Pedestals.

F. Barrier System (Gates): Design to resist twist and to resist sway.

Type: Manufacturer's standard aluminum barrier (up to 25 foot wide opening per gate leaf), nominal 3.125" by 2.875" diamond 6063-T5 alloy aluminum screen fabric (amplimesh) welded both sides completely, with sway bracing. Leading member of an aluminum barrier 4" schedule 40 round tube, sway braces- 1 1/4 x 1 1/4 x 1/8 square tube uprights- 2 x 2 x .188 square tube. Sway braces bolted to barrier. Barrier with sway braces is designed to with stand 100 MPH wind load, or optional 150 MHP sway bracing.

Type: Custom barrier as indicated on Drawings, with sway bracing.

Options: Provide stanchion to contain free end for severe crash applications; match barrier.

G. Accessories: Provide as required for complete operational installation.

1. Child Guards: Provide child and small animal guard on secured side of operator.

2.4 FINISHES

A. Finish: Factory prime with DTM epoxy and paint with Gensis acrylic urethane topcoat to resist corrosion.

1. Color: As selected from manufacturer's standard colors. Consult Owner.

Manufacturer's standard color is Sherwin Williams Gray.

Specify color of gate if different from manufacturer's standard color.

If a color (other than standard gray) is ordered the operator panels will be made with 16 gauge aluminum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify concrete support slab complies with requirements and verify anchors and conduits are properly installed

1. Ensure alignment with adjacent construction, fencing, and paving; coordinate with adjacent construction.

3.2 INSTALLATION

A. Comply with manufacturer's recommendations and installation instructions.

1. Install vertical pivot gate system to provide rigid and secure installation as indicated, straight and true to lines and levels indicated, for free, easy operation.

2. Install components square and level, accurately fitted and free from distortion and free from defects.

B. Advise Owner regarding programmable features and controls and preset controls according to Owner requirements.

1. Instruct Owner personnel in proper operation, maintenance, and reprogramming of system.

3.3 PROTECTION

A. Protect vertical pivot gate system from damage during remainder of construction operations; replace components damaged by subsequent construction operations.

B. Touch-up scratched and damaged surfaces using same primer and finish system applied in shop.

END OF SECTION 02825

SECTION 02826 - MODEL HYJG HYDRAULIC VERTICAL PIVOT GATE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Provide vertical pivot gate system including gates and special Tilt-A-Way hydraulic operator, with accessories as required for complete operational installation. Tilt-A-Way vertical pivot gate systems are UL 325, and CSA C22.2#247 listed.

1.2 SYSTEM DESCRIPTION

A. Performance Requirements:

Safety Devices: Provide manufacturer's standard safety devices including following features.

- a. Provide pressure relief valve to avoid crushing obstruction encountered in either direction of travel.
- b. Provide shut off power device if balance system fails.

2. Power Failure: Provide manual bypass system, which allows barrier to be opened and to be closed in event of power failure.

3. Operation: Design system to allow for minimum 2900 open and close operations per day.

[Note: Gate heights up to eight feet, use a standard operator model HYJG. Contact manufacture for gate heights above nine for gate length restrictions.]

B. Gate Height: As indicated on Drawings.

[Note: Gate widths from 25 feet wide or up to 50 feet total width for two vertical pivot gate operators are possible with aluminum barriers, up to 40 feet total width for steel barriers, with no center posts, overhead supports, tracks, or special framing required.]

C. Gate Width: As indicated on Drawings.

1.3 SUBMITTALS

A. Product Data: Furnish manufacturer's literature for gate and operator and each manufactured accessory to be provided for Project.

1. Wiring Diagrams: Furnish manufacturer's wiring diagrams for gate operator.

2. Maintenance Data: Furnish manufacturer's operators and parts manual.

B. Shop Drawings: Show location of vertical pivot gates system in relationship with adjacent fencing and paving, details of installation, hardware locations, and accessories.

1. Templates: Provide drawings or templates for installation of anchor bolts in support slab.

C. Certificates: Furnish manufacturer's certification indicating system provided complies with specified requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Firm approved by manufacturer or with minimum five years successful experience completing vertical pivot gate installation similar to that required.

B. Pre-installation Conference: Conduct meeting at site prior to commencing work related to vertical pivot gate system installation.

1. Require attendance of parties directly affecting vertical pivot gate installation.

2. Review site conditions, procedures, and coordination required with related work.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions and component layout by field measurements prior to beginning installation.

1.6 WARRANTY

A. Provide manufacturer's standard limited warranty for system and system components against failure resulting from normal use based on manufacturer's literature.

1. Failure shall be defined as any defect in manufacturing, which prevents gate from operating as intended.

B. Warranty Period: Three years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Ideal Manufacturing, Inc., 2011 Harnish Blvd., Billings, MT 59101;

Telephone 800-523-3888 or 406-656-4360; Fax 406-656-4363;

Web address: www.tiltaway.com; E-mail: info@idealmfginc.com

2.2 MANUFACTURED UNIT

A. Vertical Pivot Gate System: Ideal Mfg., Inc./TILT-A-WAY Models HYJG.

2.3 COMPONENTS

A. Hydraulic Power Unit: 1 HP TEFC motor, 1800 RPM, 24 Volt DC Spencer Hydraulic power unit capable of delivering 4 GPM at 385 PSI, with external adjustment relief valve and 4-way solenoid operated 3-position manual override valve.

1. Hydraulic pump, motor, and reservoir will be all as one unit with fluid thermometer and fluid level sight gauge.

2. The hydraulic system will be designed to keep the gate locked in the closed position, keeping any person from lifting the gate open when it is in the closed position.
3. Pedestal Frame: Welded construction with removable outer skin of cross break corrosion resistant painted gray .063 aluminum plate panels.
4. Inspection Door Hardware: Stainless steel continuous hinges and heavy-duty lockable pull down catches to hold inspection door shut.
5. Power: 115 Volt AC 24 Volt DC battery back up, 24 Volt DC motor and control. The two 12 Volt batteries supplied by installer, or owner.

Total gate system requires 20-amp service, with no more than 3% drop in voltage, while gate is in operation.

B. Hydraulic System: 3000-psi hydraulic cylinder.

1. Cylinder: 2-1/2" by 38" stroke hydraulic cylinder with 1-3/8" diameter rod, limit switches and cushioned slow down on each end of travel, and adjustable stops with lock down in any position.
Hydraulic Fluid: Manufacturer's standard, factory checked, filled, and tested.

C. Balance System: System designed to allow barrier to be hand raised and to be hand lowered with 12 to 15 pounds of pressure, consisting of manufacturer's standard cables, sheaves, sealed cam yoke roller bearings, and tension springs pulled in a straight line.

1. Safety Control Switch: Provide built-in safety control switch capable of stopping barrier in any position should balance system fail.
2. Testing: Factory test and adjust balance system to ensure gate may be manually raised and lowered with specified pressure.
3. Signage: Signage to be added to the gate barrier must be declared at the time of order so the manufacturer can add the signs on the barrier, to ensure Ideal Mfg. balances the operator correctly at the time of manufacturing.

D. Electrical System: Oversized rain tight enclosure housing electrical components except limit switches, safety switches, and motor.

1. Wire: Oil and gasoline resistant.
2. Overload Protection: Allen Bradley type circuit breaker to protect motor.
3. Reversing Controller: Provide as required to operate motor and solenoid valves.
 4. Overrun Delay Timers: Integral to board capable of shutting down system in case motor runs longer than 30 seconds.
 5. Limit Switches: Adjustable snap action style limit switches capable of stopping barrier at each end of travel.
 6. Logic Board: Programmable logic board with manufacturer's full range of available functions.

7. All gates are equipped with a dry contactor to accommodate all types of access equipment.

Loop Detectors: Provide detector system (except loop) to allow free exit/safety, safety or close gate operation; system to be factory wired inside electrical box and tested.

Stainless steel fasteners.

- 1) Proximity card readers.
- 2) Pedestals.

E. Barrier System (Gates): Design to resist twist and to resist sway.

Type: Manufacturer's standard aluminum barrier (up to 25 foot wide opening per gate leaf), nominal 3.125" by 2.875" diamond 6063-T5 alloy aluminum screen fabric (amplimesh) welded both sides completely, with sway bracing. Leading member of an aluminum barrier 4" schedule 40 round tube, sway braces- 1 1/4 x 1 1/4 x 1/8 square tube uprights- 2 x 2 x .188 square tube. Sway braces bolted to barrier. Barrier with sway braces is designed to with stand 100 MPH wind load, or optional 150 MHP sway bracing.

Type: Custom barrier as indicated on Drawings, with sway bracing.

Options: Provide stanchion to contain free end for severe crash applications; match barrier.

F. Accessories: Provide as required for complete operational installation.

1. Child Guards: Provide child and small animal guard on secured side of operator.

2.4 FINISHES

A. Finish: Factory prime and painted with Sherwin Williams poly urethane to resist corrosion.

1. Color: As selected from manufacturer's standard colors. Consult Owner.

Manufacturers standard color is Sherwin Williams Gray.

Specify color of gate if different from manufacturers standard color.

If a color (other than standard gray) is ordered the operator panels could be made from 16 gauge plate steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify concrete support slab complies with requirements and verify anchors and conduits are properly installed

1. Ensure alignment with adjacent construction, fencing, and paving; coordinate with adjacent construction.

3.2 INSTALLATION

- A. Comply with manufacturer's recommendations and installation instructions.
 - 1. Install vertical pivot gate system to provide rigid and secure installation as indicated, straight and true to lines and levels indicated, for free, easy operation.
 - 2. Install components square and level, accurately fitted and free from distortion and free from defects.
- B. Advise Owner regarding programmable features and controls and preset controls according to Owner requirements.
 - 1. Instruct Owner personnel in proper operation, maintenance, and reprogramming of system.

3.3 PROTECTION

- A. Protect vertical pivot gate system from damage during remainder of construction operations; replace components damaged by subsequent construction operations.
- B. Touch-up scratched and damaged surfaces using same primer and finish system applied in shop.

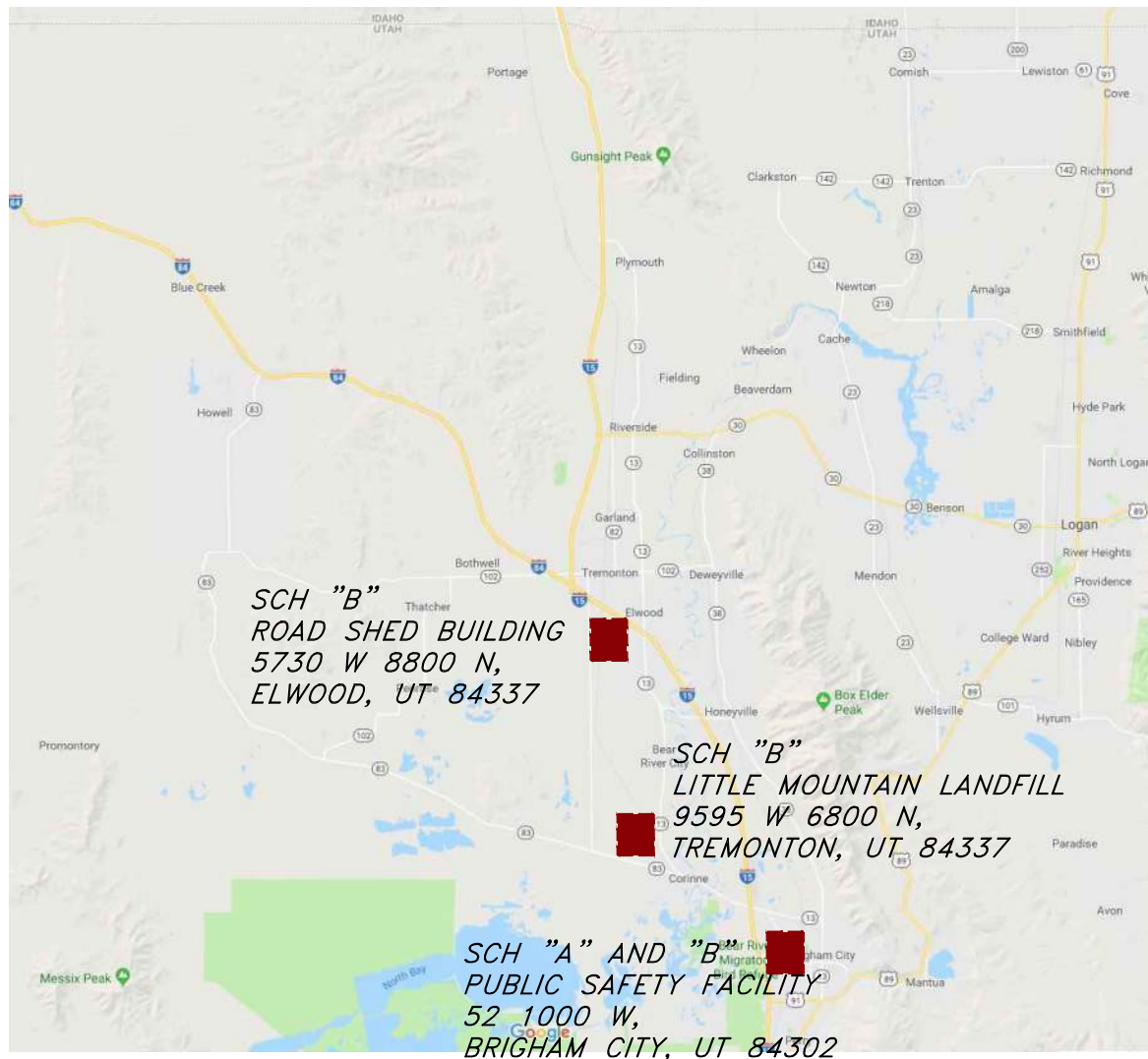
END OF SECTION 02826

Part 5: Drawings

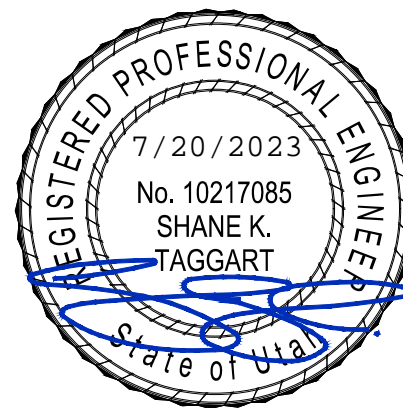
BOX ELDER COUNTY

PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCTION AND FENCING PROJECTS

Index of Drawings



PROJECT LOCATION MAP

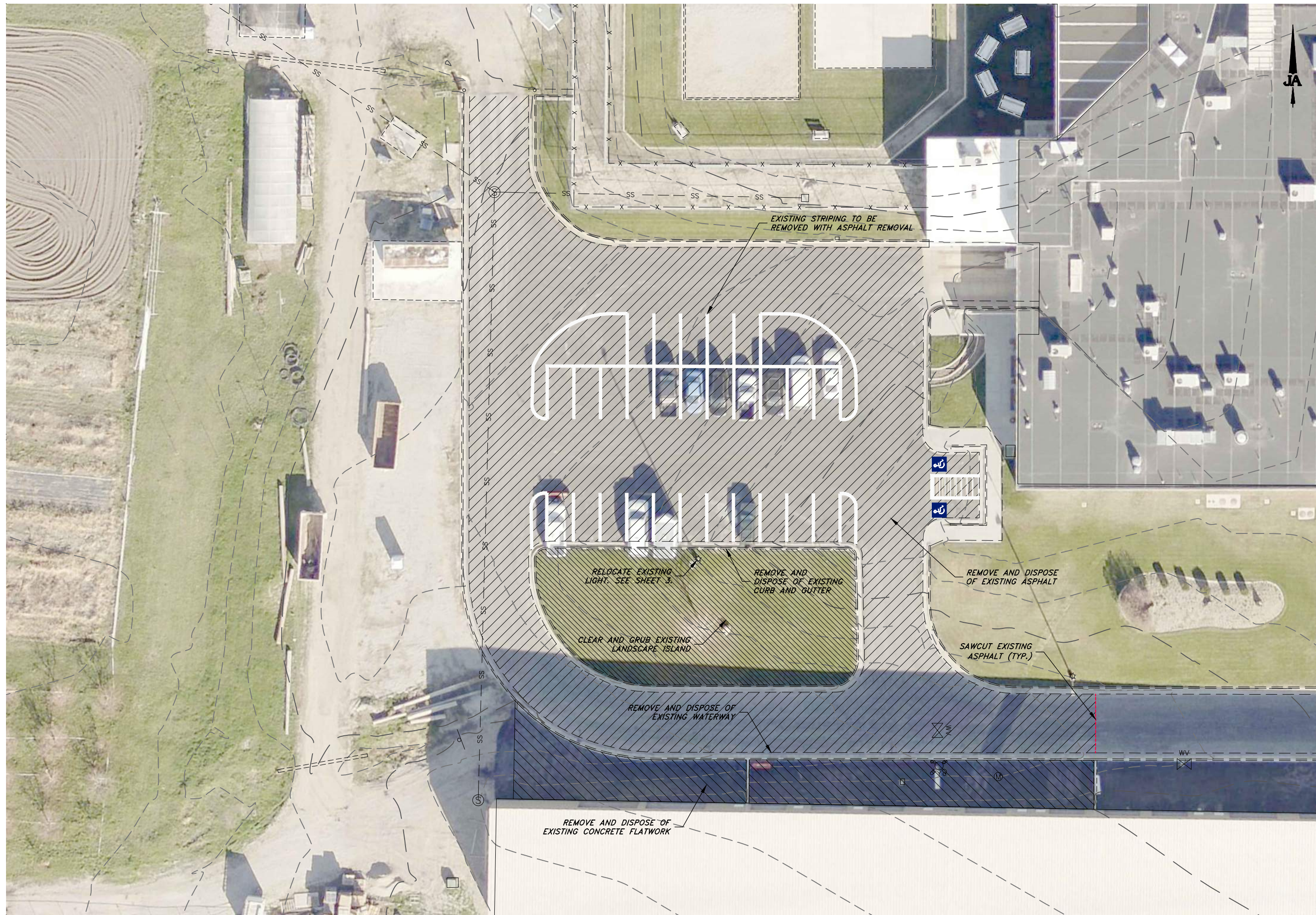


SCHEDULE "A"

- 1 PARKING LOT WEST – DEMOLITION PLAN
- 2 PARKING LOT WEST – GRADING PLAN
- 3 PARKING LOT WEST – PLAN AND PROFILE
- 4 PARKING LOT EAST – DEMOLITION PLAN
- 5 PARKING LOT EAST – GRADING PLAN
- 6 CIVIL DETAILS

SCHEDULE "B" – FENCING

- PUBLIC SAFETY FACILITY
- 7 FENCING OVERALL SITE PLAN
- 8 FENCING DETAIL OPTION "1"
- 9 FENCING DETAIL OPTION "2"
- E001 NOTES AND SYMBOLS
- E002 BOM AND TERMINAL LAYOUT
- E003 ELECTRICAL PANEL LAYOUT
- E004 NETWORK AND CONTROL SCHEMATIC
- E005 ELECTRICAL PANELS AND CALCULATIONS
- E201 SITE ELECTRICAL LAYOUT PLAN
- E501 SCHEDULES AND CONDUIT DEVELOPMENT
- E901 DETAILS 1
- E902 DETAILS 2
- LANDFILL
- 10 FENCING OVERALL SITE PLAN
- 11 FENCING DETAIL
- E001 NOTES AND SYMBOLS
- E002 POWER DISTRIBUTION AND CONTROL PANEL LAYOUT
- E003 GATE CONTROL SCHEMATIC
- E004 GATE ACCESSORY CONTROL WIRING
- E201 SITE ELECTRICAL PLAN LAYOUT
- E901 DETAILS
- ELWOOD ROAD SHED
- 12 FENCING OVERALL SITE PLAN
- 13 FENCING DETAILS
- E001 NOTES AND SYMBOLS
- E002 GATE CONTROL SCHEMATIC
- E003 GATE ACCESSORY CONTROL WIRING
- E201 SITE ELECTRICAL PLAN LAYOUT
- E501 SCHEDULES AND CONDUIT DEVELOPMENT
- E901 DETAILS



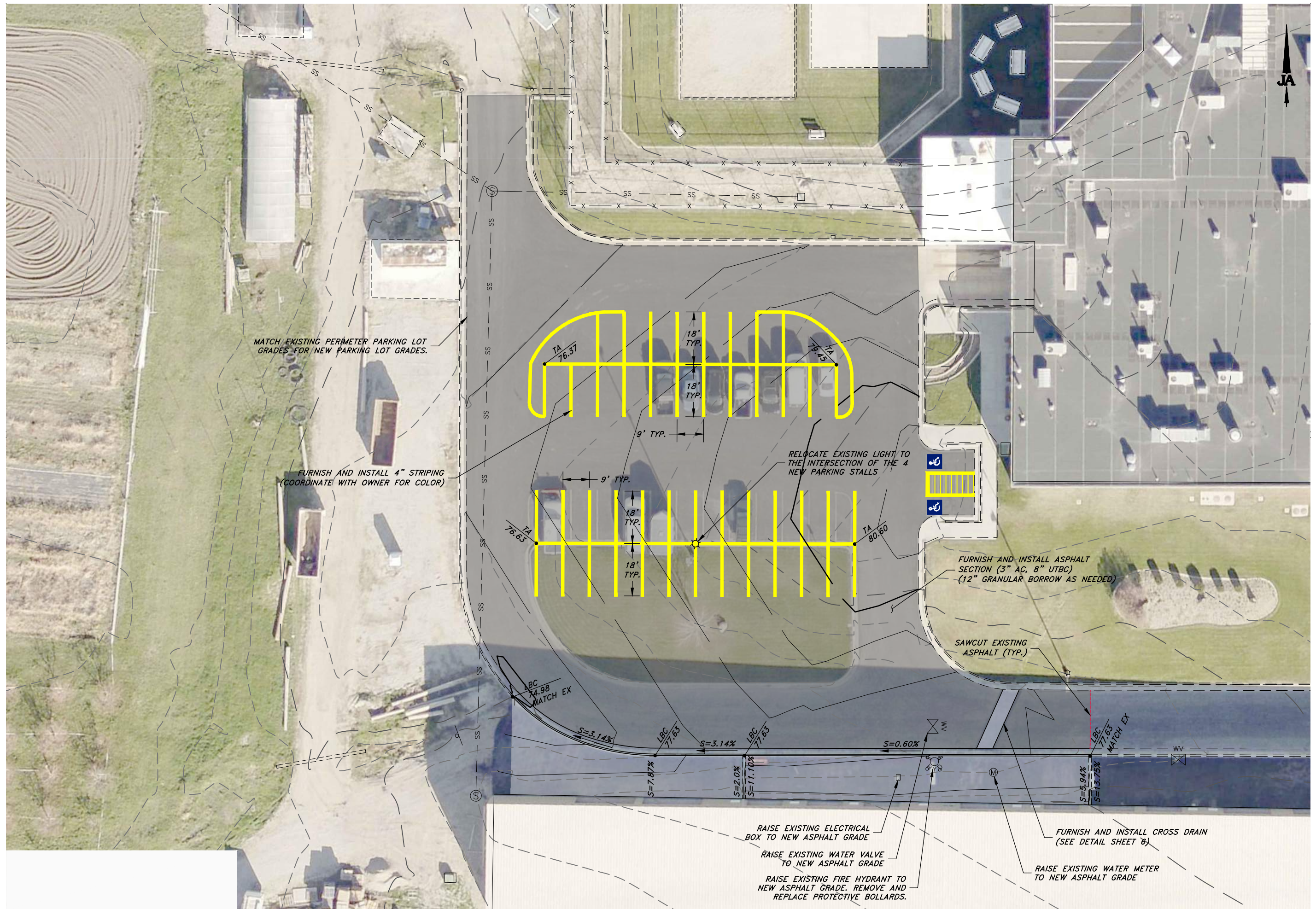
BOX ELDER COUNTY
PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCT AND FENCING

**PARKING LOT WEST
DEMOLITION PLAN**

JONES & ASSOCIATES
CONSULTING ENGINEERS
6080 Fashion Point Drive
South Ogden, Utah 84403
(801) 476-9767 www.jonescivil.com

REV.	DATE	APPR.

SCALE:	SKT DESIGNED	TIME	SKT DRAWN	SKT CHECKED
24" x 36" H:1"=15'				
11" x 17" H:1"=30'				



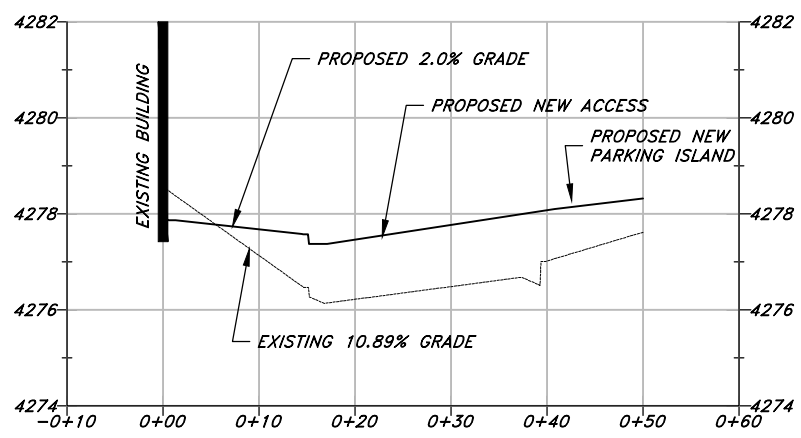
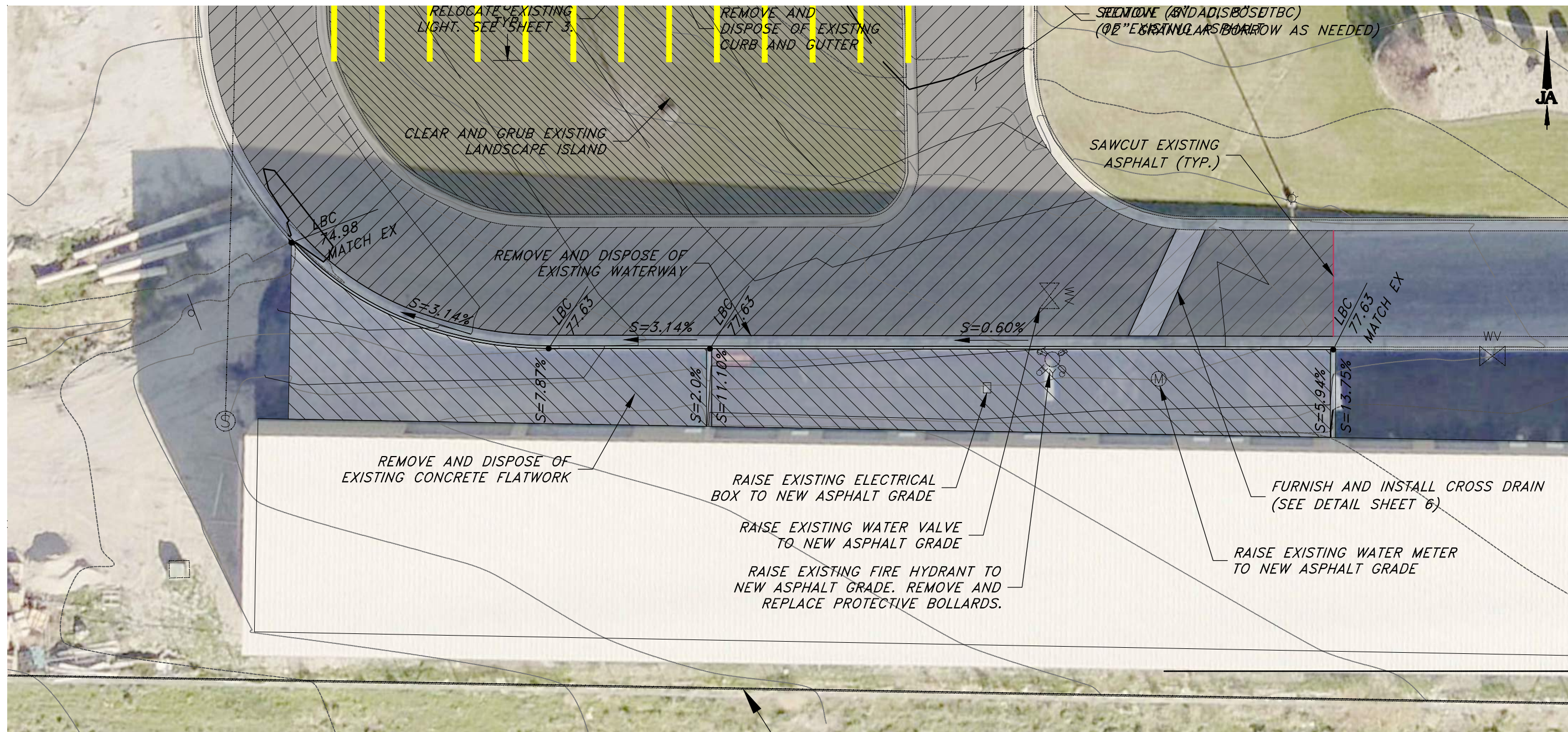
BOX ELDER COUNTY
 PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCT AND FENCING

**PARKING LOT WEST
 GRADING PLAN**

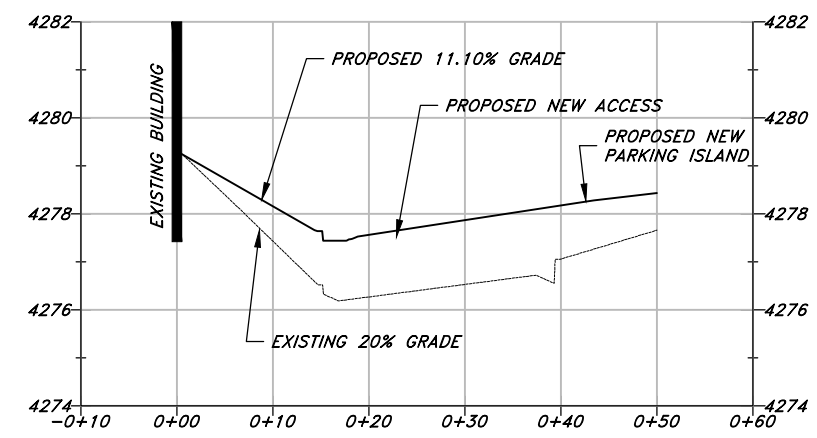
REV.	DATE	APPR.

SCALE:	SKT DESIGNED	TIME	SKT DRAWN	SKT CHECKED
24" x 36" H:1"=15'				
11" x 17" H:1"=30'				

SHEET:
2
 OF 1 SHEETS



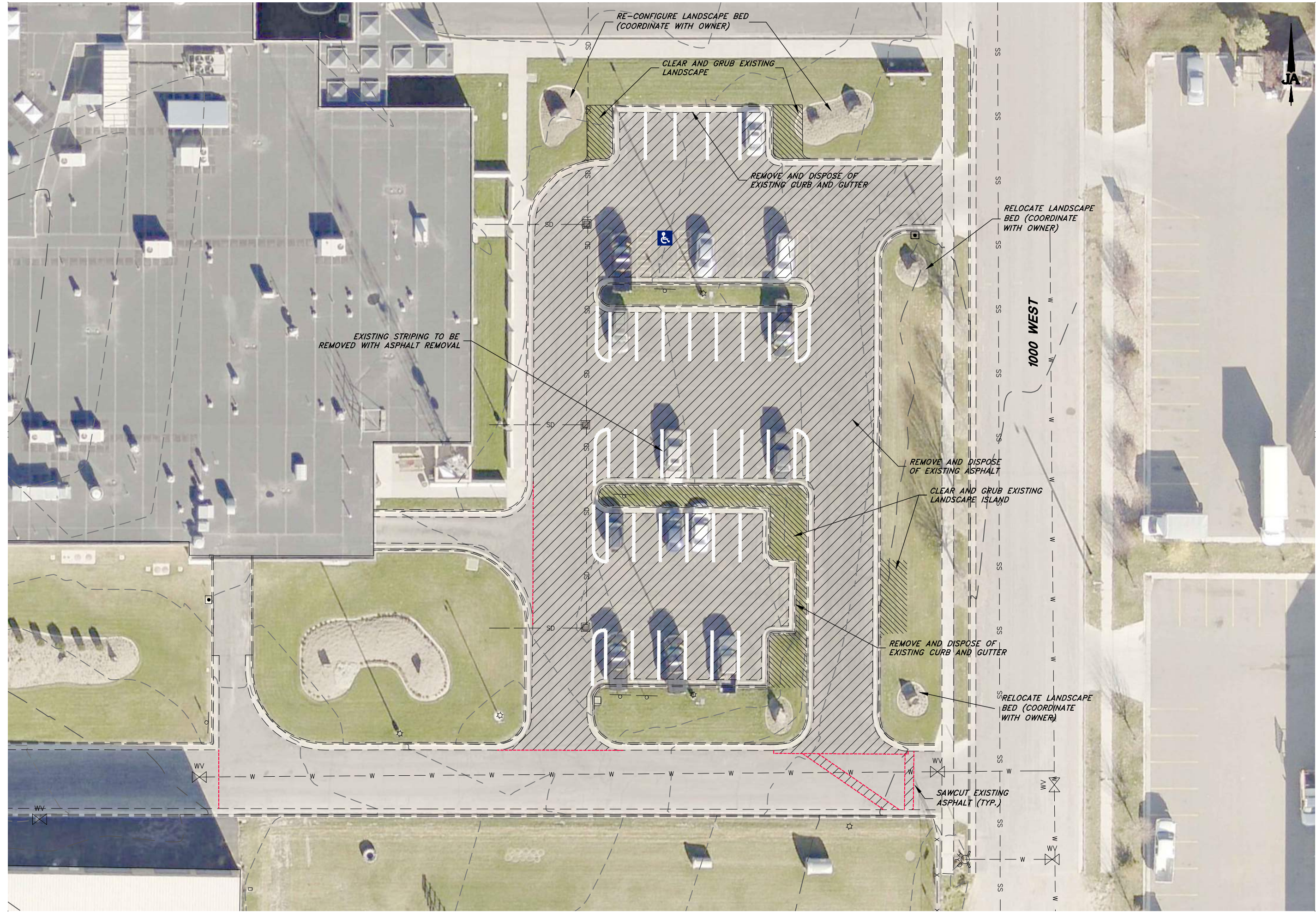
SECTION A-A



SECTION B-B

REV.	DATE	APPR.

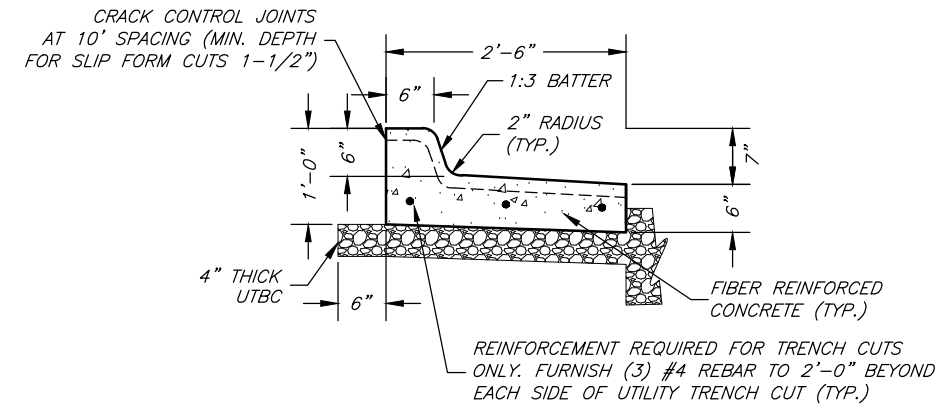
SCALE:	SKT DESIGNED	TIME	SKT DRAWN	SKT CHECKED
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H:1"=30'				
V:1"=4'				
11" x 17"				
H:1"=60'				
V:1"=8'				



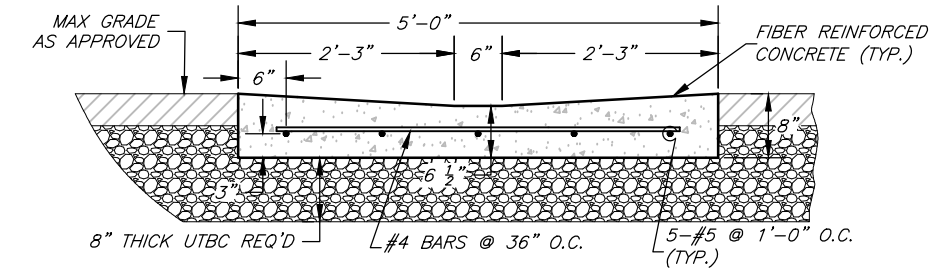
BOX ELDER COUNTY
 PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCT AND FENCING
**PARKING LOT EAST
 DEMOLITION PLAN**

REV.	DATE	APPR.

SCALE:	SKT DESIGNED	TIME	SKT DRAWN	SKT CHECKED
24" x 36" H:1"=15'				
11" x 17" H:1"=30'				



RELEASE CURB & GUTTER SECTION

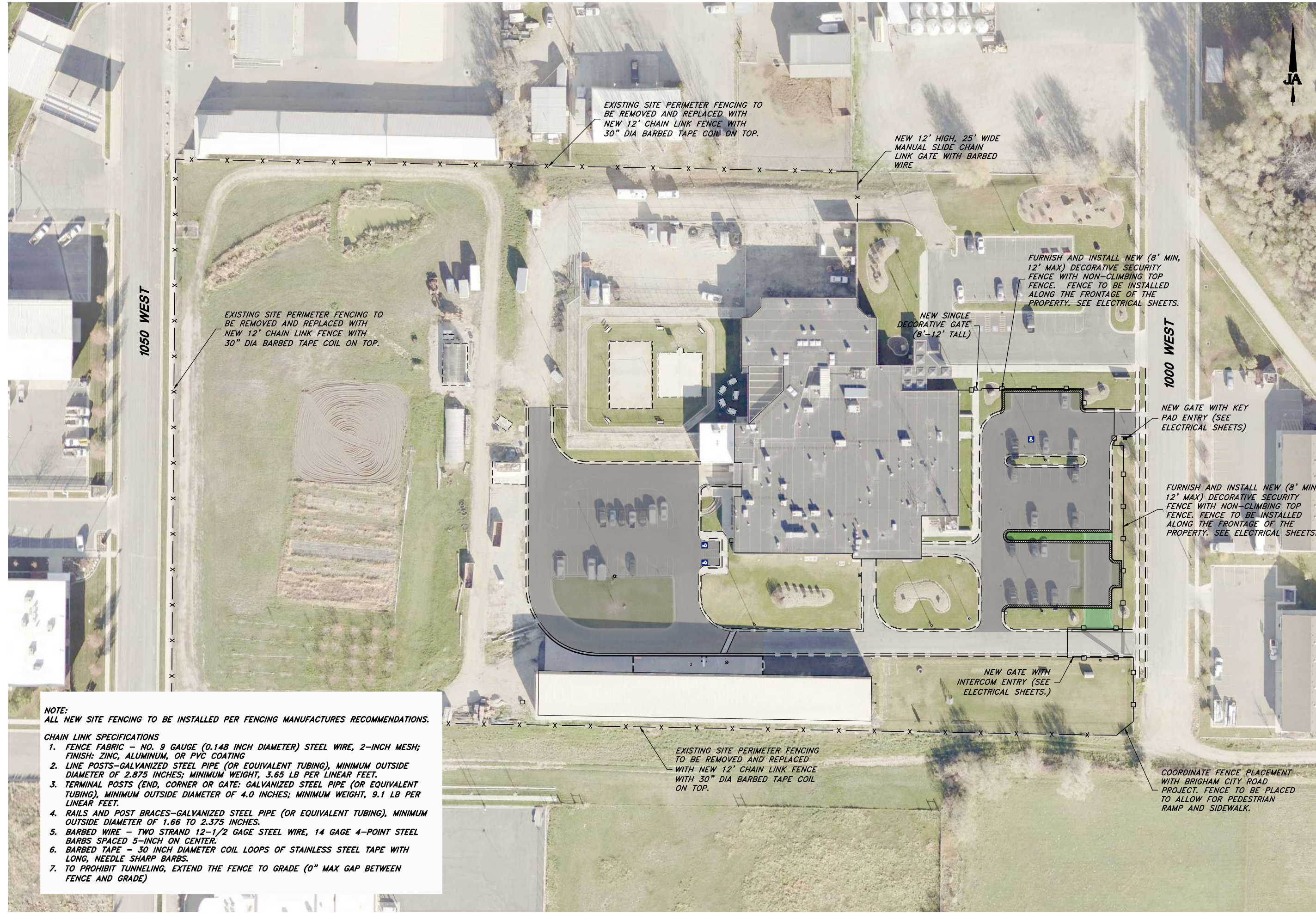


CROSS DRAIN SECTION

- CROSS DRAIN NOTES:**
- D1. CONSTRUCTION & EXPANSION JOINTS @ 5ft, EXPANSION JOINTS @ EDGE OF APRON.
 - D2. CROSS DRAINS SHALL BE CONSTRUCTED WITH 4000 PSI FIBER REINFORCED CONCRETE. VARIANCE AS APPROVED BY THE COUNTY ROAD DEPARTMENT.

REV.	DATE	APPR.

SKT DESIGNED	TIME	SKT CHECKED



EXISTING SITE PERIMETER FENCING TO BE REMOVED AND REPLACED WITH NEW 12' CHAIN LINK FENCE WITH 30" DIA BARBED TAPE COIL ON TOP.

NEW 12' HIGH, 25' WIDE MANUAL SLIDE CHAIN LINK GATE WITH BARBED WIRE

1050 WEST

EXISTING SITE PERIMETER FENCING TO BE REMOVED AND REPLACED WITH NEW 12' CHAIN LINK FENCE WITH 30" DIA BARBED TAPE COIL ON TOP.

FURNISH AND INSTALL NEW (8' MIN, 12' MAX) DECORATIVE SECURITY FENCE WITH NON-CLIMBING TOP FENCE. FENCE TO BE INSTALLED ALONG THE FRONTAGE OF THE PROPERTY. SEE ELECTRICAL SHEETS.

NEW SINGLE DECORATIVE GATE (8'-12' TALL)

1000 WEST

NEW GATE WITH KEY PAD ENTRY (SEE ELECTRICAL SHEETS)

FURNISH AND INSTALL NEW (8' MIN, 12' MAX) DECORATIVE SECURITY FENCE WITH NON-CLIMBING TOP FENCE. FENCE TO BE INSTALLED ALONG THE FRONTAGE OF THE PROPERTY. SEE ELECTRICAL SHEETS.

NEW GATE WITH INTERCOM ENTRY (SEE ELECTRICAL SHEETS.)

EXISTING SITE PERIMETER FENCING TO BE REMOVED AND REPLACED WITH NEW 12' CHAIN LINK FENCE WITH 30" DIA BARBED TAPE COIL ON TOP.

COORDINATE FENCE PLACEMENT WITH BRIGHAM CITY ROAD PROJECT. FENCE TO BE PLACED TO ALLOW FOR PEDESTRIAN RAMP AND SIDEWALK.

NOTE:
ALL NEW SITE FENCING TO BE INSTALLED PER FENCING MANUFACTURERS RECOMMENDATIONS.

CHAIN LINK SPECIFICATIONS

1. FENCE FABRIC - NO. 9 GAUGE (0.148 INCH DIAMETER) STEEL WIRE, 2-INCH MESH; FINISH: ZINC, ALUMINUM, OR PVC COATING
2. LINE POSTS-GALVANIZED STEEL PIPE (OR EQUIVALENT TUBING), MINIMUM OUTSIDE DIAMETER OF 2.875 INCHES; MINIMUM WEIGHT, 3.65 LB PER LINEAR FEET.
3. TERMINAL POSTS (END, CORNER OR GATE: GALVANIZED STEEL PIPE (OR EQUIVALENT TUBING), MINIMUM OUTSIDE DIAMETER OF 4.0 INCHES; MINIMUM WEIGHT, 9.1 LB PER LINEAR FEET.
4. RAILS AND POST BRACES-GALVANIZED STEEL PIPE (OR EQUIVALENT TUBING), MINIMUM OUTSIDE DIAMETER OF 1.66 TO 2.375 INCHES.
5. BARBED WIRE - TWO STRAND 12-1/2 GAGE STEEL WIRE, 14 GAGE 4-POINT STEEL BARBS SPACED 5-INCH ON CENTER.
6. BARBED TAPE - 30 INCH DIAMETER COIL LOOPS OF STAINLESS STEEL TAPE WITH LONG, NEEDLE SHARP BARBS.
7. TO PROHIBIT TUNNELING, EXTEND THE FENCE TO GRADE (0" MAX GAP BETWEEN FENCE AND GRADE)

REV.	DATE	APPR.

SCALE:	SKT DESIGNED	TIME	DRAWN	SKT CHECKED
24' x 36' H:1"=40'				
11' x 17' H:1"=80'				

7/13/2023 CAUSERSUNGEOLKIMIAQUA ENGINEERING BOX ELDER COUNTY - 002405.D BOX ELDER-PUBLIC SAFETY GATE AND FENCING 050 DRAFTING 099 ELECTRICAL SHEET E001 NOTES & SYMBOLS.DWG

SCHEMATIC LINETYPES

	ELECTRICAL BUS		EXISTING OR FUTURE MANUFACTURER/SHOP WIRE
	EXISTING OR FUTURE ELECTRICAL BUS		FIELD/CONTRACTOR INSTALLED WIRE
	MANUFACTURER/SHOP WIRE TYPICALLY INSTALLED OFF-SITE		EXISTING OR FUTURE FIELD/CONTRACTOR INSTALLED WIRE

SCHEMATIC SYMBOLS

	DEVICE CONNECTION LUG OR TERMINAL		HARMONIC FILTER
	SCHEMATIC POINT OF CONNECTION		LOAD REACTOR
	POWER STABS BUS CONNECTION		VARIABLE FREQUENCY DRIVE
	POWER STABS LOAD CONNECTION		REDUCED VOLTAGE SOFT STARTER
	CIRCUIT BREAKER		GROUND CONNECTION
	100AF ← FRAME SIZE		MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE
	50AT ← TRIP RATING		MOTOR STARTER, CONTACTOR, RELAY OR TIMER COIL
	MCP ← BREAKER TYPE		NORMALLY OPEN CONTACT
	DISCONNECT		NORMALLY CLOSED CONTACT
	30A ← AMPERE RATING		SOLENOID VALVE
	4X ← NEMA RATING		EQUIPMENT PROGRAMMING CONSOLE
	FUSE		2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		3 POSITION SELECTOR SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	4X ← NEMA RATING		3 POSITION SELECTOR SWITCH OPEN - CLOSE - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	FUSED DISCONNECT		3 POSITION SELECTOR SWITCH FORWARD - OFF - REVERSE POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		NORMALLY CLOSED PUSH BUTTON
	4X ← NEMA RATING		NORMALLY OPEN PUSH BUTTON
	FUSED DISCONNECT		TYPICAL SWITCH CONFIGURATION
	30A ← AMPERE RATING		FLOAT SWITCH - MAKE ON FALL
	4X ← NEMA RATING		FLOAT SWITCH - MAKE ON RISE
	FUSED DISCONNECT		FLOAT SWITCH - BREAK ON FALL
	30A ← AMPERE RATING		FLOAT SWITCH - BREAK ON RISE
	4X ← NEMA RATING		SWITCH TYPE SYMBOL (SEE BELOW)
	FUSED DISCONNECT		LEVEL SWITCH
	30A ← AMPERE RATING		PRESSURE SWITCH
	4X ← NEMA RATING		FLOW OR TORQUE SWITCH
	FUSED DISCONNECT		TEMPERATURE SWITCH
	30A ← AMPERE RATING		LIMIT SWITCH
	4X ← NEMA RATING		TIMER RELAY CONTACT NORMALLY OPEN TIME DELAY CLOSE
	FUSED DISCONNECT		ELAPSED TIME METER
	30A ← AMPERE RATING		CONTROL RELAY
	4X ← NEMA RATING		TIME DELAY RELAY
	FUSED DISCONNECT		ALARM RELAY
	30A ← AMPERE RATING		PILOT LIGHT LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN
	4X ← NEMA RATING		INSTANTANEOUS SHORT-CIRCUIT TRIP DEVICE
	FUSED DISCONNECT		TIME OVERCURRENT TRIP DEVICE
	30A ← AMPERE RATING		GROUND FAULT TRIP DEVICE
	4X ← NEMA RATING		

ELECTRICAL PLAN LINETYPES

	EXPOSED CONDUIT		BARE COPPER GROUND CONDUCTOR
	EXISTING OR FUTURE EXPOSED CONDUIT		ELECTRICAL EQUIPMENT
	UNDERGROUND CONDUIT		EXISTING OR FUTURE ELECTRICAL EQUIPMENT
	EXISTING OR FUTURE UNDERGROUND CONDUIT		DEMOLITION
	CONDUIT DUCTBANK		CAPPED UNDERGROUND CONDUIT
	EXISTING OR FUTURE CONDUIT DUCTBANK		

ELECTRICAL PLAN HAZARDOUS LOCATION CLASSIFICATION LINETYPES

	C1D1	CLASS I DIV 1		C2D1	CLASS II DIV 1
	C1D2	CLASS I DIV 2		C2D2	CLASS II DIV 2

ELEC. PLAN SYMBOLS

	SITE PLAN DEVICES		LOCAL PANEL OR DEVICE TERMINAL BLOCK
	X = (SEE BELOW)		TERMINAL LABEL
	AE - ANALYZER ELEMENT		PLC PANEL TERMINAL BLOCK
	AIT - ANALYZING INDICATING TRANSMITTER		TERMINAL LABEL
	FE - FLOW ELEMENT		MCC TERMINAL BLOCK
	FIT - FLOW INDICATING TRANSMITTER		TERMINAL LABEL
	FS - FLOW SWITCH		DEVICE TERMINAL BLOCK
	J - JUNCTION BOX		TERMINAL LABEL
	JS - TORQUE SWITCH		PLC DISCRETE INPUT
	LE - LEVEL ELEMENT		DISCRETE INPUT LABEL
	LIT - LEVEL INDICATING TRANSMITTER		PLC DISCRETE OUTPUT (NORMALLY OPEN)
	LS - LEVEL SWITCH		DISCRETE OUTPUT LABEL
	M - MOTOR		PLC DISCRETE OUTPUT (NORMALLY CLOSED)
	MH - MANHOLE		DISCRETE OUTPUT LABEL
	MV - MOTOR OPERATED VALVE		PLC ANALOG INPUT
	PB - PULLBOX		ANALOG INPUT LABEL
	PIT - PRESSURE INDICATING TRANSMITTER		PLC ANALOG OUTPUT
	PS - PRESSURE SWITCH		ANALOG OUTPUT LABEL
	PT - PRESSURE TRANSMITTER		PLC RTD
	SV - SOLENOID VALVE		RTD LABEL
	TS - TEMPERATURE SWITCH		
	WE - WEIGHT ELEMENT		
	WIT - WEIGHT INDICATING TRANSMITTER		
	ZS - LIMIT SWITCH		
	GROUND ROD		
	DUPLEX RECEPTACLE		
	DENOTES RECEPTACLE TYPE (BLANK) = STANDARD INDOORS GFCI = GND FLT CURRENT INT. WP = WEATHER PROOF & GFCI		
	QUADRUPLEX RECEPTACLE		
	DATA JACK		
	SINGLE POLE SWITCH		
	3-WAY SWITCH		
	4-WAY SWITCH		
	CONDUIT SEALOFF		
	LTC CONNECTION		
	MC CONNECTION		
	DISCONNECT SWITCH		
	THERMOSTAT		
	CONDUIT HOME RUN NUMBER INDICATES QUANTITY OF CONDUCTORS INCLUDING GROUND		

TB'S & PLC SYMBOLS

	TERMINAL LABEL
	PLC PANEL TERMINAL BLOCK
	TERMINAL LABEL
	MCC TERMINAL BLOCK
	TERMINAL LABEL
	DEVICE TERMINAL BLOCK
	TERMINAL LABEL
	PLC DISCRETE INPUT
	DISCRETE INPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY OPEN)
	DISCRETE OUTPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY CLOSED)
	DISCRETE OUTPUT LABEL
	PLC ANALOG INPUT
	ANALOG INPUT LABEL
	PLC ANALOG OUTPUT
	ANALOG OUTPUT LABEL
	PLC RTD
	RTD LABEL

EQUIPMENT CALLOUT

	EQUIP. TAG	EQUIPMENT CALLOUT
	DESCRIPTOR #1 DESCRIPTOR #2 DESCRIPTOR #3	
	100 TYP	DETAIL CALLOUT
	FE 101	FIELD INSTRUMENT CALLOUT

CONDUIT CALLOUT

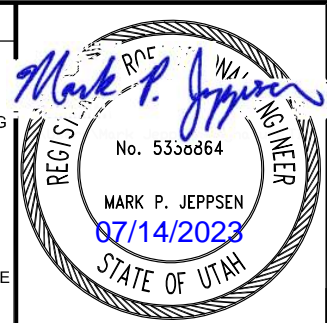
	GROUPED CONDUIT AND CIRCUIT IDENTIFICATION TAGS. REFER TO THE POWER ONE-LINE AND CONTROL ONE-LINE DIAGRAMS OR CONDUIT SCHEDULES FOR CONDUIT SIZES AND CONTENTS. C-CONTROL/INSTRUMENTATION P-POWER F-FIBER OPTIC/NETWORK SP-SPARE CONDUITS
	CXXX PXXX FXXX SPXXX

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
AIC	AMPS INTERRUPTING CAPACITY
AO	ANALOG OUTPUT
AS	AIR SUPPLY
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CL2	CHLORINE
CPT	CONTROL POWER TRANSFORMER
CTC	COMMUNICATIONS TERMINATION CABINET
CU	COPPER, BARE
CV	CONTROL VALVE
DCS	DISTRIBUTED CONTROL SYSTEM
DI	DISCRETE INPUT
DO	DISCRETE OUTPUT
DP	DISTRIBUTION PANEL
DS	DISCONNECT SWITCH
DV/DT	DIFFERENTIAL VOLTAGE/TIME DRAWING
DWG	DRAWING
ETM	ELAPSED TIME METER
EOL	ELECTRONIC OVERLOAD
FE	FLOW ELEMENT
FLA	FULL LOAD AMPS
FOC	FIBER OPTIC CABLE
FOR	FORWARD-OFF-REVERSE
FS	FLOW SWITCH
FVNR	FULL VOLTAGE NON-REVERSING
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GPM	GALLONS PER MINUTE
GRS	GALVANIZED RIGID STEEL
H2S	HYDROGEN SULFIDE
HH	HANDHOLE
HMI	HUMAN MACHINE INTERFACE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE CURRENT
I	INSTRUMENTATION CABLE
IC	INPUT/OUTPUT
IO	SHORT CIRCUIT CURRENT
ISC	JUNCTION BOX
J	LOCAL AREA NETWORK
LAN	LOCAL CONTROL PANEL
LCP	LOCK-OUT-STOP
LOS	LOCK-OUT-STOP
LP	LIGHTING PANEL
LR	LOCAL/REMOTE
LS	LEVEL SWITCH
LTC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
M	MOTOR
MA	MANUAL/AUTO, MILLIAMP
MC	MANUFACTURER'S CABLE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MFR(S)	MANUFACTURER(S)
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MOV	MOTOR OPERATED VALVE
MTU	MASTER TELEMETRY UNIT
NEC	NATIONAL ELECTRICAL CODE
NOTC	NORMALLY OPEN TIMED CLOSED
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
NTU	TURBIDITY
OIT	OPERATOR INTERFACE TERMINAL
OL	OVERLOAD
OO	ON/OFF (MAINTAINED)
OR	OFF-REMOTE
PB	PULL BOX
PC	PERSONAL COMPUTER
PFR	PHASE/POWER FAILURE RELAY
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PPM	PARTS PER MILLION
PR	PAIR
P	PRESSURE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PV	PROCESS VARIABLE
RCP	REMOTE CONTROL PANEL
RF	RADIO FREQUENCY
RIO	REMOTE INPUT OUTPUT
RST	RESET
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TELEMETRY UNIT
RVSS	REDUCED VOLTAGE SOFT STARTER
SEQ	SERVICE ENTRANCE EQUIPMENT
SES	SERVICE ENTRANCE SECTION
SLOS	START-LOCK-OFF-STOP
SMC	SUBMERSIBLE MANUFACTURER CABLE
SO2	SULFUR DIOXIDE
SP	SET POINT/SPARE
SPD	SURGE PROTECTION DEVICE
SS	START/STOP
ST	SHUNT TRIP
TC	TELEPHONE CABLE
TS	TEMPERATURE SWITCH
TYP	TYPICAL
UG	UNDERGROUND
V	VOLT
VA	VOLTAMP
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZS	POSITION SWITCH

NOTES

- THE COMPLETED INSTALLATION SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NEC STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
- VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY AFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
- THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
- ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
- PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
- LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS. LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
- CIRCUIT CONDUCTORS #6 AWG OR SMALLER SHALL BE THWN STRANDED COPPER. #4 AWG THROUGH #2 AWG SHALL BE XHHW STRANDED COPPER. #1 AWG OR LARGER SHALL BE XHHW-2 STRANDED COPPER. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG WITH #12 AWG GROUND. ALL WIRE TO BE SIZED PER NEC TABLE 316-10, 75° C BASED ON A 30° C AMBIENT.
- UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH. MINIMUM CONDUIT DEPTH UNDER SLAB SHALL BE 1 INCH.
- CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS OR NYLON TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED AND SECURED.
- EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL (GRS). MINIMUM SIZE 3/4 INCH, UNLESS OTHERWISE NOTED ON THE PLANS.
- SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE.
- THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND OEM MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
- TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.
- REFER TO SPECIFICATION 260533 "RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS" FOR CONDUIT SPACING AND ROUTING REQUIREMENTS.



DRAWING IS TO SCALE		IF BAR MEASURES:	
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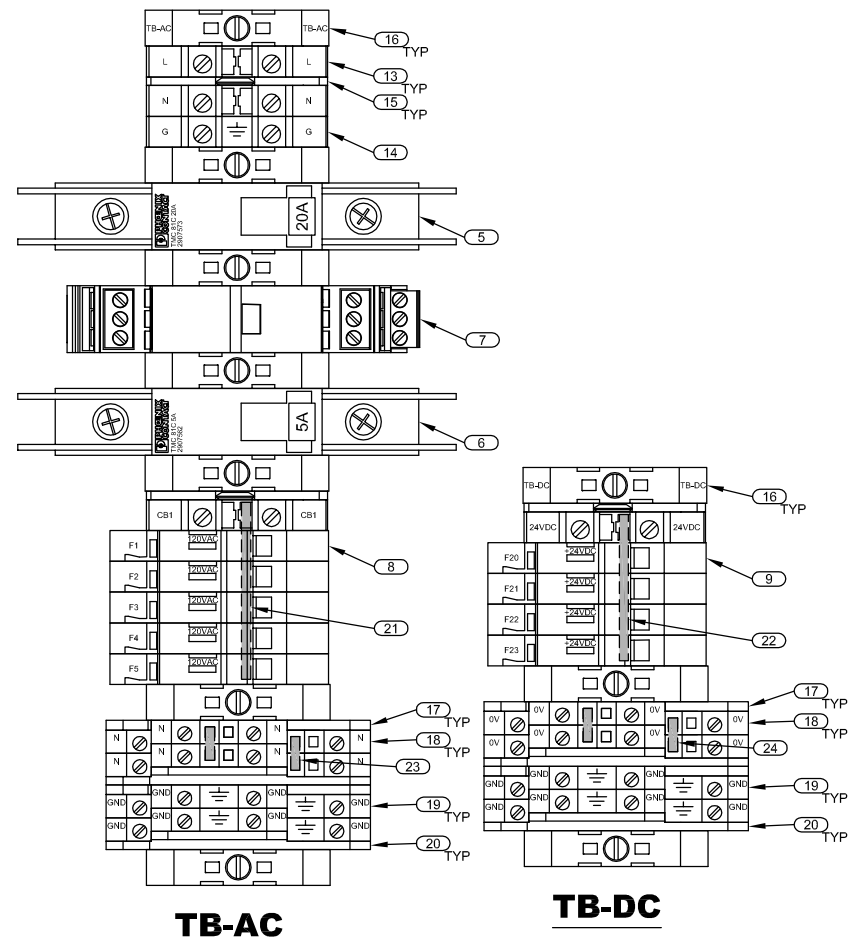
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PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
NOTES & SYMBOLS

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DRAWING NO.
E001

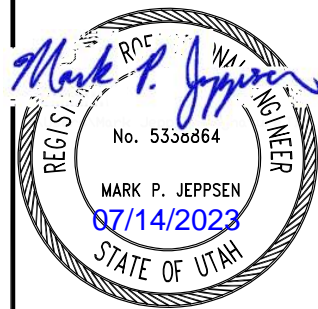
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TERMINAL LAYOUTS

ITEM	QUANTITY	MAKE	MODEL	DESCRIPTION
1	2	PHOENIX	2904601	10A 24VDC QUINT POWER SUPPLY
2	1	PHOENIX	2907719	24VDC REDUNDANCY DIODE
3	1	PHOENIX	2320225	10A 24VDC UPS MODULE
4	1	PHOENIX	1274119	12Ah 24V POWER STORAGE BATTERY
5	1	PHOENIX	2907573	20A CIRCUIT BREAKER
6	1	PHOENIX	2907562	5A CIRCUIT BREAKER
7	1	PHOENIX	2907918	120V TYPE 2-3 SURGE PROTECTION DEVICE
8	LOT	PHOENIX	3046430	UT6 120V FUSE TERMINAL BLOCK WITH LED
9	LOT	PHOENIX	3046414	UT6 24V FUSE TERMINAL BLOCK WITH LED
10	1	PHOENIX	SCE-48EL3612SSLPPL	48"x36"x12" STAINLESS ELECTRICAL ENCLOSURE
11	1	PHOENIX	SCE-48P36	BACKPANEL FOR 48"x36" ENCLOSURES
12	1	PHOENIX	SCE-ELMFK4SS6	PANEL MOUNTING FOOT KIT
13	LOT	PHOENIX	3044102	6.2MM TERMINAL BLOCK, FITS UP TO #10, UT4
14	LOT	PHOENIX	3044128	6.2MM GND TERMINAL BLOCK UT4-PE
15	LOT	PHOENIX	3047028	UT SERIES END PLATE
16	LOT	PHOENIX	800886	END BLOCK
17	LOT	PHOENIX	3047303	UTTB4 TERMINAL SPACER PLATE
18	LOT	PHOENIX	3044814	UTTB4 16-10GA TWO POLE FEED THROUGH TERMINAL
19	LOT	PHOENIX	3044759	UTTB4 16-10GA DOUBLE LEVEL GROUND TERMINAL
20	LOT	PHOENIX	3047293	UTTB4 DOUBLE LEVEL TERMINAL END COVER
21	LOT	PHOENIX	3030323	UT6 10 TERMINAL PLUG IN BRIDGE - RED
22	LOT	PHOENIX	3032606	UT6 10 TERMINAL PLUG IN BRIDGE - BLUE
23	LOT	PHOENIX	3032224	UT4 50 TERMINAL PLUG IN BRIDGE - RED
24	LOT	PHOENIX	3032211	UT4 50 TERMINAL PLUG IN BRIDGE - BLUE
25	LOT	PANDUIT	F4X4WH6	4" x 4" WIRE DUCT, WHITE
26	LOT	PANDUIT	C4WH6	4" WIRE COVER, WHITE
27	LOT	PANDUIT	F1X4WH6	1" x 4" WIRE DUCT, WHITE
28	LOT	PANDUIT	C1WH6	1" WIRE COVER, WHITE
29	LOT	PANDUIT	F1X4LG6	1" x 4" WIRE DUCT, LT GRAY
30	LOT	PANDUIT	C1LG6	1" WIRE COVER, LT GRAY
31	LOT	IBOCO	OM3AF	DIN RAIL
32	LOT	TYTON	CTAM1	TIE DOWN CLIPS
33	LOT	PHOENIX	VARIES	TERMINAL BLOCK LABELS
34	LOT	PHOENIX	VARIES	WIRE LABELS
35	LOT	PHOENIX	VARIES	BACKPANEL ADHESIVE LABELS
36	LOT	CUSTOM	VARIES	ENGRAVED LABELS
37	1	VARIOUS	VARIOUS	ETHERNET AND FIBER SWITCH
38	1	CORNING	SHP-01P	FIBER PATCH PANEL ENCLOSURE
39	1	CORNING	CCH-CP12	FIBER TERMINATION PANEL
40	1	LEVITON	CR15	NEMA 5-15R DUPLEX RECEPTACLE
40A	1	LEVITON	SL8	SINGLE GANG DUPLEX RECEPTACLE COVER PLATE
40B	1	BELL	5320-0	SINGLE GANG ELECTRICAL BOX
41	LOT	BELDEN	8760	#18 TWISTED SHIELDED PAIR, TINNED COPPER
42	1	PFANNENBERG	FLH-TF125-120	120VAC 125W PANEL HEATER WITH BUILT IN THERMOSTAT
43	1	VERKADA	AC-41	5-DOOR CONTROLLER PANEL

BILL OF MATERIALS



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		REVISIONS			

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
BOM & TERMINAL LAYOUT

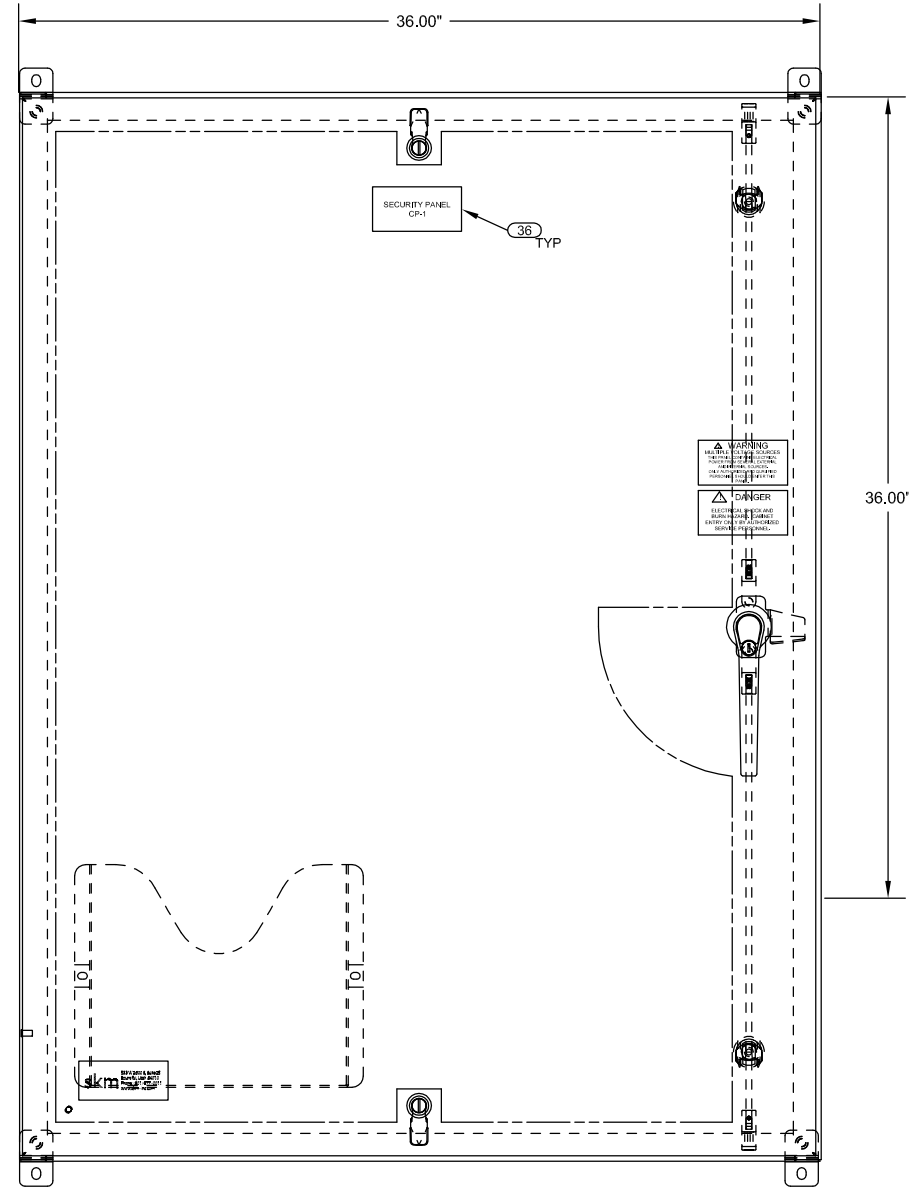
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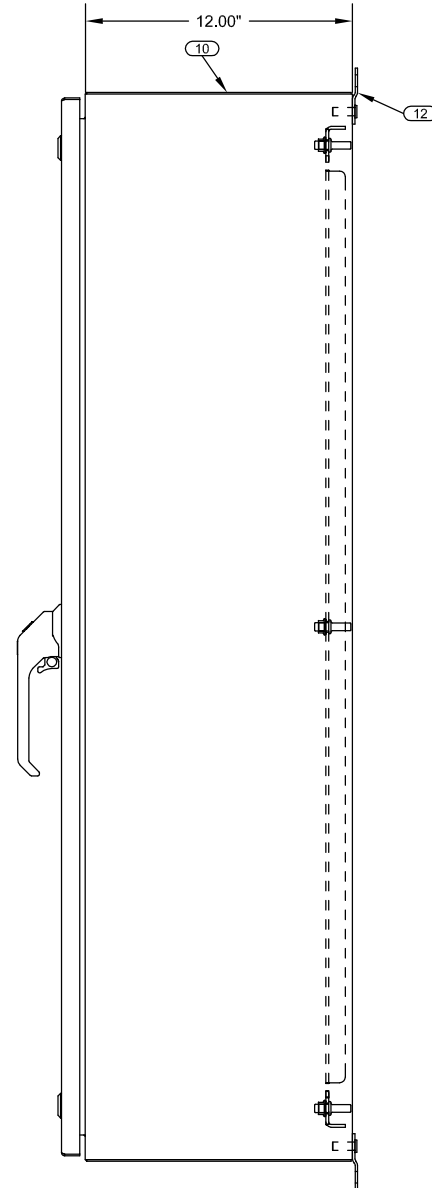
E002

SHEET

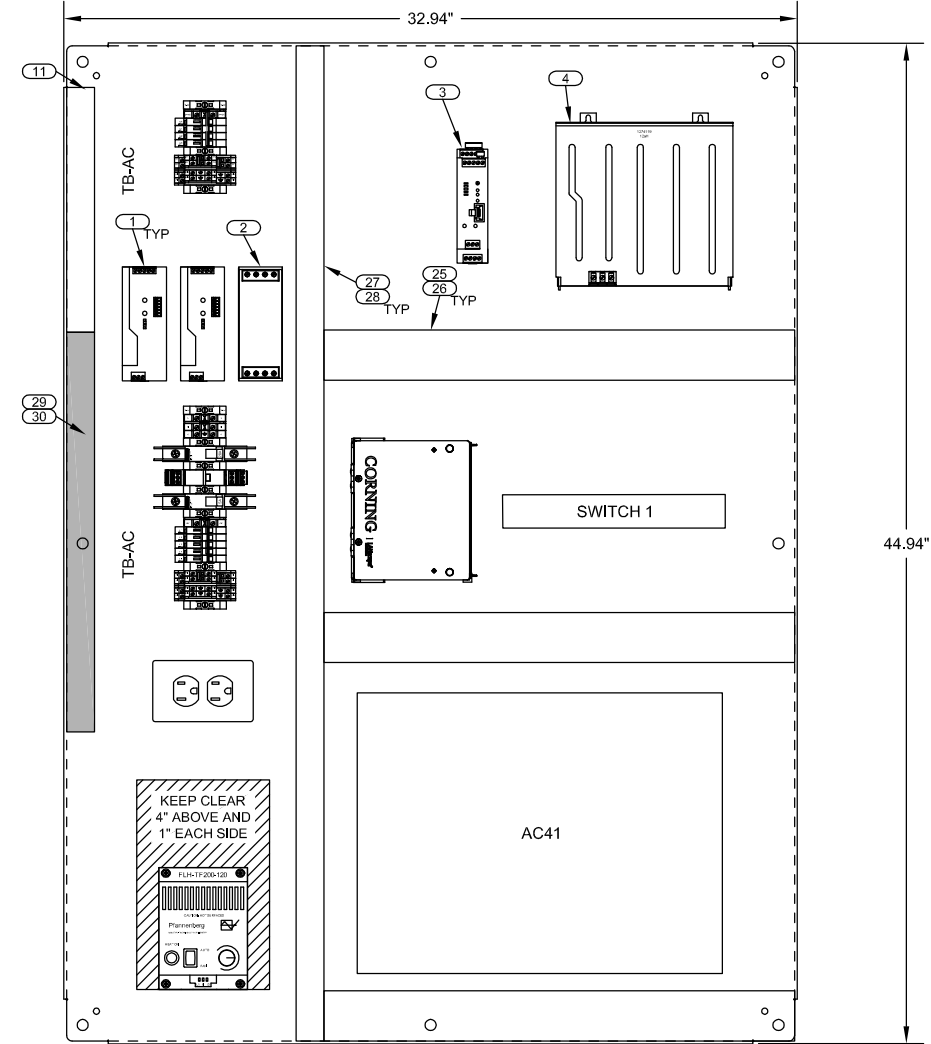
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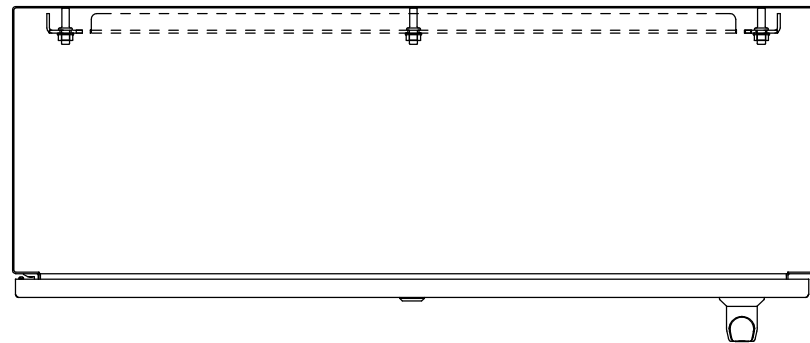
PANEL FRONT VIEW



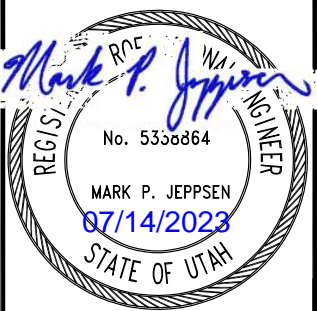
PANEL SIDE VIEW



BACKPANEL LAYOUT VIEW



PANEL TOP VIEW



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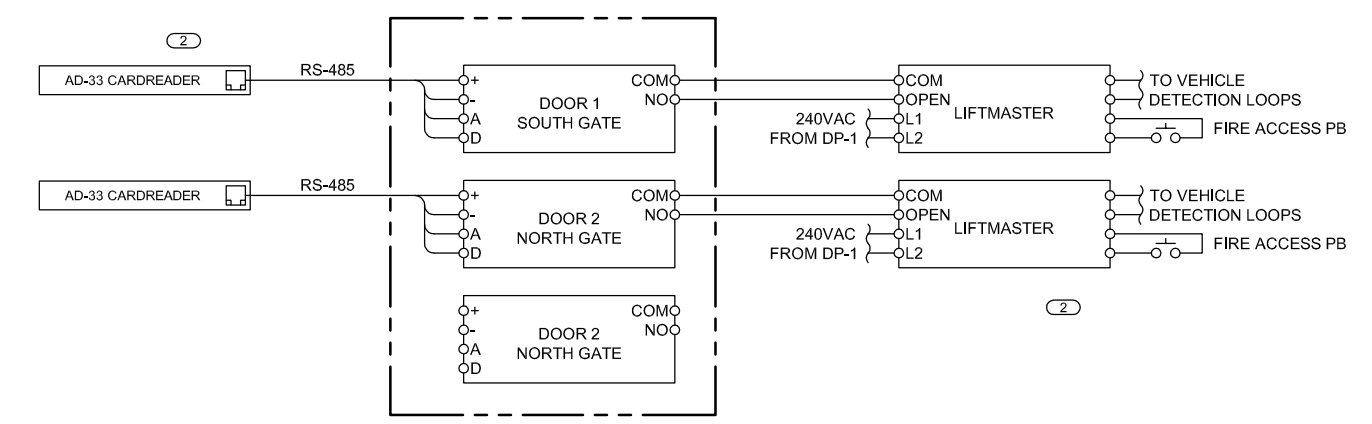
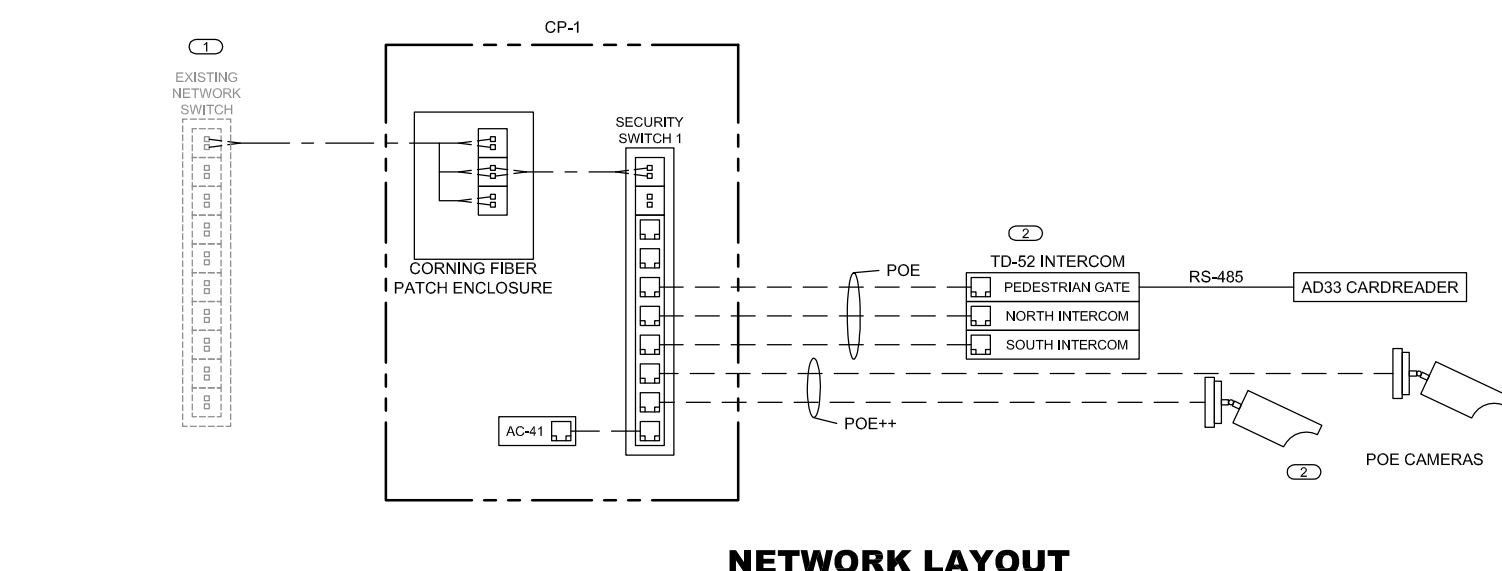
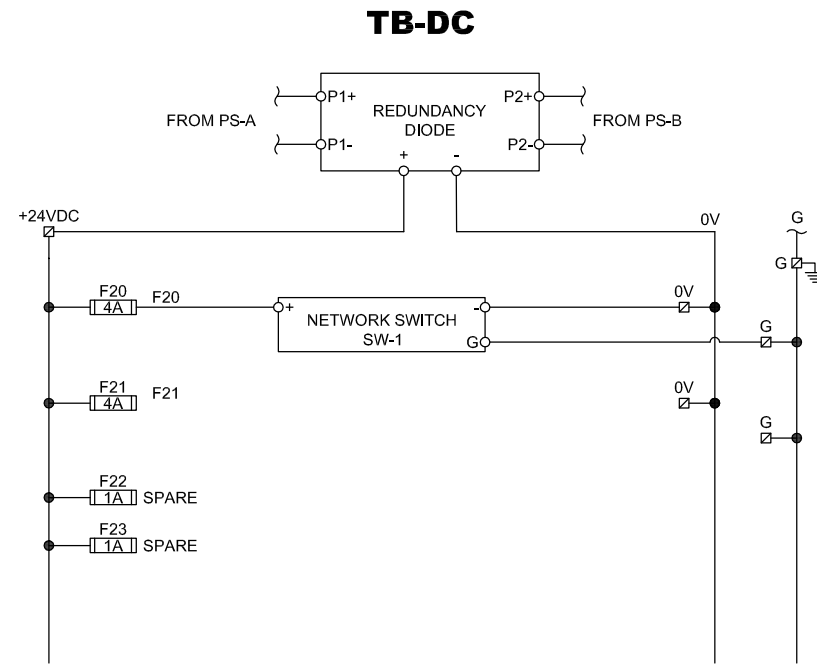
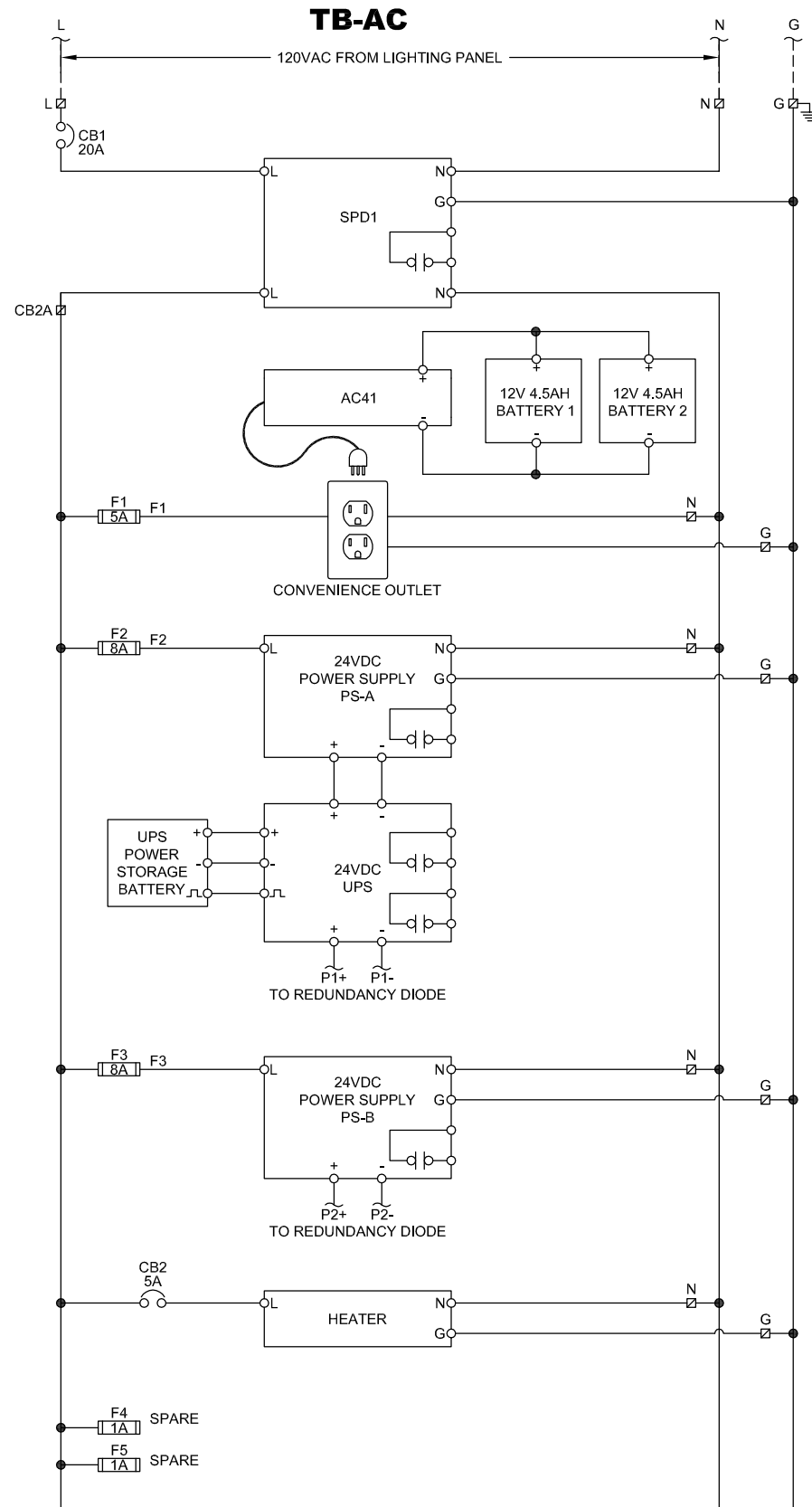
BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
ELECTRICAL PANEL LAYOUT

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E003

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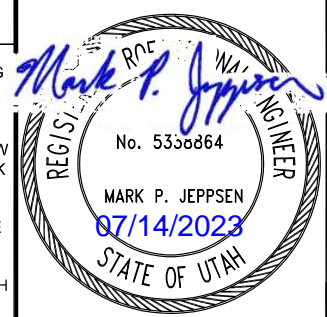
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NOTES

- 1 NEW SECURITY NETWORK WILL BE TIED INTO EXISTING NETWORK USING SPARE PORTS IN THE SWITCH IN STACY'S SHOP. CONTRACTOR TO PROCURE AND INSTALL A RACK MOUNT PATCH PANEL IN EXISTING NETWORK CABINET. CONTRACTOR SHALL INSTALL NEW FIBER ACCORDING TO THE SPECIFICATIONS, NETWORK LAYOUT AND CONDUIT SCHEDULES.
- 2 OWNERS SYSTEM INTEGRATOR WILL BE RESPONSIBLE FOR PROVIDING NETWORK SWITCHES IN CP1, CAMERAS, CARDREADERS, AND AC-41 DOOR CONTROLLER. CONTRACTOR SHALL COORDINATE WITH THE COUNTY REPRESENTATIVES DURING INSTALLATION AND COMMISSIONING.

DESIGN AND SPECIFICATION HAVE BEEN DEVELOPED AROUND THE VERKADA SYSTEM AT THE REQUEST OF THE COUNTY AND THEIR IT DEPARTMENT. CONTRACTOR TO PROCURE AND INSTALL A COMPLETE SYSTEM PER THE DESIGN AND SPECIFICATION SUCH THAT IT INTEGRATES SEAMLESSLY WITH THE VERKADA SYSTEM. IF THE CONTRACTOR'S INTENTION IS TO PROCURE AN EQUAL SECURITY VENDOR THE ENGINEER'S APPROVAL IS REQUIRED PRIOR TO AWARD OF BID.



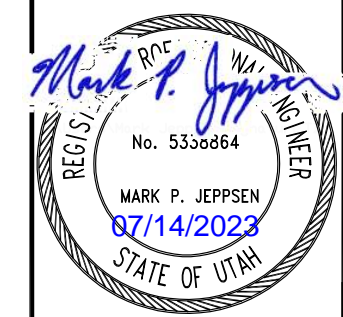
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BOX ELDER COUNTY, UTAH
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SHERIFF BUILDING AND COUNTY JAIL
NETWORK & CONTROL SCHEMATIC

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E004
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INSTALL A 50A 2P BREAKER TO POWER DP-1

CONTRACTOR SHALL REPLACE THE EXISTING 200A BREAKER WITH A NEW SERVICE RATED 150A BREAKER. THE REMAINING 50A WILL BE USED TO POWER NEW DISTRIBUTION PANEL DP-1.

NEW CONDUIT TO DP-1
 NEW STUBBED SPARE POWER CONDUIT
 INSTALL A NEW FIBER PULL BOX "JB-F" TO BE 6"x6"x6"
 NEW STUBBED SPARE COMM CONDUIT

EXISTING POWER DISTRIBUTION

PANEL: DP-1				VOLTAGE: 120/240		MAIN CB: 50 AMP		BUS AMPS: 100 AMP	
				BUS A.I.C.: 22KA		BKR A.I.C.: 22KA		MOUNTING: SURFACE	
CIRCUIT DESCRIPTION	BKR	CIRCUIT	LOAD	PHASE	LOAD	CIRCUIT	BKR	CIRCUIT DESCRIPTION	
NORTH GATE MOTOR	20/2	1	1200	A		2	20/1		
		3	1200	B		4	20/1		
SOUTH GATE MOTOR	20/2	5	1200	A		6	20/1		
		7	1200	B		8	20/1		
CP-1	20/1	9	180	A		10	20/1		
		11		B		12	20/1		
CONNECTED VA PER PHASE			PHASE A		PHASE B	NOTES:			
CONNECTED AMPS PER PHASE			2580.0		2400.0				
25% OF CONTINUOUS & LIGHTING LOAD (VA)			21.5		20.0				
CODE VA PER PHASE			645.0		600.0				
CODE AMPS PER PHASE			3225.0		3000.0				
			26.9		25.0				

DP-1 LOAD CALCULATIONS

CKT.#	DESCRIPTION	VOLT	AMPS	FEET	CABLE		VOLTAGE	
					SIZE	VD/KA-FT	DROP	%
1	CP-1	240	50	460	0	0.229	5.8	2.2
2	NORTH GATE	240	10	200	12	2.911	5.8	2.4

VOLTAGE DROP CALCULATIONS

DRAWING IS TO SCALE
 IF BAR MEASURES:
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 1/2" = HALF SCALE

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BOX ELDER COUNTY, UTAH
 PUBLIC SAFETY GATE AND FENCING PROJECT
 SHERIFF BUILDING AND COUNTY JAIL
 ELECTRICAL PANELS AND CALCULATIONS

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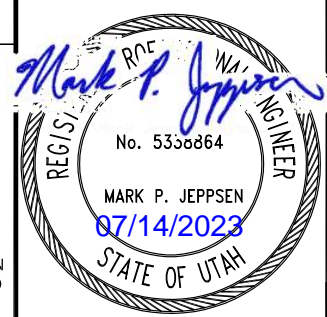


SITE ELECTRICAL LAYOUT PLAN

SCALE: 1:40
 0 40 80
 Scale in Feet

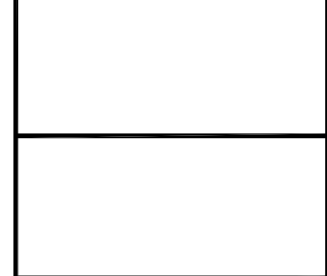
NOTES

- ① CP-1 TO BE INSTALLED BY CONTRACTOR FACING NORTH ACCORDING TO DETAIL 015. DP-1 SHALL BE INSTALLED BY THE CONTRACTOR ON THE SOUTH FACING SIDE OF THIS NEW EQUIPMENT RACK. ALL CABINETS REQUIRES SUN PROTECTION AS SHOWN IN DETAIL 901.
- ② VEHICLE DETECTION LOOP CABLE TO BE PROVIDED AND INSTALLED BY CONTRACTOR PER SPECIFICATION OF THE MOTOR SUPPLIER. LOOPS TO BE TERMINATED ACCORDING TO WIRING DIAGRAM ON E003.
- ③ PEDESTALS FOR KEYPAD, INTERCOM AND FIRE ACCESS BOX TO BE PROVIDED AND INSTALLED BY CONTRACTOR.
- ④ PB-1, PB-1A AND PB-2 FIBER AND POWER PULL BOXES TO BE INSTALLED BY CONTRACTOR PER DETAIL 023.
- ⑤ ALL EXPOSED CONDUITS SHALL BE PVC COATED GR.
- ⑥ GATES SHALL BE GROUNDED USING DETAIL NUMBER 101, GROUND SHOULD BE ESTABLISHED PER THE LIFTMASTER INSTALLATION GUIDE AND SPECIFICATIONS. GROUNDING FOR THE CONTROL BOARD SHALL BE TIED INTO NEW GROUND GRID AT DP-1. GROUNDS TO KEYPAD ENTRIES MUST BE BONDED TO METAL ENCLOSURES AND RETURN TO CONTROL BOARD, SEE CONDUIT DEVELOPMENT.
- ⑦ DESIGN AND SPECIFICATIONS HAVE BEEN DEVELOPED AROUND THE LIFTMASTER SL585UL GATE CONTROLLER. CONTRACTOR TO SUPPLY AND INSTALL GATES AND ACCESSORIES PER THE DESIGN AND SPECIFICATIONS. IF THE CONTRACTORS INTENTION IS TO PROCURE EQUAL GATE VENDOR THE ENGINEER'S APPROVAL IS REQUIRED PRIOR TO AWARD OF BID.

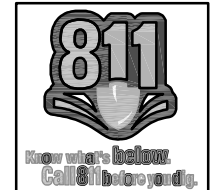


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BOX ELDER COUNTY, UTAH
 PUBLIC SAFETY GATE AND FENCING PROJECT
 SHERIFF BUILDING AND COUNTY JAIL
 SITE ELECTRICAL LAYOUT PLAN



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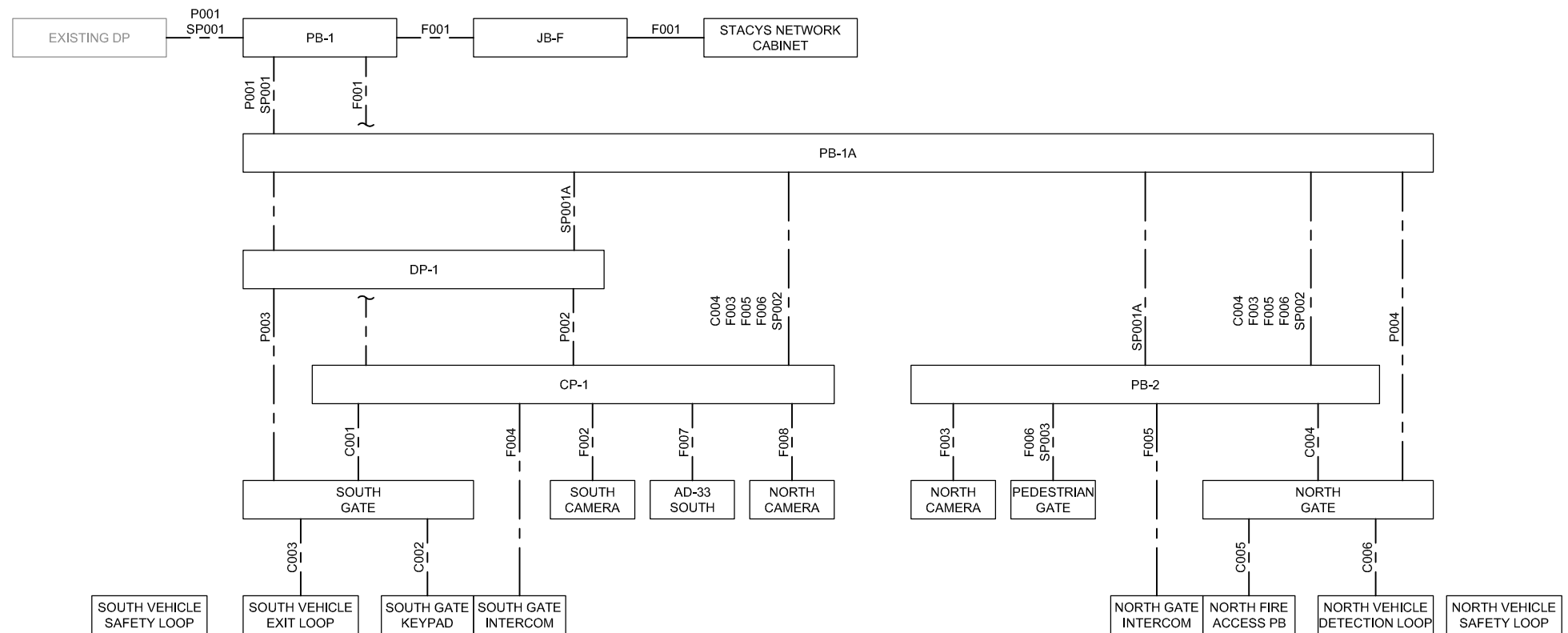


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E201
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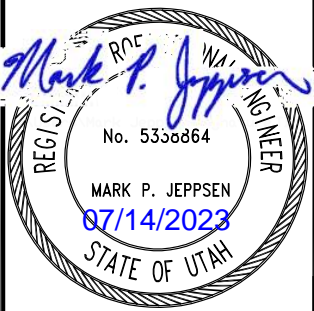
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SHERIFF AND COUNTY JAIL POWER CONDUIT						
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES
P001	2"	3 #1/0 W#6 GND	240VAC	EXISTING DP	DP-1	THROUGH PB-1 & PB-1A
P002	1"	2#12 W#12 GND	120VAC	DP-1	CP-1	
P003	1"	2#12 W#12 GND	240VAC	DP-1	SOUTH GATE	
P004	1"	2#12 W#12 GND	240VAC	DP-1	NORTH GATE	THROUGH PB-2
SHERIFF AND COUNTY JAIL CONTROL CONDUIT						
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES
C001	1"	2#14	CONTROL	CP-1/AD-41	SOUTH GATE	
C002	1"	2#14 W#14 GND	CONTROL	SOUTH GATE	FIRE ACCESS SOUTH PUSHBUTTON	PROVIDED BY GATE MOTOR SUPPLIER AS ACCESSORY
C003	1"	LOOP CONDUCTORS - EXIT LOOP	CONTROL	SOUTH GATE	SOUTH GATE VEHICLE DETECTION LOOPS	PROVIDED BY GATE MOTOR SUPPLIER AS ACCESSORY
C004	1"	2#14	CONTROL	CP-1/AD-41	NORTH GATE	THROUGH PB-2
C005	1"	2#14 W#14 GND	CONTROL	NORTH GATE	FIRE ACCESS NORTH PUSHBUTTON	PROVIDED BY GATE MOTOR SUPPLIER AS ACCESSORY
C006	1"	LOOP CONDUCTORS - EXIT LOOP	CONTROL	NORTH GATE	NORTH GATE VEHICLE DETECTION LOOPS	PROVIDED BY GATE MOTOR SUPPLIER AS ACCESSORY
SHERIFF AND COUNTY JAIL COMM CONDUIT						
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES
F001	1"	6 - STRANDS SINGLE MODE FIBER OSP	COMMS	FIBER SWITCH STACYS NETWORK CABINET	CP-1 SWITCH 1	THROUGH PB-1
F002	1"	SHIELDED CAT6E / POE++	COMMS	CP-1 SWITCH 2	SOUTH CAMERA	
F003	1"	SHIELDED CAT6E / POE++	COMMS	CP-1 SWITCH 2	NORTH CAMERA	THROUGH PB-2
F004	1"	SHIELDED CAT6E / POE++	COMMS	CP-1 SWITCH 2	SOUTH GATE INTERCOM	
F005	1"	SHIELDED CAT6E / POE++	COMMS	CP-1 SWITCH 2	NORTH GATE INTERCOM	THROUGH F003 AND PB-2
F006	1"	SHIELDED CAT6E / POE++	COMMS	CP-1 SWITCH 2	MAN GATE INTERCOM	THROUGH F003 AND PB-2
F007	1"	SHIELDED BELDEN RS-485 CABLE OSP	COMMS	CP-1/AD-41	AD-33 CARDREADER SOUTH	
F008	1"	SHIELDED BELDEN RS-485 CABLE OSP	COMMS	CP-1/AD-41	AD-33 CARDREADER NORTH	
SHERIFF AND COUNTY JAIL SPARE CONDUIT						
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES
SP001	2"	PULL STRING	240VAC	EXISTING DP	DP-1	THROUGH PB-1 & PB-1A
SP001A	1"	PULL STRING	240VAC	DP-1	PB-2	THROUGH PB-1A
SP002	1"	PULL STRING	COMMS	CP-1	PB-2	
SP002A	1"	PULL STRING	COMMS	JB-F	PB-1A	THROUGH PB-1
SP003	1"	PULL STRING	COMMS	PB-2	PEDESTRIAN GATE	

CONDUIT SCHEDULE



CONDUIT DEVELOPMENT



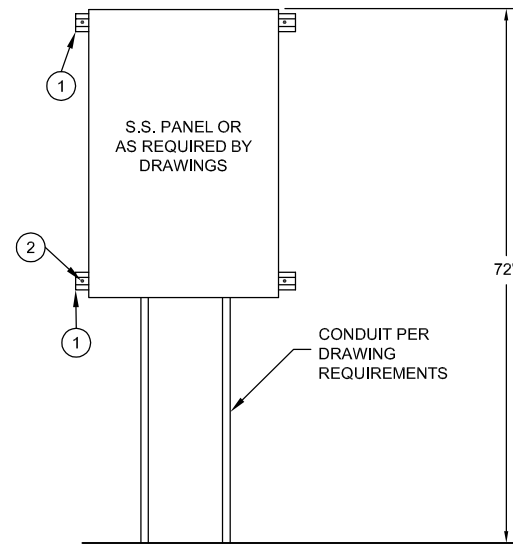
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NO.	DATE	DESIGN	DRAWN	CHECKED	MPJ
0	00/00/0000	MPJ	MGJ	MPJ	
		REVISIONS			

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
SCHEDULES & CONDUIT DEVELOPMENT

skm
 533 W 2600 S, Suite 25
 Bountiful, Utah 84010
 Phone: (801) 677-0011
 www.skmeng.com

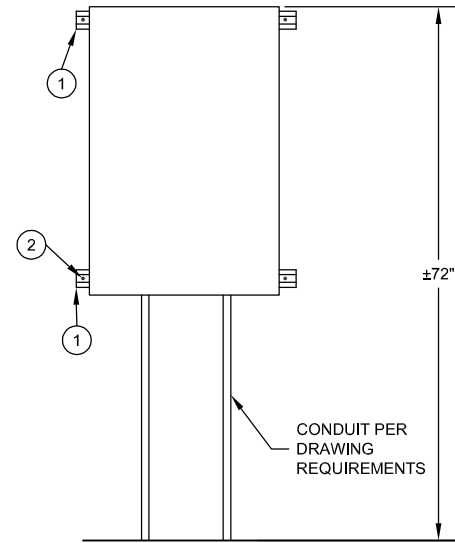
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E501
 SHEET

7/14/2023 C:\USERS\UNGEOL\KIMIAQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER- PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 E901 DETAILS 1.DWG



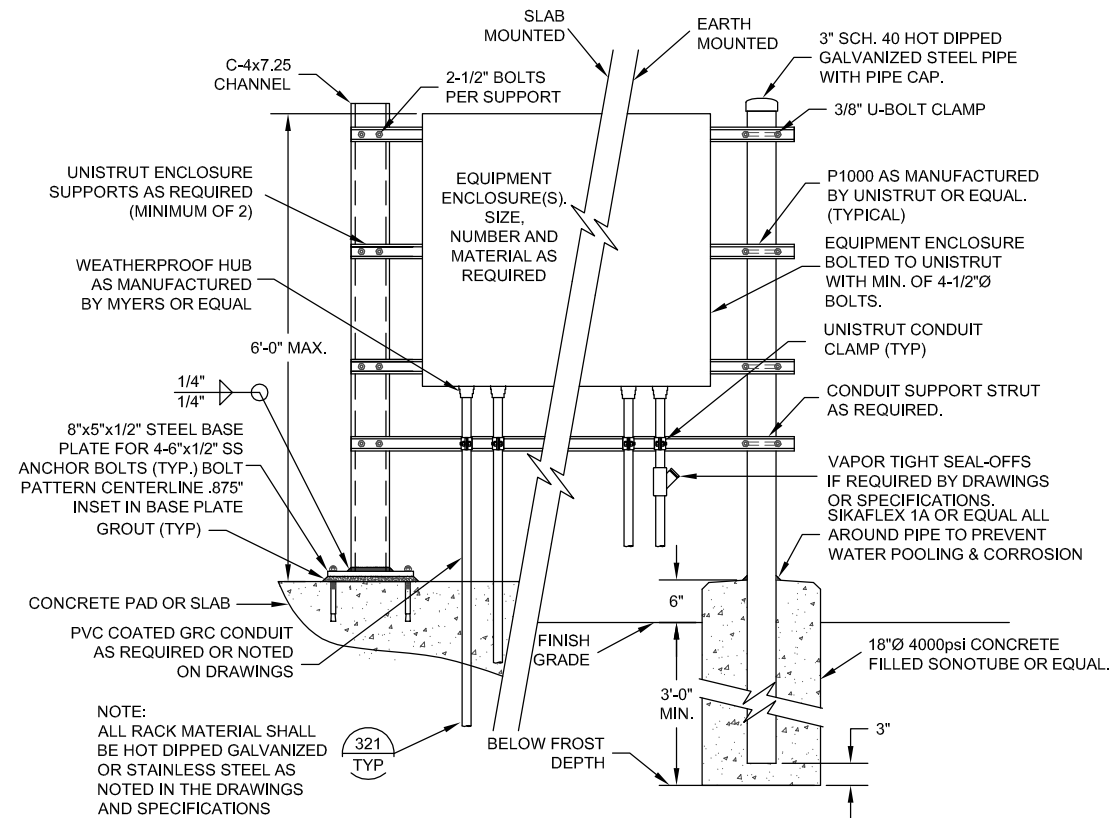
- 1 STAINLESS STEEL 1-5/8" X 1-5/8" UNISTRUT CHANNEL.
- 2 1/2" X 3" S.S. ANCHOR BOLT OR LAG BOLT WITH WASHER, ANCHORED TO WALL (EVERY 18", 2 MIN.)
- 3 MAXIMUM PANEL HEIGHT NOT TO EXCEED 72".
- 4 CENTER OF INSTRUMENT DISPLAYS SHALL BE 62".
- 5 CENTER OF LOCAL CONTROL STATIONS SHALL BE 48".

002 WALL MOUNTED PANEL
TYP SCALE: NONE

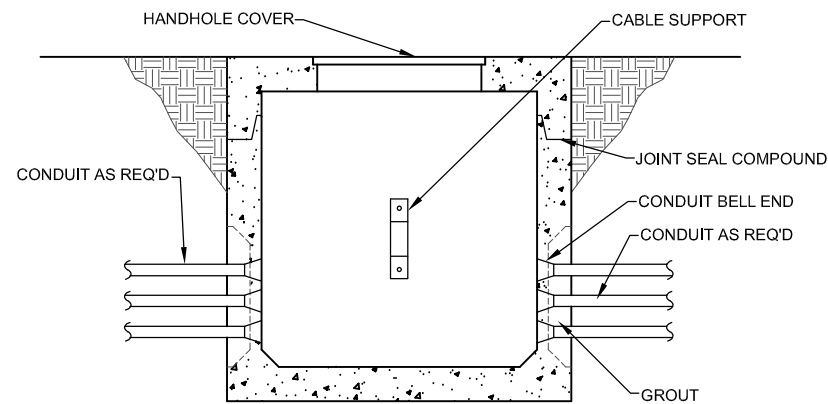


- 1 STAINLESS STEEL 1-5/8" x 1-5/8" UNISTRUT CHANNEL
- 2 1/2" x 3" SS ANCHOR BOLT OR LAG BOLT WITH WASHER ANCHORED TO WALL (EVERY 18" MAX 2" MIN")

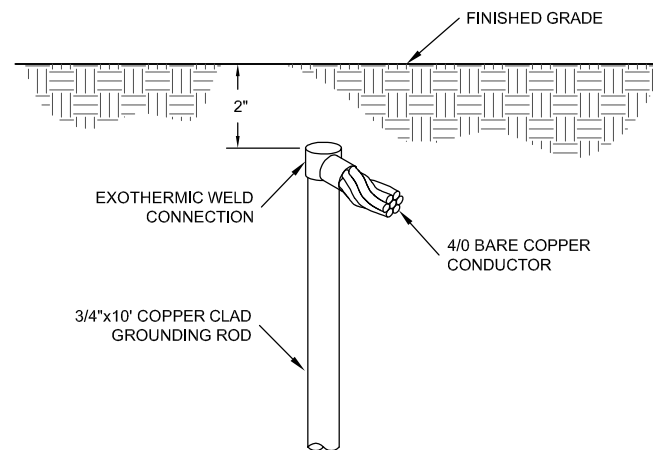
012 WALL MOUNTED J-BOX
TYP SCALE: NONE



015 EQUIPMENT RACK DETAIL
TYP NO SCALE



023 PULL BOX
TYP SCALE: NONE



101 EXOTHERMIC GROUND ROD CONNECTION
TYP SCALE: NONE



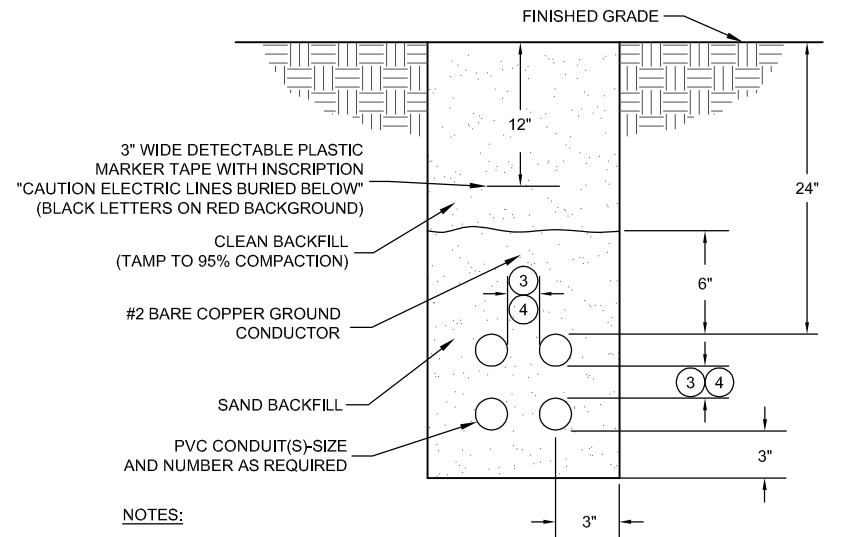
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NO.	DATE	MPJ	MGJ	MPJ	MPJ
0	00/00/0000				
REVISIONS					

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
DETAILS 1

533 W 2600 S, Suite 25
 Bountiful, Utah 84010
 Phone: (801) 677-0011
 www.skmeng.com

DRAWING NO.
E901
 SHEET

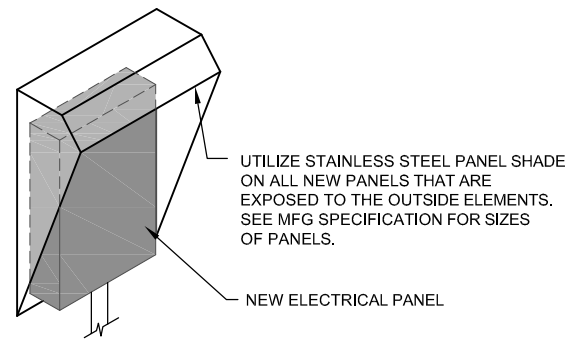
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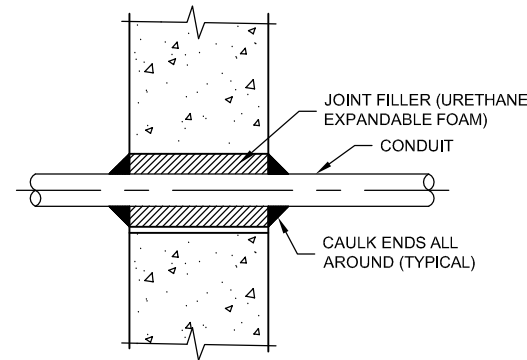
NOTES:

- ① DIMENSIONS ARE MINIMUM.
- ② THE GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND PULL BOXES AND SHALL CONTINUE FROM THE DUCTBANK INTO THE ELECTRICAL EQUIPMENT OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. BOND CONDUCTORS TO BE SOLID COPPER #10 AWG OR LARGER AS REQUIRED BY THE NEC.
- ③ ALL DUCTS OF THE SAME DUTY (480V POWER, 120V POWER, 120V CONTROLS, AND SIGNAL/FIBER) SHALL BE SEPARATED BY A MINIMUM OF 2".
- ④ SIGNAL AND FIBER DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 12", FROM 120V POWER BY A MIN. OF 6" AND FROM 120V CONTROL BY MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS. 120V POWER AND 120V CONTROL DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS.

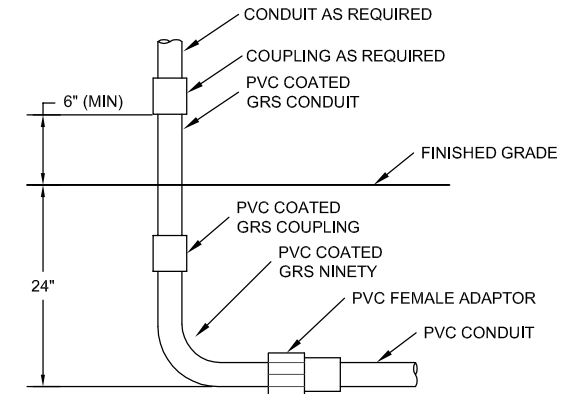
200 DIRECT BURIED CONDUIT
TYP SCALE: NONE



901 PANEL SHADE
TYP SCALE: NONE



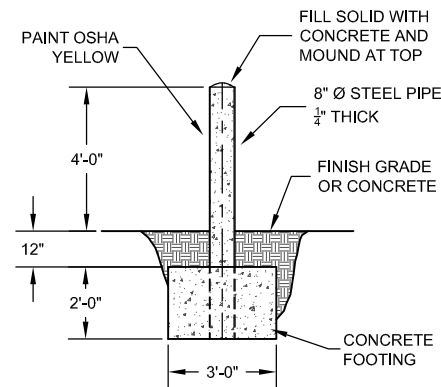
301 CONDUIT PENETRATION AT EXISTING WALL OR SLAB
TYP SCALE: NONE



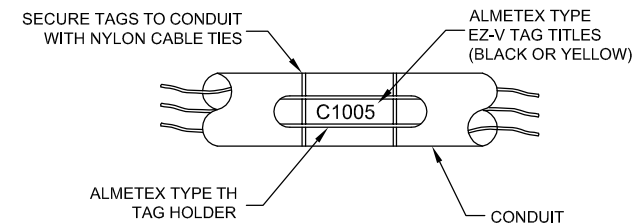
NOTES:

1. WHERE CONDUITS ARE INSTALLED IN OR UNDER A CONCRETE SLAB, THE 24" DIMENSION DOES NOT APPLY. CONDUITS SHALL BE INSTALLED BETWEEN REBAR MATS OR UNDER A SINGLE REBAR MAT.
2. IN CORROSIVE AREAS, PVC COATED GRS SHALL BE USED.

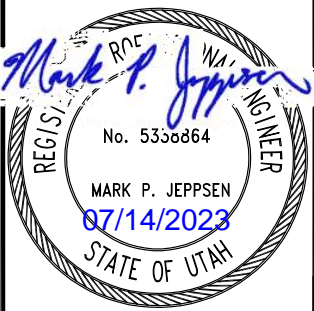
320 GRS STUB UP DETAIL
TYP SCALE: NONE



421 PIPE BOLLARD DETAIL
TYP SCALE: NTS



360 CONDUIT MARKING SYSTEM
TYP SCALE: NONE



DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE	
ORIGINAL	CHECKED
NO.	DATE
0	00/00/0000
DESIGN	DRAWN
MPJ	MGJ
MPJ	MPJ
REVISIONS	

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
SHERIFF BUILDING AND COUNTY JAIL
DETAILS 2

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 533 W 2600 S, Suite 25
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 www.skmeng.com

DRAWING NO.

E902

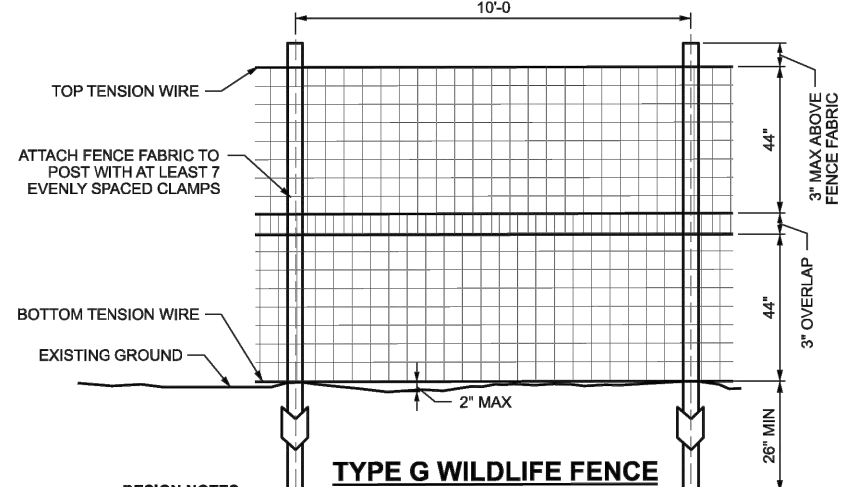
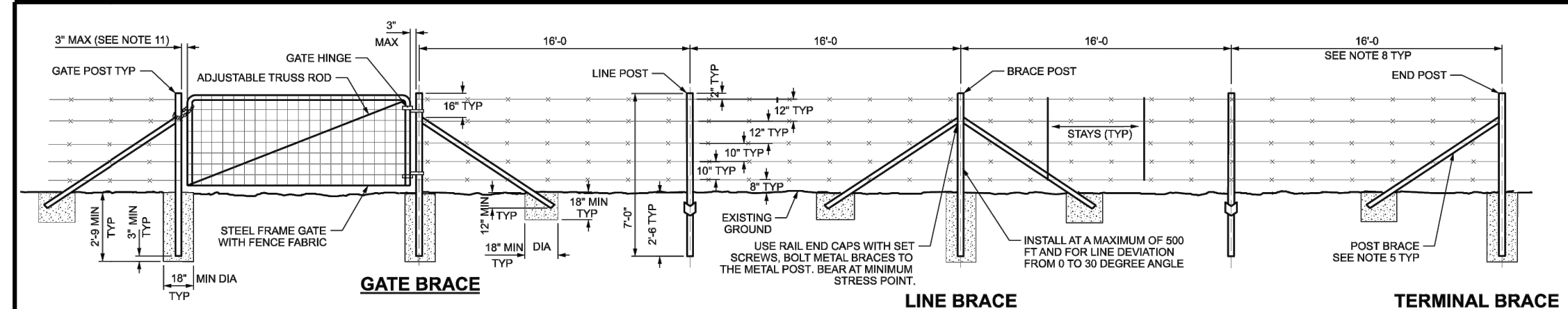
SHEET



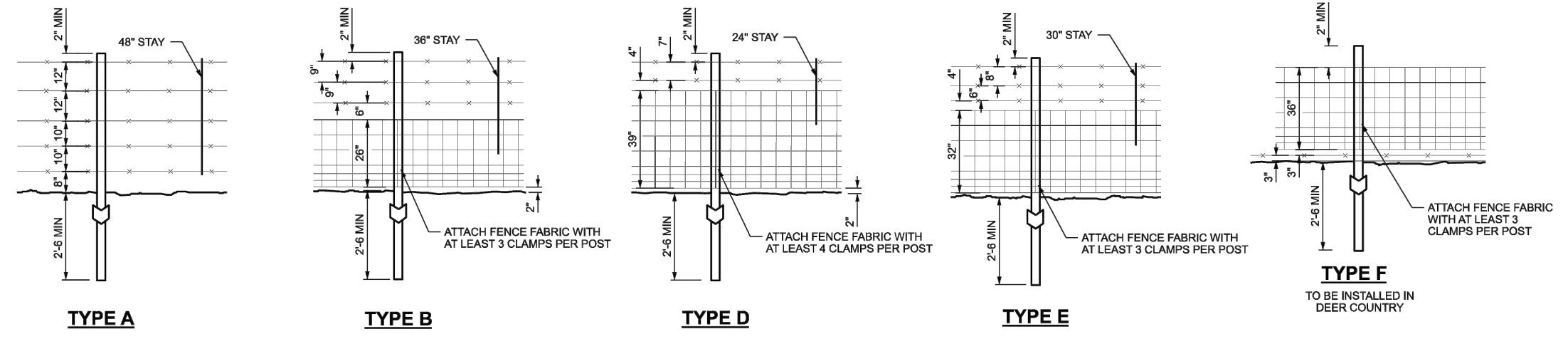
BOX ELDER COUNTY
 PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCT AND FENCING
OVERALL FENCING PLAN
BOX ELDER LANDFILL

REV.	DATE	APPR.

SCALE:	SKT DESIGNED	SKT DRAWN	SKT CHECKED
24" x 36" H:1" = 20'			
11" x 17" H:1" = 40'			
SHEET: 10 OF 0 SHEETS			



- DESIGN NOTES:**
- INSTALL 4 FT GATE ON TYPE G WILDLIFE FENCE ADJACENT TO ANIMAL CROSSING STRUCTURES.
- NOTES:**
- 3 INCH MIN OVERLAP REQUIRED AND TIE OR CLAMP TOGETHER EVERY 18 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
 - PLACE BOTTOM TENSION WIRE AND FENCE FABRIC AT EXISTING GROUND AT POSTS AND WITHIN 2 INCHES OF EXISTING GROUND BETWEEN POSTS.
 - TIE OR CLAMP BOTTOM AND TOP TENSION WIRE TO FENCE FABRIC EVERY 24 INCHES USING HOG RINGS OR OTHER TYPES OF TIES OR CLAMPS.
 - A SINGLE FENCE FABRIC MAY BE USED IF MEETS OVERALL MINIMUM DIMENSIONS.



INSTALLATION WITH METAL POSTS

- NOTES:** (TYPE A SHOWN, ALL OTHERS SIMILAR)
- SET GATE POST, BRACE POST, END POST, CORNER POST, AND POST BRACE IN CLASS "B" CONCRETE. SEE STD DWG FG 2B FOR CORNER BRACE DETAIL.
 - LINE POSTS FOR TYPE A, B, D, E, F & G FENCE **SEE NOTE BELOW**
 A. "T", "Y", OR "U" STEEL CHANNEL SECTIONS, MINIMUM WEIGHT 1.33 LB/FT OF LENGTH OR STEEL PIPE, 1.900 INCH OUTSIDE DIAMETER SCHEDULE 40 PIPE, WEIGHT 2.72 LB/FT OF LENGTH OR HIGH TENSILE TRIPLE COATED STEEL PIPE, WEIGHT 2.23 LB/FT OF LENGTH.
 B. LINE POSTS FOR TYPE A, B, D, E, & F FENCE: 7 FT LENGTH.
 C. LINE POSTS FOR TYPE G FENCE: 10 FT LENGTH.
 - BRACE POSTS, CORNER POSTS, AND END POSTS **SEE NOTE BELOW**
 A. TYPE A, B, D, E, & F FENCES USE 2.5 INCH x 2.5 INCH x 0.25 INCH STEEL ANGLE, MINIMUM WEIGHT 4.10 LB/FT OR STEEL PIPE 2.375 INCH OUTSIDE DIAMETER, WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
 B. TYPE G FENCE USE STEEL PIPE 2.375 INCH OUTSIDE DIAMETER, WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
 - POSTS **SEE NOTE BELOW**
 A. GATE WIDTHS 8 FT AND LESS USE STEEL PIPE WITH OUTSIDE DIAMETER 2.375 INCH AND WEIGHT 3.65 LB/FT OR HIGH TENSILE TRIPLE COATED STEEL, 2.375 INCH OUTSIDE DIAMETER WEIGHT 3.11 LB/FT.
 B. GATE WIDTHS GREATER THAN 8 FT USE STEEL PIPE WITH OUTSIDE DIAMETER 3.50 INCH AND WEIGHT 7.58 LB/FT.
 - POST BRACES TO MATCH POST TYPE AND SIZE.
 - USE CORNER BRACE ON FENCE LINE DEVIATIONS GREATER THAN 30 DEGREE ANGLE. USE CORNER BRACE ON TYPE G FENCE WITH DEVIATIONS GREATER THAN 17 DEGREE ANGLE. SEE STD DWG FG 2B FOR CORNER BRACE DETAILS.
 - TERMINATE FENCE FABRIC AND BARBED WIRE AT EACH CORNER POST.
 - USE 10 FT SPACING IN AREAS OF FARM ANIMAL USE OR AS SHOWN.
 - SPACING AND BRACING ARE AS SHOWN IN INSTALLATION WITH METAL POST ABOVE FOR FENCE TYPES A, B, D, E AND F POST SIZE. SPACE 2 STAYS EVENLY BETWEEN EACH SET OF POSTS.
 - GATE FRAME USE STEEL PIPE 1.875 INCH OUTSIDE DIAMETER WITH WEIGHT OF 2.72 LB/FT.
 - WHERE DOUBLE GATES ARE INSTALLED PROVIDE AT LEAST A 4 INCH GAP BETWEEN GATE FRAMES TO ALLOW FOR LATCH.

ALL LINE, END AND CORNER POST SHALL BE 10' TALL AND MATCH THE BOX ELDER COUNTY STANDARD FOR CHAIN LINK FENCE POST. (DETAIL SHEET 11-FENCING STANDARD DETAIL)

NO.	DATE	APPR.	REMARKS

UTAH DEPARTMENT OF TRANSPORTATION
STANDARD DRAWINGS FOR ROAD AND BRIDGE CONSTRUCTION
SALT LAKE CITY, UTAH
STANDARD DRAWING EDITION

2024 Standard Drawing

RIGHT OF WAY
FENCE AND GATES
(METAL POST)

STANDARD DRAWING TITLE

STD. DWG. NO.
FG 2A

REV.	DATE	APPR.

7/14/2023 CAUSERSUNGEOLKIMIAQUA ENGINEERING BOX ELDER COUNTY - 002405.D BOX ELDER-PUBLIC SAFETY GATE AND FENCING 050 DRAFTING 999-001 NOTES & SYMBOLS.DWG

SCHEMATIC LINETYPES

	ELECTRICAL BUS		EXISTING OR FUTURE MANUFACTURER/SHOP WIRE
	EXISTING OR FUTURE ELECTRICAL BUS		FIELD/CONTRACTOR INSTALLED WIRE
	MANUFACTURER/SHOP WIRE TYPICALLY INSTALLED OFF-SITE		EXISTING OR FUTURE FIELD/CONTRACTOR INSTALLED WIRE

SCHEMATIC SYMBOLS

	DEVICE CONNECTION LUG OR TERMINAL		HARMONIC FILTER
	SCHEMATIC POINT OF CONNECTION		LOAD REACTOR
	POWER STABS BUS CONNECTION		VARIABLE FREQUENCY DRIVE
	POWER STABS LOAD CONNECTION		REDUCED VOLTAGE SOFT STARTER
	CIRCUIT BREAKER		GROUND CONNECTION
	100AF ← FRAME SIZE		MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE
	50AT ← TRIP RATING		MOTOR STARTER, CONTACTOR, RELAY OR TIMER COIL
	MCP ← BREAKER TYPE		NORMALLY OPEN CONTACT
	DISCONNECT		NORMALLY CLOSED CONTACT
	30A ← AMPERE RATING		SOLENOID VALVE
	4X ← NEMA RATING		EQUIPMENT PROGRAMMING CONSOLE
	FUSE		2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		3 POSITION SELECTOR SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	4X ← NEMA RATING		3 POSITION SELECTOR SWITCH OPEN - CLOSE - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	FUSED DISCONNECT		3 POSITION SELECTOR SWITCH FORWARD - OFF - REVERSE POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		NORMALLY CLOSED PUSH BUTTON
	4X ← NEMA RATING		NORMALLY OPEN PUSH BUTTON
	FUSE		TYPICAL SWITCH CONFIGURATION
	30A ← AMPERE RATING		FLOAT SWITCH - MAKE ON FALL
	4X ← NEMA RATING		FLOAT SWITCH - MAKE ON RISE
	FUSED DISCONNECT		FLOAT SWITCH - BREAK ON FALL
	30A ← AMPERE RATING		FLOAT SWITCH - BREAK ON RISE
	4X ← NEMA RATING		SWITCH TYPE SYMBOL (SEE BELOW)
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		LEVEL SWITCH
	TVSS CLASS C ← TVSS CLASSIFICATION		PRESSURE SWITCH
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		FLOW OR TORQUE SWITCH
	TVSS CLASS C ← TVSS CLASSIFICATION		TEMPERATURE SWITCH
	MOTOR OVERLOAD RELAY		LIMIT SWITCH
	FULL VOLTAGE NON-REVERSING STARTER (FVNR)		TIMER RELAY CONTACT NORMALLY OPEN TIME DELAY CLOSE
	NEMA SIZE ← STARTER TYPE AND SIZE		ELAPSED TIME METER
	FULL VOLTAGE REVERSING STARTER (FVR)		CONTROL RELAY
	NEMA SIZE ← STARTER TYPE AND SIZE		TIME DELAY RELAY
	TWO-SPEED STARTER		ALARM RELAY
	NEMA SIZE ← STARTER TYPE AND SIZE		PILOT LIGHT LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		INSTANTANEOUS SHORT-CIRCUIT TRIP DEVICE
	TVSS CLASS C ← TVSS CLASSIFICATION		TIME OVERCURRENT TRIP DEVICE
	MOTOR OVERLOAD RELAY		GROUND FAULT TRIP DEVICE
	FULL VOLTAGE NON-REVERSING STARTER (FVNR)		
	NEMA SIZE ← STARTER TYPE AND SIZE		
	FULL VOLTAGE REVERSING STARTER (FVR)		
	NEMA SIZE ← STARTER TYPE AND SIZE		
	TWO-SPEED STARTER		
	NEMA SIZE ← STARTER TYPE AND SIZE		

ELECTRICAL PLAN LINETYPES

	EXPOSED CONDUIT		BARE COPPER GROUND CONDUCTOR
	EXISTING OR FUTURE EXPOSED CONDUIT		ELECTRICAL EQUIPMENT
	UNDERGROUND CONDUIT		EXISTING OR FUTURE ELECTRICAL EQUIPMENT
	EXISTING OR FUTURE UNDERGROUND CONDUIT		DEMOLITION
	CONDUIT DUCTBANK		CAPPED UNDERGROUND CONDUIT
	EXISTING OR FUTURE CONDUIT DUCTBANK		

ELECTRICAL PLAN HAZARDOUS LOCATION CLASSIFICATION LINETYPES

	C1D1	CLASS I DIV 1		C2D1	CLASS II DIV 1
	C1D2	CLASS I DIV 2		C2D2	CLASS II DIV 2

ELEC. PLAN SYMBOLS

	X ← (SEE BELOW)
	AE - ANALYZER ELEMENT
	AIT - ANALYZING INDICATING TRANSMITTER
	FE - FLOW ELEMENT
	FIT - FLOW INDICATING TRANSMITTER
	FS - FLOW SWITCH
	J - JUNCTION BOX
	JS - TORQUE SWITCH
	LE - LEVEL ELEMENT
	LIT - LEVEL INDICATING TRANSMITTER
	LS - LEVEL SWITCH
	M - MOTOR
	MH - MANHOLE
	MV - MOTOR OPERATED VALVE
	PB - PULLBOX
	PIT - PRESSURE INDICATING TRANSMITTER
	PS - PRESSURE SWITCH
	PT - PRESSURE TRANSMITTER
	SV - SOLENOID VALVE
	TS - TEMPERATURE SWITCH
	WE - WEIGHT ELEMENT
	WIT - WEIGHT INDICATING TRANSMITTER
	ZS - LIMIT SWITCH
	GROUND ROD
	DUPLEX RECEPTACLE
	DENOTES RECEPTACLE TYPE (BLANK) = STANDARD INDOORS GFCI = GND FLT CURRENT INT. WP = WEATHER PROOF & GFCI
	QUADRUPLEX RECEPTACLE
	DATA JACK
	SINGLE POLE SWITCH
	3-WAY SWITCH
	4-WAY SWITCH
	CONDUIT SEALOFF
	LTC CONNECTION
	MC CONNECTION
	DISCONNECT SWITCH
	THERMOSTAT
	CONDUIT HOME RUN NUMBER INDICATES QUANTITY OF CONDUCTORS INCLUDING GROUND

TB'S & PLC SYMBOLS

	LOCAL PANEL OR DEVICE TERMINAL BLOCK
	TERMINAL LABEL
	PLC PANEL TERMINAL BLOCK
	TERMINAL LABEL
	MCC TERMINAL BLOCK
	TERMINAL LABEL
	DEVICE TERMINAL BLOCK
	TERMINAL LABEL
	PLC DISCRETE INPUT
	DISCRETE INPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY OPEN)
	DISCRETE OUTPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY CLOSED)
	DISCRETE OUTPUT LABEL
	PLC ANALOG INPUT
	ANALOG INPUT LABEL
	PLC ANALOG OUTPUT
	ANALOG OUTPUT LABEL
	PLC RTD
	RTD LABEL

EQUIPMENT CALLOUT

	EQUIP. TAG	EQUIPMENT CALLOUT
	DESCRIPTOR #1	
	DESCRIPTOR #2	
	DESCRIPTOR #3	
	100 TYP	DETAIL CALLOUT
	FE	FIELD INSTRUMENT CALLOUT
	101	

CONDUIT CALLOUT

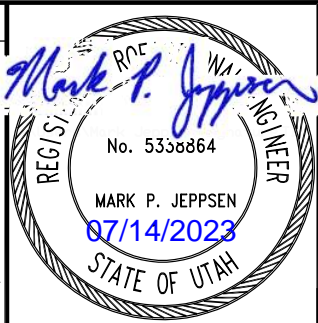
	GROUPED CONDUIT AND CIRCUIT IDENTIFICATION TAGS. REFER TO THE POWER ONE-LINE AND CONTROL ONE-LINE DIAGRAMS OR CONDUIT SCHEDULES FOR CONDUIT SIZES AND CONTENTS. C-CONTROL/INSTRUMENTATION P-POWER F-FIBER OPTIC/NETWORK SP-SPARE CONDUITS
	CXXX
	PXXX
	FXXX
	SPXXX

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
AIC	AMPS INTERRUPTING CAPACITY
AO	ANALOG OUTPUT
AS	AIR SUPPLY
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CL2	CHLORINE
CPT	CONTROL POWER TRANSFORMER
CTC	COMMUNICATIONS TERMINATION CABINET
CU	COPPER, BARE
CV	CONTROL VALVE
DCS	DISTRIBUTED CONTROL SYSTEM
DI	DISCRETE INPUT
DO	DISCRETE OUTPUT
DP	DISTRIBUTION PANEL
DS	DISCONNECT SWITCH
DV/DT	DIFFERENTIAL VOLTAGE/TIME DRAWING
DWG	DRAWING
ETM	ELAPSED TIME METER
EOL	ELECTRONIC OVERLOAD
FE	FLOW ELEMENT
FLA	FULL LOAD AMPS
FOC	FIBER OPTIC CABLE
FOR	FORWARD-OFF-REVERSE
FS	FLOW SWITCH
FVNR	FULL VOLTAGE NON-REVERSING
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GPM	GALLONS PER MINUTE
GRS	GALVANIZED RIGID STEEL
H2S	HYDROGEN SULFIDE
HH	HANDHOLE
HMI	HUMAN MACHINE INTERFACE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
I	CURRENT
IC	INSTRUMENTATION CABLE
IO	INPUT/OUTPUT
ISC	SHORT CIRCUIT CURRENT
J	JUNCTION BOX
LAN	LOCAL AREA NETWORK
LCP	LOCAL CONTROL PANEL
LOS	LOCK-OUT-STOP
LP	LIGHTING PANEL
LR	LOCAL/REMOTE
LS	LEVEL SWITCH
LTC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
M	MOTOR
MA	MANUAL/AUTO, MILLIAMP
MC	MANUFACTURER'S CABLE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MFR(S)	MANUFACTURER(S)
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MOV	MOTOR OPERATED VALVE
MTU	MASTER TELEMETRY UNIT
NEC	NATIONAL ELECTRICAL CODE
NOTC	NORMALLY OPEN TIMED CLOSED
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
NTU	TURBIDITY
OIT	OPERATOR INTERFACE TERMINAL
OL	OVERLOAD
OO	ON/OFF (MAINTAINED)
OR	OFF-REMOTE
PB	PULL BOX
PC	PERSONAL COMPUTER
PFR	PHASE/POWER FAILURE RELAY
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PPM	PARTS PER MILLION
PR	PAIR
P	PRESSURE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PV	PROCESS VARIABLE
RCP	REMOTE CONTROL PANEL
RF	RADIO FREQUENCY
RIO	REMOTE INPUT OUTPUT
RST	RESET
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TELEMETRY UNIT
RVSS	REDUCED VOLTAGE SOFT STARTER
SEQ	SERVICE ENTRANCE EQUIPMENT
SES	SERVICE ENTRANCE SECTION
SLOS	START-LOCK-OFF-STOP
SMC	SUBMERSIBLE MANUFACTURER CABLE
SO2	SULFUR DIOXIDE
SP	SET POINT/SPARE
SPD	SURGE PROTECTION DEVICE
SS	START/STOP
ST	SHUNT TRIP
TC	TELEPHONE CABLE
TS	TEMPERATURE SWITCH
TYP	TYPICAL
UG	UNDERGROUND
V	VOLT
VA	VOLTAMP
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZS	POSITION SWITCH

NOTES

- THE COMPLETED INSTALLATION SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NEC STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
- VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY AFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
- THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
- ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
- PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
- LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS. LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
- CIRCUIT CONDUCTORS #6 AWG OR SMALLER SHALL BE THWN STRANDED COPPER. #4 AWG THROUGH #2 AWG SHALL BE XHHW STRANDED COPPER. #1 AWG OR LARGER SHALL BE XHHW-2 STRANDED COPPER. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG WITH #12 AWG GROUND. ALL WIRE TO BE SIZED PER NEC TABLE 316-10, 75° C BASED ON A 30° C AMBIENT.
- UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH. MINIMUM CONDUIT DEPTH UNDER SLAB SHALL BE 1 INCH.
- CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS OR NYLON TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED AND SECURED.
- EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL (GRS). MINIMUM SIZE 3/4 INCH, UNLESS OTHERWISE NOTED ON THE PLANS.
- SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE.
- THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND OEM MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
- TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.
- REFER TO SPECIFICATION 260533 "RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS" FOR CONDUIT SPACING AND ROUTING REQUIREMENTS.



DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE	ORIGINAL	CHECKED																		
	DESIGN	DRAWN	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ	MPJ
NO.	DATE	0	00/00/0000																	

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
LANDFILL FENCE AND GATING
NOTES & SYMBOLS

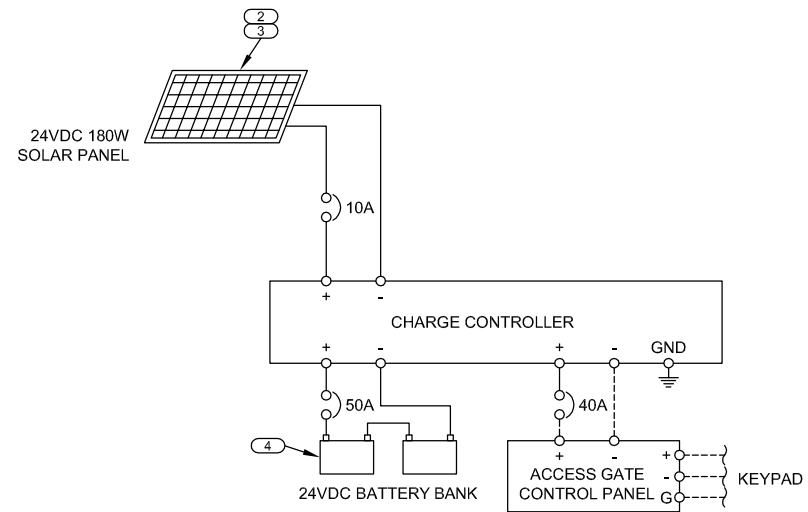
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Bountiful, Utah 84010
Phone: (801) 677-0011
www.skmeng.com

skm

DRAWING NO.
E001

SHEET

C:\USERS\ENGINEOL\KIM\AQUA ENGINEERING\BOX ELDER COUNTY - 002405.D BOX ELDER - PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\LANDFILL FENCE AND GATING\999-E002 POWER DISTRIBUTION AND CONTROL PANEL LAYOUT.DWG



POWER DISTRIBUTION

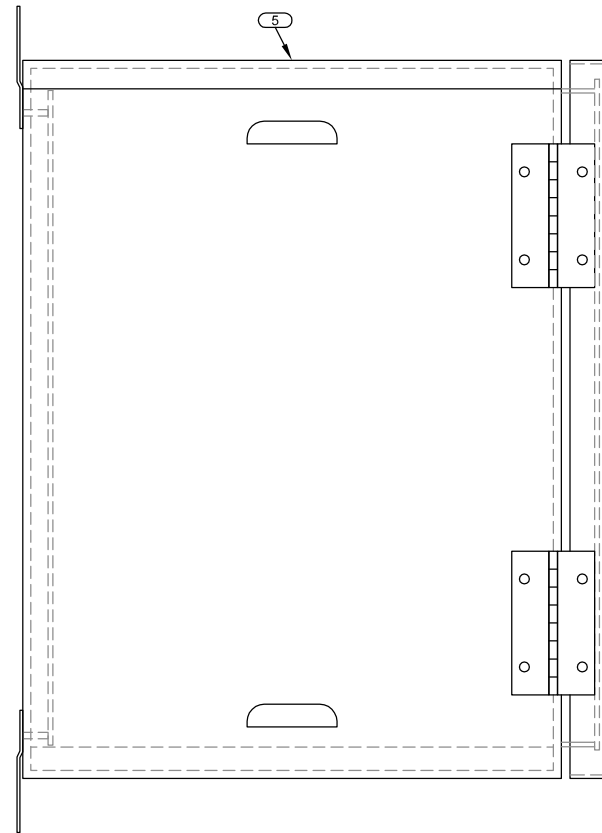
DC Loads	watts	hours/week	watt-hours/week
Gate	480	7	3360
Loop Detector	0.36	168	60.48
Keypad	0.48	168	80.64
Total watt-hours/week			3501.12
watt-hours/day			500.16
Solar Array Sizing			
Minimum watt-hours/day (25% added)			625.2
Average sun-hours/day		6	
Minimum array capacity			104.2
System Voltage		24	
Peak Amps		4.34	
Array Amps (from datasheet)		4.16	
Charge Controller minimum size		5.2	
# of days of autonomy		5	
Amp-hours per day		26.05	
Maximum depth of Discharge		70%	
Battery capacity		186.07	

SOLAR SIZING

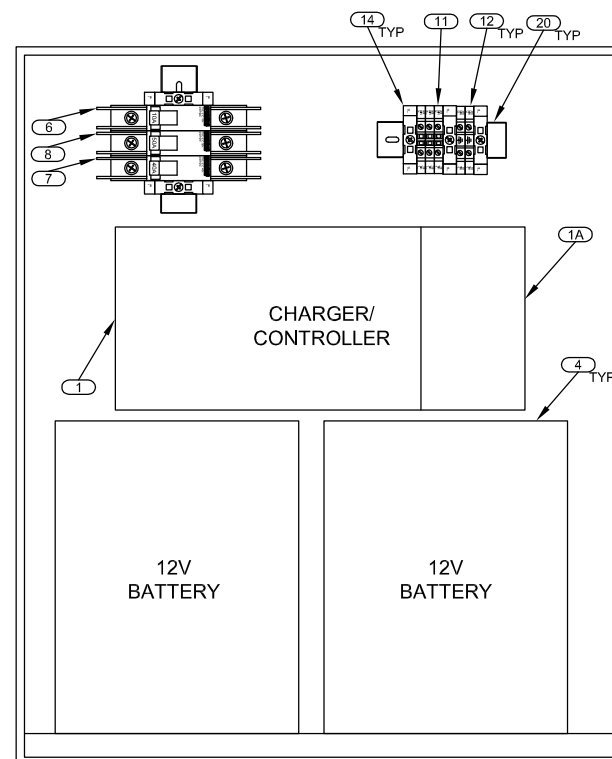
- APPROVED OR EQUAL EQUIPMENT MAY BE USED, REFER TO SPECIFICATION AND/OR CONSULT ENGINEER PRIOR TO BID AWARD.
- EACH OF THE THREE GATES WILL HAVE ITS OWN CHARGER AND SOLAR PANELS TYPICAL OF 3.

ITEM	QUANTIT	MAKE	MODEL	DESCRIPTION
1	1	MORNINGSTAR	TS-MPPT-45	SOLAR CHARGER, 40A, 24VDC WITH DISPLAY
1A	1	MORNINGSTAR	TS-M-2	TS DISPLAY AND METER
2	1	OGRE	B180-J24	180 WATT SOLAR ARRAY
3	1	OGRE	1XSPM-OGRE	SOLAR PANEL BRACKET POLE MOUNT
4	2	LOSSIGY	LIFEPO4	200AH 12VDC BATTERY
5	1	OGRE	14258	20x17x15 ALUMINUM NEMA 3R BATTERY CABINET
6	1	PHOENIX	2907566	10A CIRCUIT BREAKER
7	1	PHOENIX	2907578	40A CIRCUIT BREAKER
8	1	PHOENIX	1019948	50A CIRCUIT BREAKER
11	LOT	PHOENIX	3044102	6.2MM TERMINAL BLOCK, FITS UP TO #10, UT4
12	LOT	PHOENIX	3044128	6.2MM GND TERMINAL BLOCK UT4-PE
13	LOT	PHOENIX	3047028	UT SERIES END PLATE
14	LOT	PHOENIX	800886	END BLOCK
15	LOT	PHOENIX	3032211	UT4 JUMPER BAR, 50 PIECES, BLUE
20	LOT	BOCO	OM3AF	DIN RAIL
21	LOT	TYTON	CTAM1	TIE DOWN CLIPS
22	LOT	PHOENIX	VARIES	TERMINAL BLOCK LABELS
23	LOT	PHOENIX	VARIES	WIRE LABELS
24	LOT	PHOENIX	VARIES	BACKPANEL ADHESIVE LABELS
25	LOT	CUSTOM	VARIES	ENGRAVED LABELS

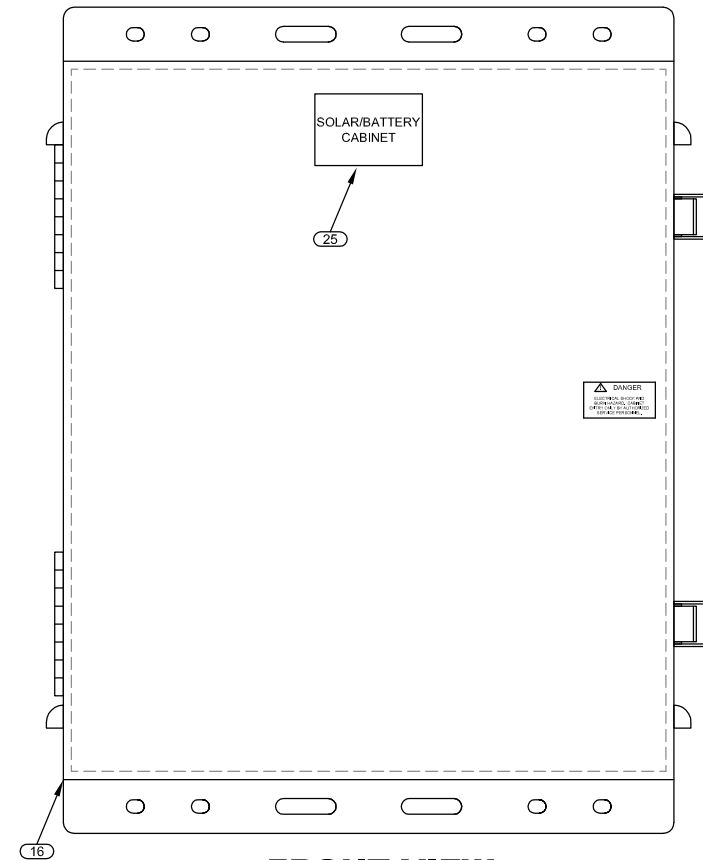
BILL OF MATERIALS



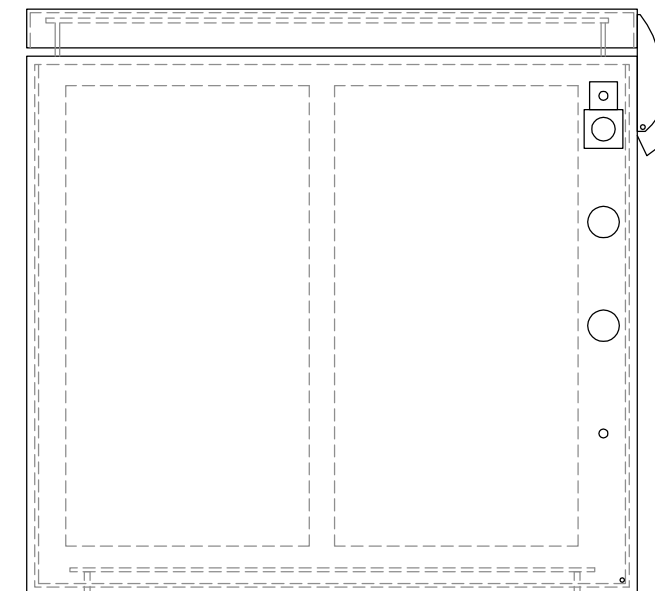
FRONT VIEW (INSIDE)



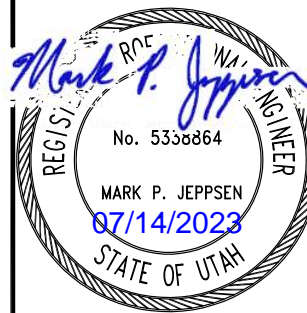
FRONT VIEW (INSIDE)



FRONT VIEW



BOTTOM VIEW



DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED
0	00/00/0000	MPJ	MGJ	MPJ

REVISIONS

NO.	DATE	DESCRIPTION

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
LANDFILL FENCE AND GATING
POWER DISTRIBUTION AND
CONTROL PANEL LAYOUT

533 W 2600 S, Suite 25
Bountiful, Utah 84010
Phone: (801) 677-0011
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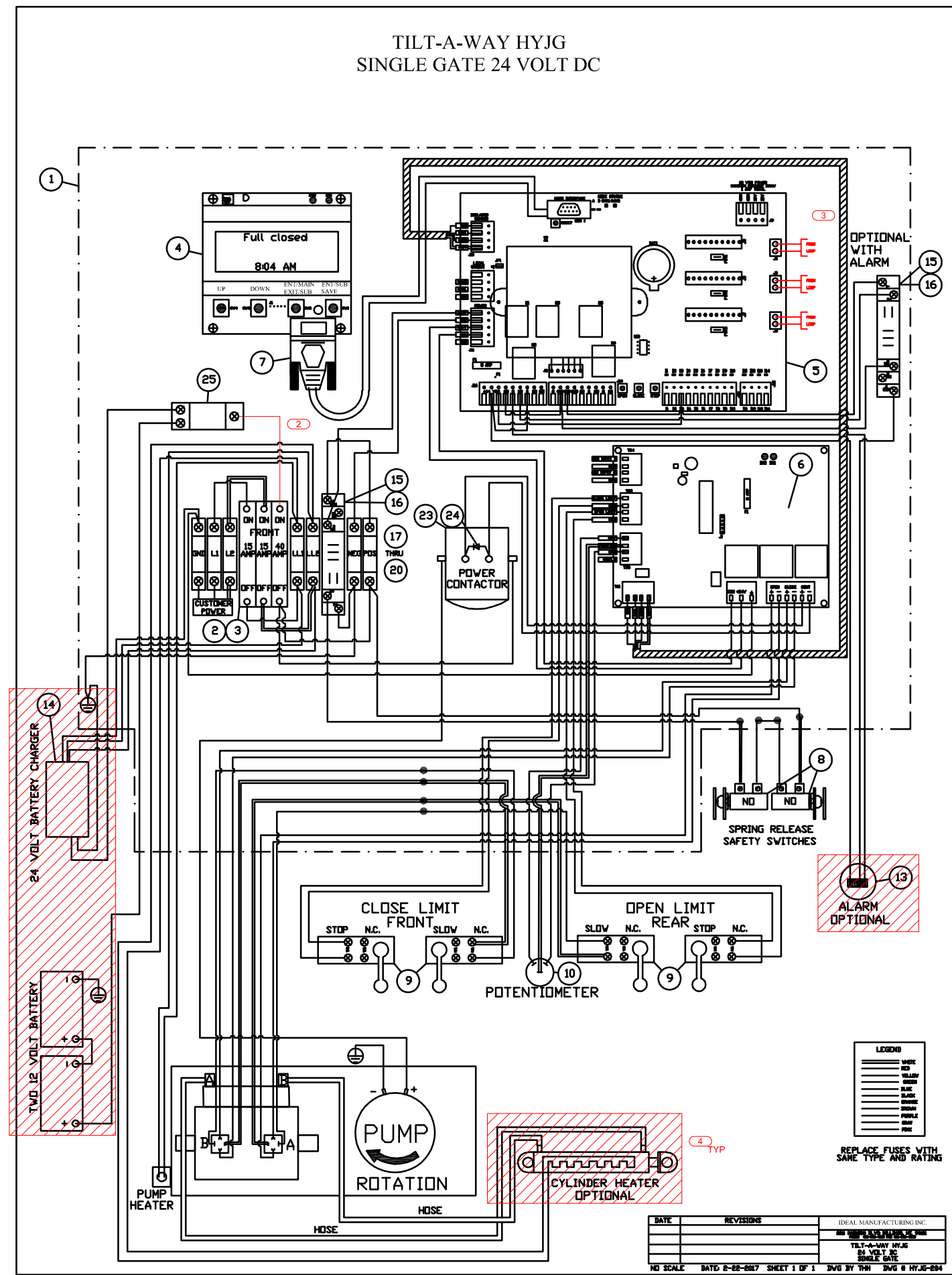
DRAWING NO.

E002

SHEET

7/14/2023 C:\USERS\ENGINEER\KIMIAQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\LANDFILL FENCE AND GATING\999-E003 GATE CONTROL SCHEMATIC.DWG

TILT-A-WAY HYJG
SINGLE GATE 24 VOLT DC



LEGEND

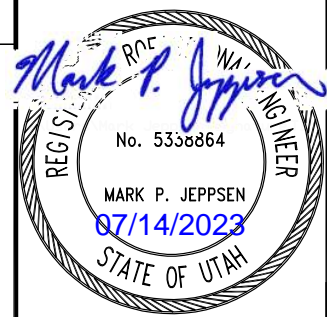
---	WIRE
---	WIRE
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---	WIRE
---	WIRE

REPLACE FUSES WITH SAME TYPE AND RATING

DATE	REVISIONS	IDEAL MANUFACTURING INC.
		24 VOLT DC SINGLE GATE
		TILT-A-WAY HYJG
		NO SCALE DATE: 2-22-2017 SHEET 1 OF 1 DWG BY THN DWG # HYJE-204

NOTES

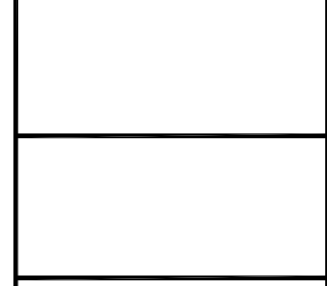
- 1 DESIGN AND SPECIFICATION HAVE BEEN DEVELOPED AROUND THE TILT-A-WAY HYJG GATE SYSTEM. CONTRACTOR TO SUPPLY AND INSTALL GATES AND ACCESSORIES PER THE DESIGN AND SPECIFICATIONS. IF THE CONTRACTORS INTENTION IS TO PROCURE AN EQUAL GATE VENDOR, THE ENGINEERS APPROVAL IS REQUIRED PRIOR TO AWARD OF BID.
- 2 CONTRACTOR TO COORDINATE WITH TILT-A-WAY AND REFER TO OWNER'S MANUAL AND SPECIFICATION FOR TERMINATION POINT FROM SOLAR CHARGER.
- 3 CONTRACTOR TO INSTALL LOOP WIRE SUPPLIED WITH TILT-A-WAY GATE SYSTEM PER OWNER MANUALS AND TILT-A-WAY SPECIFICATION. CONTRACTOR TO TERMINATE ON CONTROL BOARD AT THIS LOCATION.
- 4 OPTIONAL ITEMS SHOWN HATCHED SHALL NOT BE PROVIDED BY THE CONTRACTOR AS PART OF THE GATE SYSTEM.



DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED	REVISIONS
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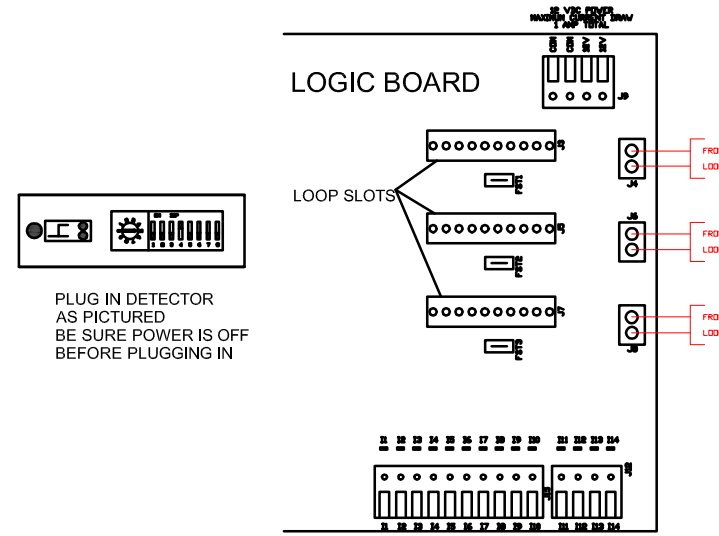
BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
LANDFILL FENCE AND GATING
GATE CONTROL SCHEMATIC



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DRAWING NO.
E003
SHEET

TILT-A-WAY HYJG LOOP DETECTOR SOCKET DIAGRAM



TILT-A-WAY HYJG
THERE ARE THREE LOOP SLOTS J3, J5, AND J7 THAT CAN BE PROGRAMMED FOR SEVERAL DIFFERENT FUNCTIONS
LOOP SLOT DISABLED / SAFETY LOOP / FREE EXIT LOOP / SHADOW LOOP / ARMING LOOP
TO ACCESS THESE FUNCTIONS PRESS AND HOLD BUTTON SW2 ON THE INTERFACE BOARD FOR ABOUT 4 SECONDS
UNTIL THE DISPLAY CHANGES TO SHOW

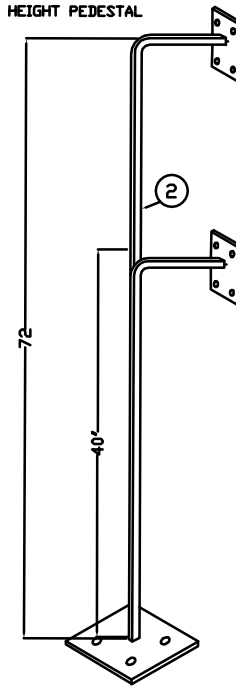
- MAIN MENU
- UP / DOWN - VIEW MENUS
- SELECT - VIEW / EDIT
- RESET - EXIT
- PRESS AND RELEASE BUTTON SW4 UNTIL THE DISPLAY CHANGES TO TIMING AND OPTIONS
- PRESS AND RELEASE BUTTON SW1 TO ENTER THIS MENU
- PRESS AND RELEASE BUTTON SW4 UNTIL THE DISPLAY SHOWS LOOP AND REMOTE ASSIGNMENT
- PRESS AND RELEASE BUTTON SW1 TO ENTER SUBMENU
- THE DISPLAY WILL SHOW
- LOOP FUNCTIONALITY ASSIGNMENT J3 SLOT
- USE BUTTON SW4 TO SCROLL THRU THE SUBMENU UNTIL THE SLOT THAT YOU WANT TO ACCESS IS SHOW
- PRESS AND RELEASE BUTTON SW1 TO ENTER
- USE BUTTON SW4 TO SCROLL THRU THE FUNCTION ASSIGNMENTS UNTIL THE DESIRE FUNCTION IS SHOW
- PRESS AND RELEASE BUTTON SW1 TO SAVE
- USE BUTTON SW4 TO CHANGE TO THE NEXT LOOP SLOT TO BE PROGRAMMED AND REPEAT
- TO ASSIGN FUNCTIONS TO ALL SLOTS USED
- WHEN ALL SLOTS HAVE BEEN PROGRAMMED PRESS AND RELEASE BUTTON SW2 TO EXIT SUBMENU
- REPEAT UNTIL YOU HAVE EXITED ALL MENUS

SAFETY LOOP WILL STOP AND REVERSE A CLOSING GATE, AND HOLD AN OPEN GATE OPEN UNTIL CLEARED
FREE EXIT WILL OPEN A CLOSED GATE AND STOP AND REVERSE A CLOSING GATE AND HOLD IT OPEN UNTIL CLEARED
SHADOW LOOP WILL HOLD OPEN A FULLY OPENED GATE UNTIL CLEARED
ARMING LOOP WILL LATCH AN AUXILIARY OUTPUT RELAY IF THE AUXILIARY OUTPUT RELAY FUNCTION
HOLD AUX RELAY ON ARMING LOOP ASSERTION HAS BEEN SELECTED IN THE AUXILIARY I/O SUBMENU IN
TIMING AND OPTIONS MENU

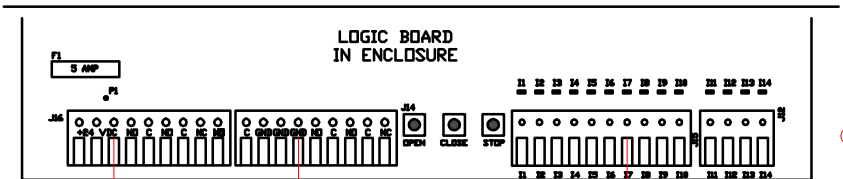
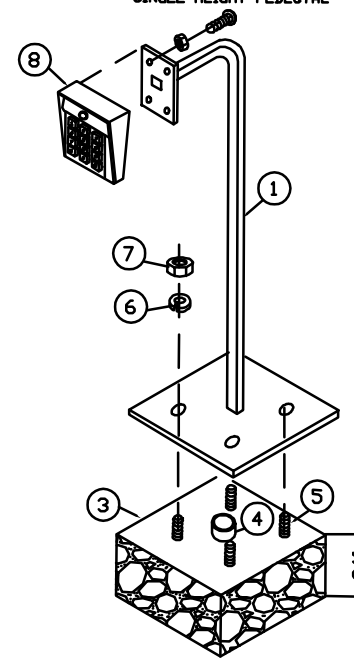
IDEAL MANUFACTURING INC.

3/24/2016 HYJG-230

DUAL HEIGHT PEDESTAL



SINGLE HEIGHT PEDESTAL



NORMALLY OPEN
POWER / GROUND
POWER 24 VOLT DC & COMMON
WIRES FROM CONTROL STATION
NOTE: INPUT TO TERMINAL I7 FROM THE CONTROL STATION MUST BE 24 VOLT DC POSITIVE

TILT-A-WAY HYJG REMOTE CONTROL STATION PEDESTAL AND GATELOCK

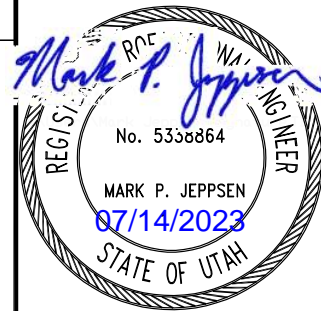
REF NO.	PART NO.	DESCRIPTION	REQ NO
1	N/A	Single Height Pedestal	1
2	N/A	Dual Height Pedestal 72" in Height	1
3	N/A	Concrete Support Pier 15" X 15" X 24" Deep	1
4	N/A	1" in Diameter Electrical Conduit with 2 1/2" projection above Concrete. Conduit Routed from Barrier Pedestal.	1
5	N/A	1/2" x 8" Expansion Bolt	4
6	N/A	1/2" Lock Washer	4
7	N/A	1/2" Hex Nut	4
8	N/A	Remote Control Station of Choice (Included are bolts, nuts, keys and plate.	4

IDEAL MANUFACTURING INC.

3/24/2016 HYJG-233

NOTES

- CONTRACTOR TO FURNISH AND INSTALL KEYPADS FOR VEHICLE ENTRY. KEYPADS SHOULD BE INSTALLED PER CIVIL DESIGN AND SPECIFICATIONS. TERMINATE CONTROL WIRE ON MASTER CONTROL BOARD AT THESE LOCATIONS.



DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE	
ORIGINAL	CHECKED
NO.	DATE
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MPJ	MGJ
MPJ	MPJ
REVISIONS	

BOX ELDER COUNTY, UTAH
 PUBLIC SAFETY GATE AND FENCING PROJECT
 LANDFILL FENCE AND GATING
 GATE ACCESSORY CONTROL WIRING

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DRAWING NO.

E004

SHEET

C:\USERS\ELUNGEOL\KIM\AQUA ENGINEERING\BOX ELDER-COUNTY-002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFT\ING989-E201 SITE ELECTRICAL PLAN LAYOUT.DWG



LANDFILL POWER CONDUIT					
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO
P001	1"	2#12	24VDC	SOLAR CONTROL PANEL	GATE CONTROL BOARD
LANDFILL CONTROL CONDUIT					
CONDUIT	SIZE	CONDUCTORS	SERVICE	FROM	TO
C001	1"	TILT-A-WAY LOOP CABLES	CONTROL	GATE VEHICLE DETECTION CONTROLLER	GATE VEHICLE DETECTION LOOPS
C002	1"	3#14 W #14 GND	CONTROL	GATE MASTER CONTROL BOARD	GATE KEYPADS

CONDUIT SCHEDULE (TYP. 3)

SITE ELECTRICAL PLAN LAYOUT
 SCALE: 1:40
 0 20 40
 Scale in Feet

NOTES

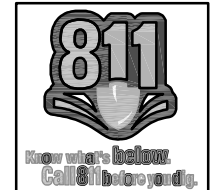
- GATES SHALL BE GROUNDED USING DETAIL NUMBER 101. GROUND SHOULD BE BONDED PER THE TILT-A-WAY INSTALLATION GUIDE AND SPECIFICATIONS. GROUNDING FOR THE GATE AND SOLAR CONTROL BOARDS SHALL BE TIED INTO NEW GROUND GRID AT EACH LOCATION. GROUNDS TO KEYPAD ENTRIES MUST BE BONDED TO METAL ENCLOSURES AND RETURN TO CONTROL BOARD, SEE CONDUIT DEVELOPMENT.
- ALL GATE SOLAR CABINETS REQUIRE SUN PROTECTION AS SHOWN IN DETAIL 901. CONTRACTOR TO INSTALL AND ORIENT SOLAR CABINETS SUCH THAT THEY ARE FACING DUE EAST.

DRAWING IS TO SCALE
 IF BAR MEASURES:
 1" = FULL SCALE
 1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED	REVISIONS	
					MPJ	MGJ
0	00/00/0000	MPJ	MGJ	MPJ		

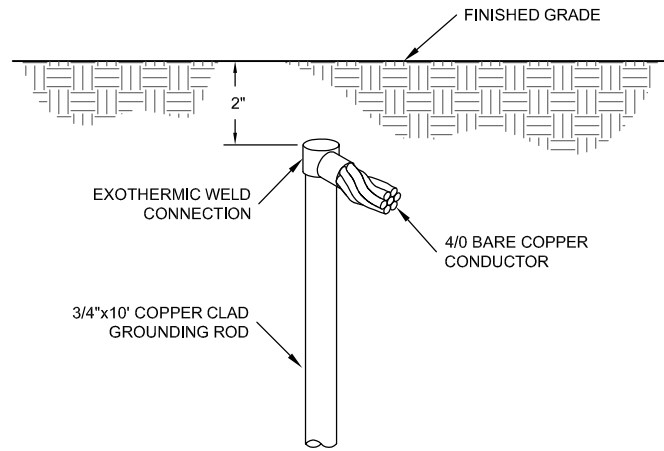
BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
LANDFILL FENCE AND GATING
SITE ELECTRICAL PLAN LAYOUT

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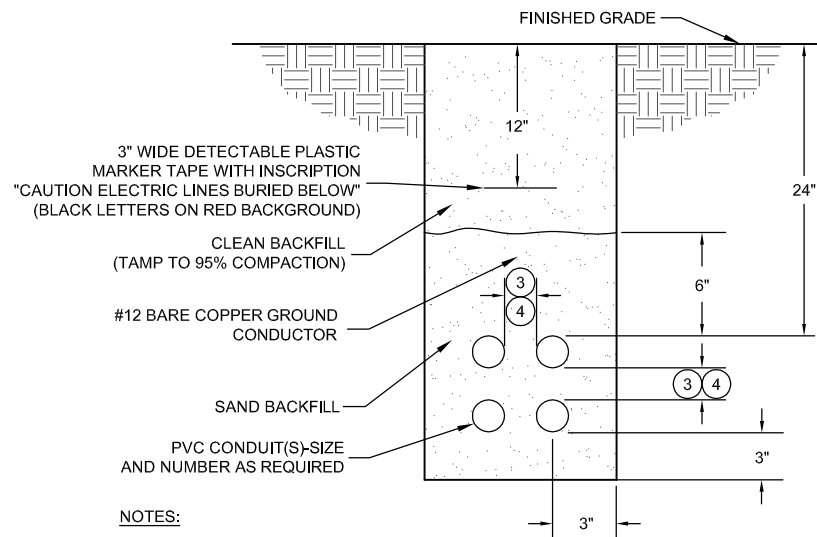


DRAWING NO.
E201
 SHEET

7/14/2023 C:\USERS\ELNGEOL\KIM\AQUA ENGINEERING\BOX ELDER COUNTY - 002405.D BOX ELDER- PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\LANDFILL FENCE AND GATING\999-E901 DETAILS.DWG

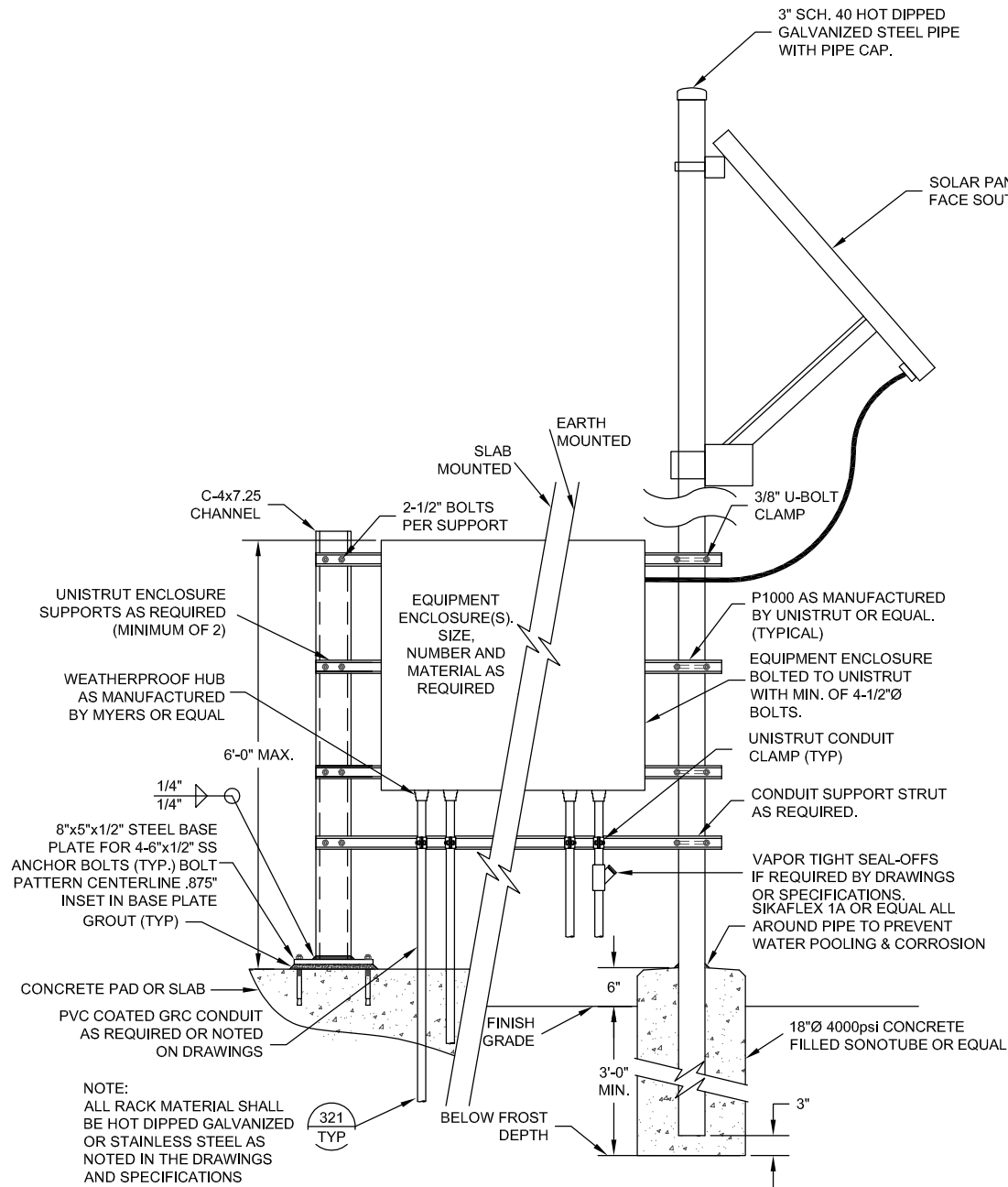


101 TYP EXOTHERMIC GROUND ROD CONNECTION
SCALE: NONE

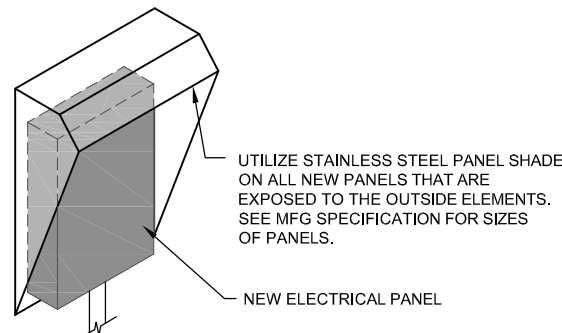


- NOTES:**
- DIMENSIONS ARE MINIMUM.
 - THE GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND PULL BOXES AND SHALL CONTINUE FROM THE DUCTBANK INTO THE ELECTRICAL EQUIPMENT OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIGID METAL CONDUIT. BOND CONDUCTORS TO BE SOLID COPPER #10 AWG OR LARGER AS REQUIRED BY THE NEC.
 - ALL DUCTS OF THE SAME DUTY (480V POWER, 120V POWER, 120V CONTROLS, AND SIGNAL/FIBER) SHALL BE SEPARATED BY A MINIMUM OF 2".
 - SIGNAL AND FIBER DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 12", FROM 120V POWER BY A MIN. OF 6" AND FROM 120V CONTROL BY MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS. 120V POWER AND 120V CONTROL DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS.

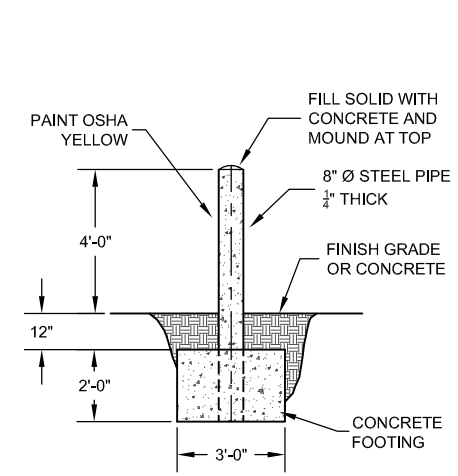
200 TYP DIRECT BURIED CONDUIT
SCALE: NONE



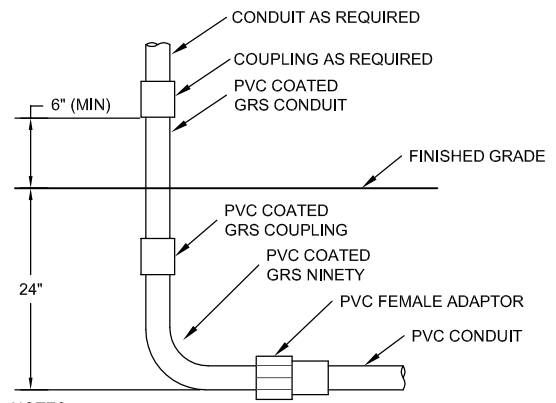
015 TYP EQUIPMENT RACK DETAIL
NO SCALE



901 TYP PANEL SHADE
SCALE: NONE

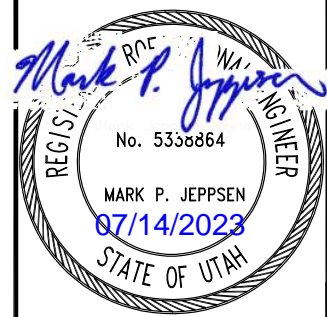


421 TYP PIPE BOLLARD DETAIL
SCALE: NTS



- NOTES:**
- WHERE CONDUITS ARE INSTALLED IN OR UNDER A CONCRETE SLAB, THE 24" DIMENSION DOES NOT APPLY. CONDUITS SHALL BE INSTALLED BETWEEN REBAR MATS OR UNDER A SINGLE REBAR MAT.
 - IN CORROSIVE AREAS, PVC COATED GRS SHALL BE USED.

320 TYP GRS STUB UP DETAIL
SCALE: NONE



DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE		ORIGINAL	DESIGN	DRAWN	CHECKED
NO.	DATE	MPJ	MPJ	MPJ	MPJ
0	00/00/0000				
REVISIONS					

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
LANDFILL FENCE AND GATING
DETAILS

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 Bountiful, Utah 84010
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 www.skmeng.com

DRAWING NO.
E901
 SHEET

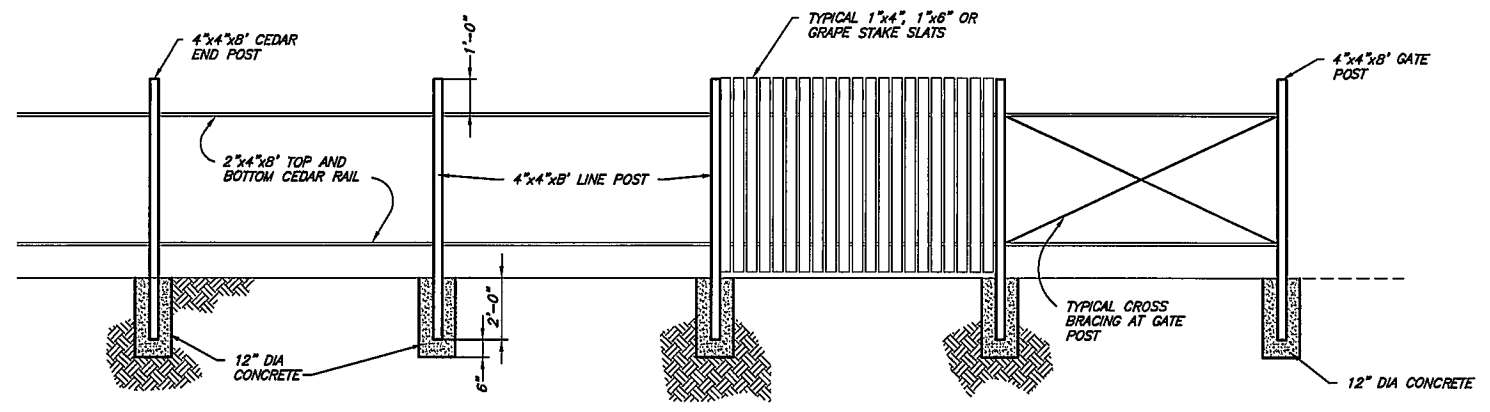


BOX ELDER COUNTY
PUBLIC SAFETY CENTER PARKING LOT RECONSTRUCT AND FENCING
OVERALL FENCING PLAN
ROAD SHED - ELWOOD, UT

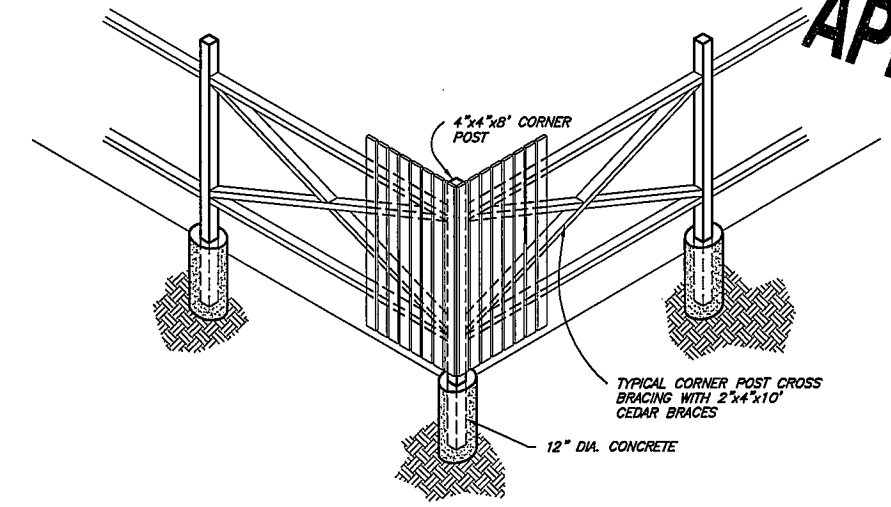
REV.	DATE	APPR.

SCALE:	SKT DESIGNED	SKT DRAWN	SKT CHECKED
24" x 36"			
H:1" = 20'			
V:1" = 20'			
11" x 17"			
H:1" = 40'			
V:1" = 40'			

APPROVED

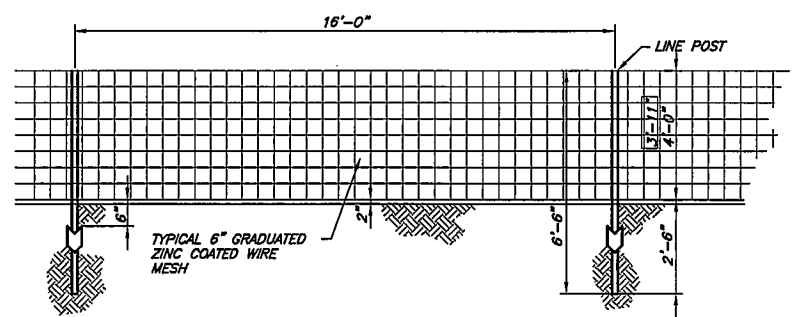


TYPICAL WOOD FENCE

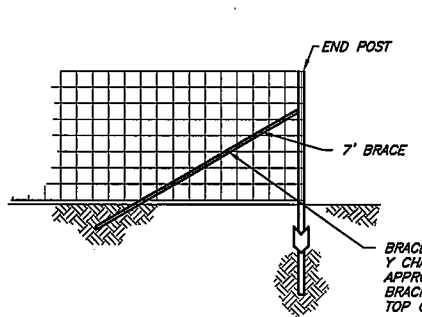


CORNER POST DETAIL

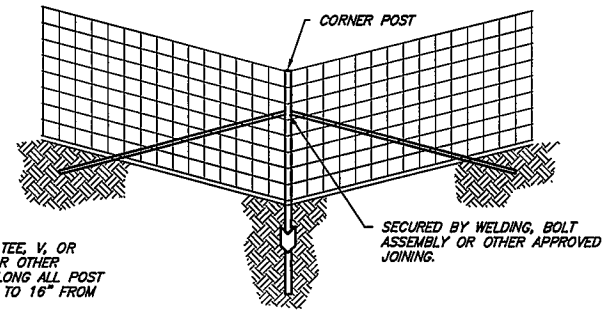
NOTE: THIS SHEET SPECIFIES VARIOUS FENCING TYPES TO BE CONSTRUCTED WHEN CALLED FOR BY THE COUNTY ENGINEER.



TYPICAL WIRE FENCE

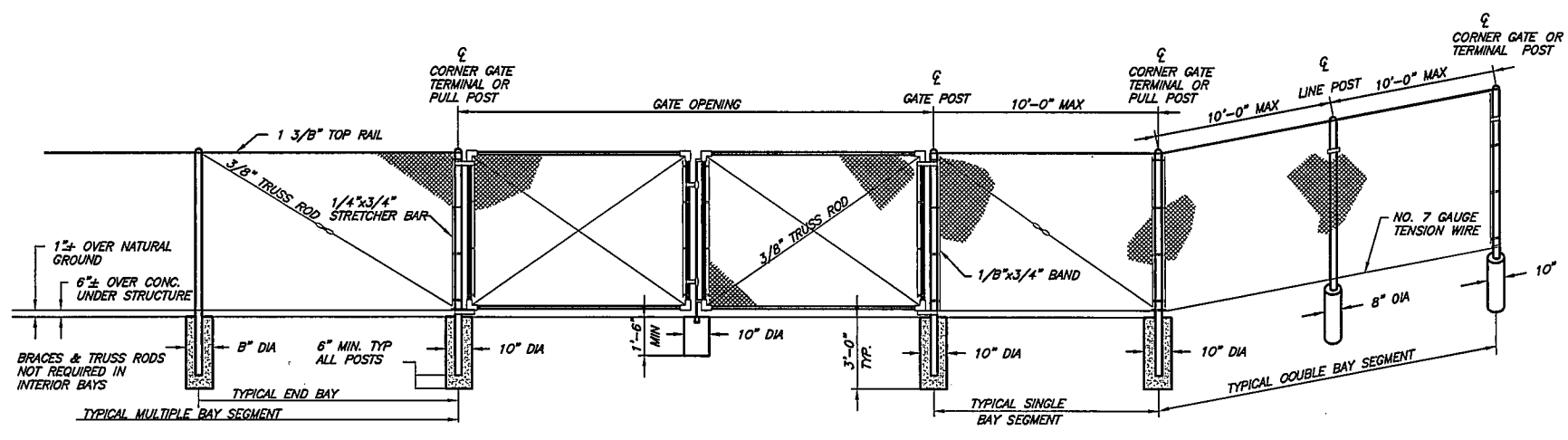


END POST BRACING DETAIL

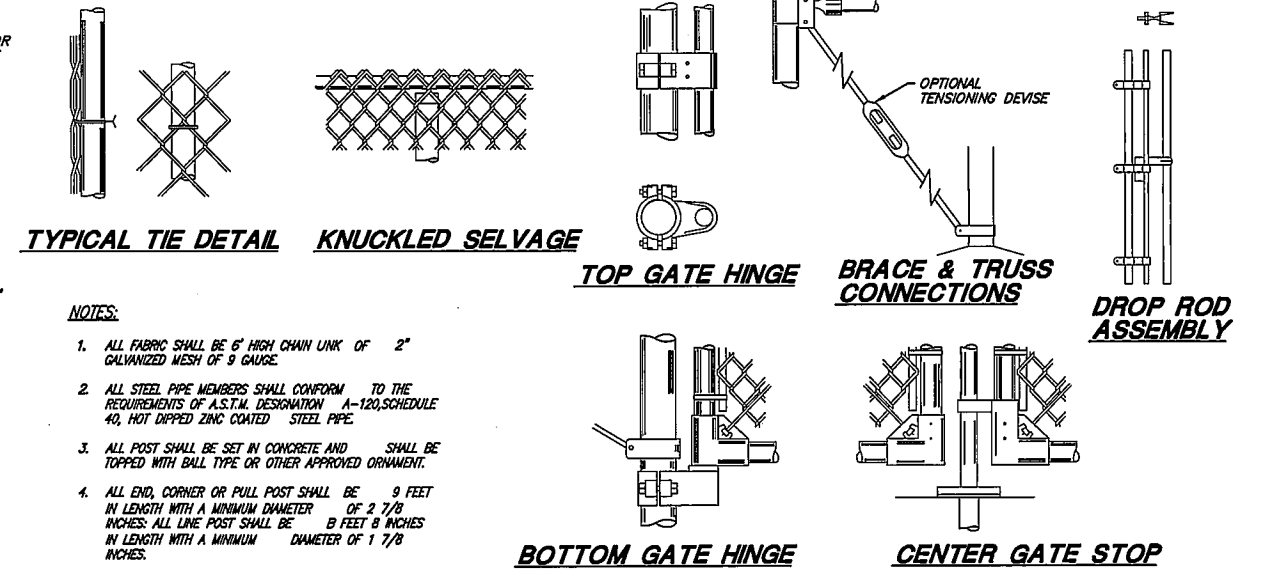


CORNER POST DETAIL

GATES			
GATE POST AND GATE FRAMES			
HEIGHT	GATE OPENING	GATE POST	GATE FRAME
6 FEET AND OVER	SINGLE TO 6' OR DOUBLE TO 12'	2 5/8"	1 1/2"
	SINGLE OVER 6' TO 13' OR DOUBLE OVER 12' TO 24'	3 1/2"	
	SINGLE OVER 13' TO 18' OR DOUBLE OVER 24' TO 36'	6"	
	SINGLE TO 18' OR DOUBLE OVER 36'	8"	



TYPICAL CHAIN LINK FENCE



- NOTES:
- ALL FABRIC SHALL BE 6" HIGH CHAIN LINK OF 2" GALVANIZED MESH OF 9 GAUGE.
 - ALL STEEL PIPE MEMBERS SHALL CONFORM TO THE REQUIREMENTS OF A.S.T.M. DESIGNATION A-120, SCHEDULE 40, HOT DIPPED ZINC COATED STEEL PIPE.
 - ALL POST SHALL BE SET IN CONCRETE AND SHALL BE TOPPED WITH BALL TYPE OR OTHER APPROVED ORNAMENT.
 - ALL END, CORNER OR PULL POST SHALL BE 9 FEET IN LENGTH WITH A MINIMUM DIAMETER OF 2 7/8 INCHES. ALL LINE POST SHALL BE 8 FEET 8 INCHES IN LENGTH WITH A MINIMUM DIAMETER OF 1 7/8 INCHES.

PROJECT ENGINEER	REV.	DATE	APPR.
DATE			

SCALE: N.T.S.
DESIGNED RWS
DRAWN BEB
CHECKED KLJ

JJA CONSULTING ENGINEERS
1716 East 5600 South
South Ogden, Utah 84403 (801) 476-9767

BOX ELDER COUNTY
ROAD, STORM DRAIN, AND FENCING STANDARD DRAWINGS
FENCING STANDARD DETAILS

7/14/2023 C:\USERS\JUNGLE\KIM\AQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\WOOD ROAD-SHED\999-E001 NOTES & SYMBOLS.DWG SKM ENGINEERING, LLC © COPYRIGHT 2020 BOUNTIFUL, UTAH

SCHEMATIC LINETYPES

	ELECTRICAL BUS		EXISTING OR FUTURE MANUFACTURER/SHOP WIRE
	EXISTING OR FUTURE ELECTRICAL BUS		FIELD/CONTRACTOR INSTALLED WIRE
	MANUFACTURER/SHOP WIRE TYPICALLY INSTALLED OFF-SITE		EXISTING OR FUTURE FIELD/CONTRACTOR INSTALLED WIRE

SCHEMATIC SYMBOLS

	DEVICE CONNECTION LUG OR TERMINAL		HARMONIC FILTER
	SCHEMATIC POINT OF CONNECTION		LOAD REACTOR
	POWER STABS BUS CONNECTION		VARIABLE FREQUENCY DRIVE
	POWER STABS LOAD CONNECTION		REDUCED VOLTAGE SOFT STARTER
	CIRCUIT BREAKER		GROUND CONNECTION
	100AF ← FRAME SIZE		MOTOR, NUMBER DESIGNATES NEMA HORSEPOWER SIZE
	50AT ← TRIP RATING		MOTOR STARTER, CONTACTOR, RELAY OR TIMER COIL
	MCP ← BREAKER TYPE		NORMALLY OPEN CONTACT
	DISCONNECT		NORMALLY CLOSED CONTACT
	30A ← AMPERE RATING		SOLENOID VALVE
	4X ← NEMA RATING		EQUIPMENT PROGRAMMING CONSOLE
	FUSE		2 POSITION SELECTOR SWITCH POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		3 POSITION SELECTOR SWITCH SWITCH HAND - OFF - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	4X ← NEMA RATING		3 POSITION SELECTOR SWITCH OPEN - CLOSE - AUTO POSITION LEGEND: X=CLOSED O=OPEN
	FUSED DISCONNECT		3 POSITION SELECTOR SWITCH FORWARD - OFF - REVERSE POSITION LEGEND: X=CLOSED O=OPEN
	30A ← AMPERE RATING		NORMALLY CLOSED PUSH BUTTON
	4X ← NEMA RATING		NORMALLY OPEN PUSH BUTTON
	FUSE		TYPICAL SWITCH CONFIGURATION
	30A ← AMPERE RATING		FLOAT SWITCH - MAKE ON FALL
	4X ← NEMA RATING		FLOAT SWITCH - MAKE ON RISE
	FUSED DISCONNECT		FLOAT SWITCH - BREAK ON FALL
	30A ← AMPERE RATING		FLOAT SWITCH - BREAK ON RISE
	4X ← NEMA RATING		SWITCH TYPE SYMBOL (SEE BELOW)
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		LEVEL SWITCH
	TVSS CLASS C ← TVSS CLASSIFICATION		PRESSURE SWITCH
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		FLOW OR TORQUE SWITCH
	TVSS CLASS C ← TVSS CLASSIFICATION		TEMPERATURE SWITCH
	METERING EQUIPMENT		LIMIT SWITCH
	UM ← METER TYPE DESIGNATION		TIMER RELAY CONTACT
	AM = AMMETER		NORMALLY OPEN TIME DELAY CLOSE
	SSM = SOLID STATE METER		ELAPSED TIME METER
	UM = UTILITY METER		CONTROL RELAY
	VM = VOLTMETER		TIME DELAY RELAY
	WHM = WATT HOUR METER		ALARM RELAY
	WM = WATT METER		PILOT LIGHT LETTER INDICATES COLOR R=RED, A=AMBER, B=BLUE, G=GREEN
	MANUAL OR AUTOMATIC TRANSFER SWITCH		INSTANTANEOUS SHORT-CIRCUIT TRIP DEVICE
	600A ← AMPERE RATING		TIME OVERCURRENT TRIP DEVICE
	3R ← NEMA RATING		GROUND FAULT TRIP DEVICE
	TRANSIENT VOLTAGE SURGE SUPPRESSOR		
	TVSS CLASS C ← TVSS CLASSIFICATION		
	MOTOR OVERLOAD RELAY		
	FULL VOLTAGE NON-REVERSING STARTER (FVNR)		
	NEMA SIZE ← STARTER TYPE AND SIZE		
	FULL VOLTAGE REVERSING STARTER (FVR)		
	NEMA SIZE ← STARTER TYPE AND SIZE		
	TWO-SPEED STARTER		
	NEMA SIZE ← STARTER TYPE AND SIZE		

ELECTRICAL PLAN LINETYPES

	EXPOSED CONDUIT		BARE COPPER GROUND CONDUCTOR
	EXISTING OR FUTURE EXPOSED CONDUIT		ELECTRICAL EQUIPMENT
	UNDERGROUND CONDUIT		EXISTING OR FUTURE ELECTRICAL EQUIPMENT
	EXISTING OR FUTURE UNDERGROUND CONDUIT		DEMOLITION
	CONDUIT DUCTBANK		CAPPED UNDERGROUND CONDUIT
	EXISTING OR FUTURE CONDUIT DUCTBANK		

ELECTRICAL PLAN HAZARDOUS LOCATION CLASSIFICATION LINETYPES

	C1D1	CLASS I DIV 1		C2D1	CLASS II DIV 1
	C1D2	CLASS I DIV 2		C2D2	CLASS II DIV 2

ELEC. PLAN SYMBOLS

	X ← (SEE BELOW)
	AE - ANALYZER ELEMENT
	AIT - ANALYZING INDICATING TRANSMITTER
	FE - FLOW ELEMENT
	FIT - FLOW INDICATING TRANSMITTER
	FS - FLOW SWITCH
	J - JUNCTION BOX
	JS - TORQUE SWITCH
	LE - LEVEL ELEMENT
	LIT - LEVEL INDICATING TRANSMITTER
	LS - LEVEL SWITCH
	M - MOTOR
	MH - MANHOLE
	MV - MOTOR OPERATED VALVE
	PB - PULLBOX
	PIT - PRESSURE INDICATING TRANSMITTER
	PS - PRESSURE SWITCH
	PT - PRESSURE TRANSMITTER
	SV - SOLENOID VALVE
	TS - TEMPERATURE SWITCH
	WE - WEIGHT ELEMENT
	WIT - WEIGHT INDICATING TRANSMITTER
	ZS - LIMIT SWITCH
	GROUND ROD
	DUPLEX RECEPTACLE
	WP DENOTES RECEPTACLE TYPE (BLANK) = STANDARD INDOORS GFCI = GND FLT CURRENT INT. WP = WEATHER PROOF & GFCI
	QUADRUPLEX RECEPTACLE
	DATA JACK
	SINGLE POLE SWITCH
	3-WAY SWITCH
	4-WAY SWITCH
	CONDUIT SEALOFF
	LTC CONNECTION
	MC CONNECTION
	DISCONNECT SWITCH
	THERMOSTAT
	CONDUIT HOME RUN NUMBER INDICATES QUANTITY OF CONDUCTORS INCLUDING GROUND

TB'S & PLC SYMBOLS

	LOCAL PANEL OR DEVICE TERMINAL BLOCK
	TERMINAL LABEL
	PLC PANEL TERMINAL BLOCK
	TERMINAL LABEL
	MCC TERMINAL BLOCK
	TERMINAL LABEL
	DEVICE TERMINAL BLOCK
	TERMINAL LABEL
	PLC DISCRETE INPUT
	DISCRETE INPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY OPEN)
	DISCRETE OUTPUT LABEL
	PLC DISCRETE OUTPUT (NORMALLY CLOSED)
	DISCRETE OUTPUT LABEL
	PLC ANALOG INPUT
	ANALOG INPUT LABEL
	PLC ANALOG OUTPUT
	ANALOG OUTPUT LABEL
	PLC RTD
	RTD LABEL

EQUIPMENT CALLOUT

	EQUIP. TAG	EQUIPMENT CALLOUT
	DESCRIPTOR #1	
	DESCRIPTOR #2	
	DESCRIPTOR #3	
	100	DETAIL CALLOUT
	FE	FIELD INSTRUMENT CALLOUT
	101	

CONDUIT CALLOUT

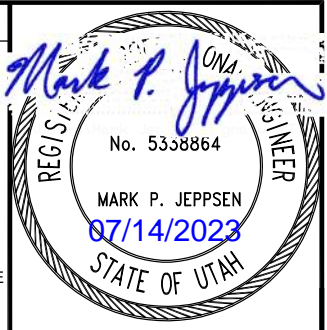
	GROUPED CONDUIT AND CIRCUIT IDENTIFICATION TAGS. REFER TO THE POWER ONE-LINE AND CONTROL ONE-LINE DIAGRAMS OR CONDUIT SCHEDULES FOR CONDUIT SIZES AND CONTENTS. C-CONTROL/INSTRUMENTATION P-POWER F-FIBER OPTIC/NETWORK SP-SPARE CONDUITS
	CXXX
	PXXX
	FXXX
	SPXXX

ABBREVIATIONS

A	AMPERE
AFF	ABOVE FINISHED FLOOR
AI	ANALOG INPUT
AIC	AMPS INTERRUPTING CAPACITY
AO	ANALOG OUTPUT
AS	AIR SUPPLY
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
CB	CIRCUIT BREAKER
CL2	CHLORINE
CPT	CONTROL POWER TRANSFORMER
CTC	COMMUNICATIONS TERMINATION CABINET
CU	COPPER, BARE
CV	CONTROL VALVE
DCS	DISTRIBUTED CONTROL SYSTEM
DI	DISCRETE INPUT
DO	DISCRETE OUTPUT
DP	DISTRIBUTION PANEL
DS	DISCONNECT SWITCH
DV/DT	DIFFERENTIAL VOLTAGE/TIME DRAWING
DWG	DRAWING
ETM	ELAPSED TIME METER
EOL	ELECTRONIC OVERLOAD
FE	FLOW ELEMENT
FLA	FULL LOAD AMPS
FOC	FIBER OPTIC CABLE
FOR	FORWARD-OFF-REVERSE
FS	FLOW SWITCH
FVNR	FULL VOLTAGE NON-REVERSING
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND	GROUND
GPM	GALLONS PER MINUTE
GRS	GALVANIZED RIGID STEEL
H2S	HYDROGEN SULFIDE
HH	HANDHOLE
HMI	HUMAN MACHINE INTERFACE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE CURRENT
I	INSTRUMENTATION CABLE
IC	INPUT/OUTPUT
IO	SHORT CIRCUIT CURRENT
ISC	JUNCTION BOX
J	LOCAL AREA NETWORK
LAN	LOCAL CONTROL PANEL
LCP	LOCK-OUT-STOP
LOS	LOCK-OUT-STOP
LP	LIGHTING PANEL
LR	LOCAL/REMOTE
LS	LEVEL SWITCH
LTC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
M	MOTOR
MA	MANUAL/AUTO, MILLIAMP
MC	MANUFACTURER'S CABLE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MFR(S)	MANUFACTURER(S)
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MOV	MOTOR OPERATED VALVE
MTU	MASTER TELEMETRY UNIT
NEC	NATIONAL ELECTRICAL CODE
NOTC	NORMALLY OPEN TIMED CLOSED
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
NTU	TURBIDITY
OIT	OPERATOR INTERFACE TERMINAL
OL	OVERLOAD
OO	ON/OFF (MAINTAINED)
OR	OFF-REMOTE
PB	PULL BOX
PC	PERSONAL COMPUTER
PFR	PHASE/POWER FAILURE RELAY
PLC	PROGRAMMABLE LOGIC CONTROLLER
PNL	PANEL
PPM	PARTS PER MILLION
PR	PAIR
P	PRESSURE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PV	PROCESS VARIABLE
RCP	REMOTE CONTROL PANEL
RF	RADIO FREQUENCY
RIO	REMOTE INPUT OUTPUT
RST	RESET
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TELEMETRY UNIT
RVSS	REDUCED VOLTAGE SOFT STARTER
SEQ	SERVICE ENTRANCE EQUIPMENT
SES	SERVICE ENTRANCE SECTION
SLOS	START-LOCK-OFF-STOP
SMC	SUBMERSIBLE MANUFACTURER CABLE
SO2	SULFUR DIOXIDE
SP	SET POINT/SPARE
SPD	SURGE PROTECTION DEVICE
SS	START/STOP
ST	SHUNT TRIP
TC	TELEPHONE CABLE
TS	TEMPERATURE SWITCH
TYP	TYPICAL
UG	UNDERGROUND
V	VOLT
VA	VOLTAMP
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZS	POSITION SWITCH

NOTES

- THE COMPLETED INSTALLATION SHALL COMPLY WITH APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. ALL WORK SHALL BE COMPLETED IN A NEAT, WORKMANLIKE MANNER IN ACCORDANCE WITH THE LATEST NEC STANDARDS OF INSTALLATION UNDER COMPETENT SUPERVISION. INSTALL GROUNDING PER NEC.
- VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND OTHER FACTORS, WHICH MAY AFFECT THE EXECUTION OF THE WORK. INCLUDE ALL RELATED COSTS IN THE INITIAL BID PROPOSAL.
- THE CONTRACTOR SHALL COORDINATE WORK WITH THE UTILITIES PROVIDING SERVICES ON THIS PROJECT, AND SHALL COMPLY WITH ALL THEIR INSTALLATION REQUIREMENTS.
- ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, UL, OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURERS' NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, USEFULNESS, AND BID PRICE.
- PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS, OR ANY OTHER PREVENTABLE CAUSES. EQUIPMENT DAMAGED DURING SHIPPING OR CONSTRUCTION, PRIOR TO ACCEPTANCE BY THE ENGINEER OR THE OWNER, WILL BE REJECTED AS DEFECTIVE.
- LEAVE THE SITE CLEAN. REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS. LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK. DAMAGED PAINT AND FINISHES SHALL BE TOUCHED UP OR REPAINTED WITH MATCHING COLOR PAINT AND FINISH.
- CIRCUIT CONDUCTORS #6 AWG OR SMALLER SHALL BE THWN STRANDED COPPER. #4 AWG THROUGH #2 AWG SHALL BE XHHW STRANDED COPPER. #1 AWG OR LARGER SHALL BE XHHW-2 STRANDED COPPER. MINIMUM POWER CONDUCTOR SIZE SHALL BE #12 AWG WITH #12 AWG GROUND. ALL WIRE TO BE SIZED PER NEC TABLE 316-10, 75° C BASED ON A 30° C AMBIENT.
- UNDERGROUND CONDUITS SHALL BE SCHEDULE 40 PVC. MINIMUM CONDUIT DEPTH SHALL BE 24 INCHES. MINIMUM UNDERGROUND CONDUIT SIZE SHALL BE 1 INCH. MINIMUM CONDUIT DEPTH UNDER SLAB SHALL BE 1 INCH.
- CONDUITS SHALL BE MARKED AT EACH END WITH MATCHING NUMBERED BRASS OR NYLON TAGS. SPARE CONDUITS SHALL HAVE A PULL STRING INSTALLED AND SECURED.
- EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL (GRS). MINIMUM SIZE 3/4 INCH, UNLESS OTHERWISE NOTED ON THE PLANS.
- SAFETY SWITCHES, ELECTRICAL DISTRIBUTION EQUIPMENT, CONTROL PANELS, AND OTHER ELECTRICAL DEVICES SHALL BE UL LISTED, AND RATED FOR HEAVY DUTY SERVICE.
- WIRING DEVICES SHALL BE SPECIFICATION GRADE.
- THE CONTRACTOR IS RESPONSIBLE FOR MANAGING, SCHEDULING, DOCUMENTING, AND PERFORMING THE WORK SO THAT A COMPLETE ELECTRICAL, INSTRUMENTATION AND CONTROL SYSTEM FOR THE FACILITY IS PROVIDED. ACCURATE SHOP AND RECORD DRAWINGS, AND OEM MANUALS SHALL BE SUBMITTED PRIOR TO FINAL ACCEPTANCE OF THE WORK.
- TYPICAL DETAILS SHALL APPLY IN ALL CASES, WHETHER SPECIFICALLY REFERRED TO OR NOT.
- REFER TO SPECIFICATION 260533 "RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS" FOR CONDUIT SPACING AND ROUTING REQUIREMENTS.



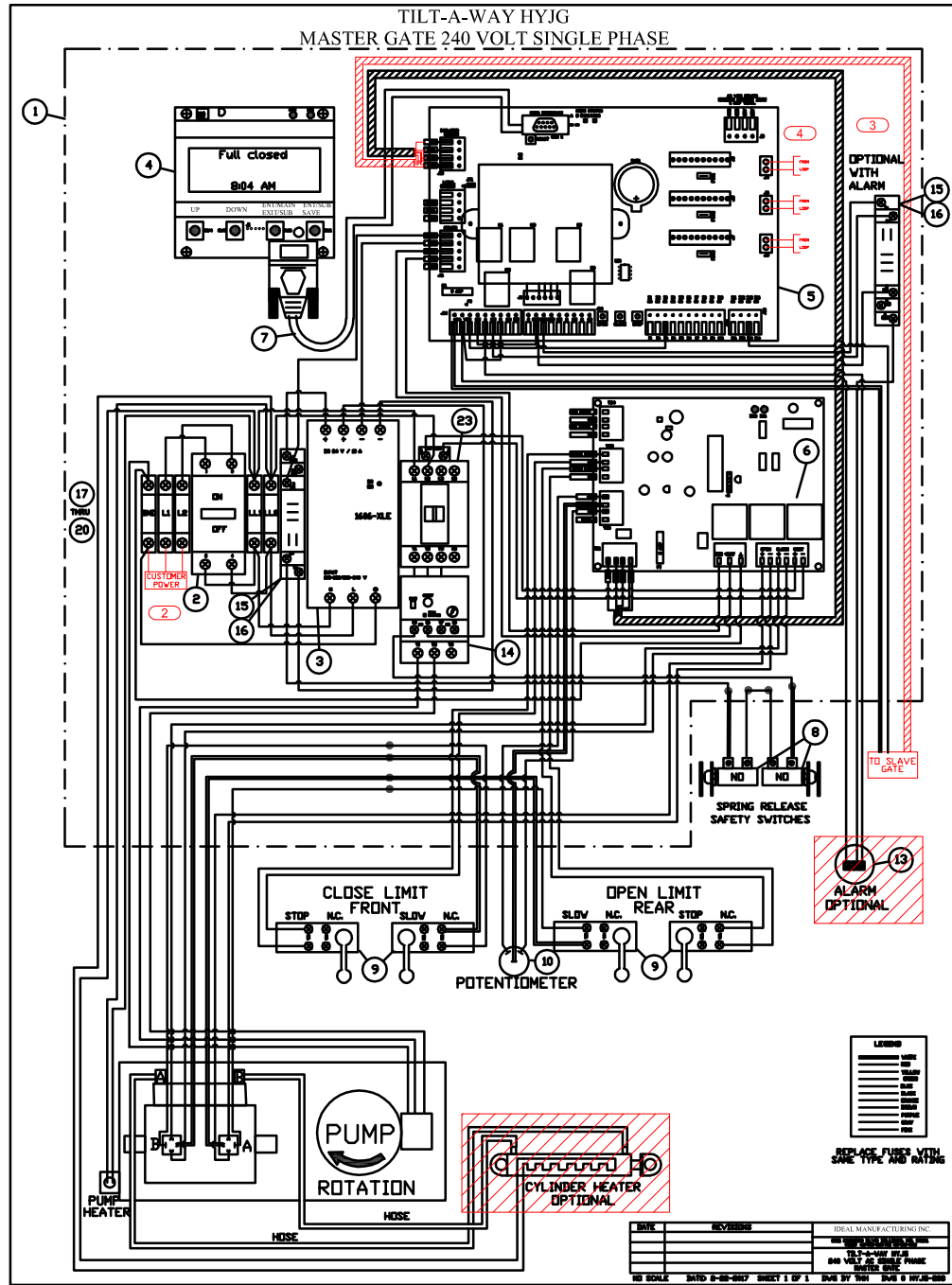
DRAWING IS TO SCALE IF BAR MEASURES: 1" = FULL SCALE 1/2" = HALF SCALE	ORIGINAL	CHECKED	
	DESIGN	DRAWN	MPJ
NO.	DATE	NO.	DATE
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REVISIONS			

BOX ELDER COUNTY, UTAH
 PUBLIC SAFETY GATE AND FENCING PROJECT
 ELWOOD ROAD SHED
 NOTES & SYMBOLS

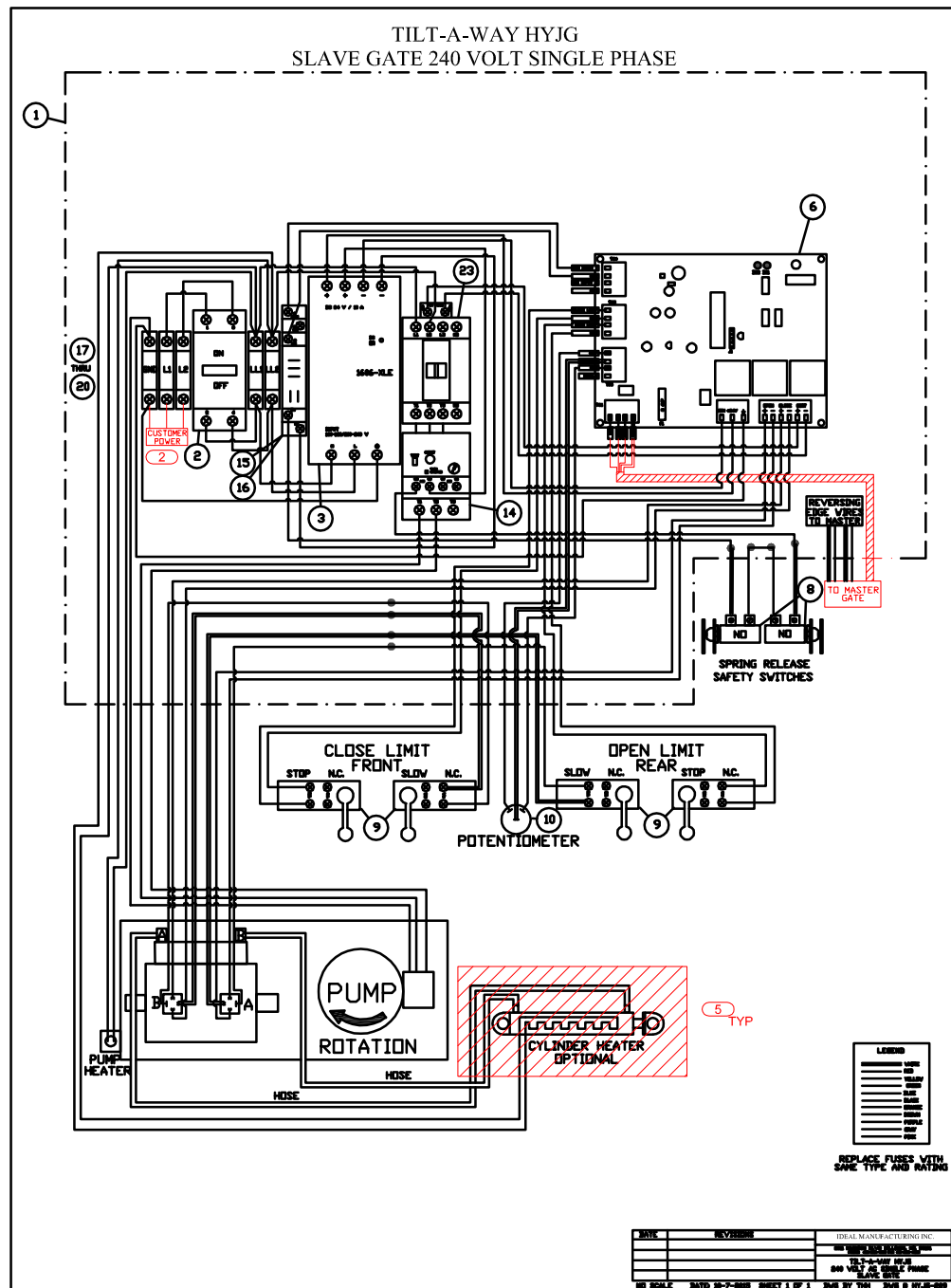
533 W 2600 S, Suite 25
Bountiful, Utah 84010
Phone: (801) 677-0011
www.skmeng.com

DRAWING NO.
E001
SHEET

7/14/2023 C:\USERS\ELGEO\KIMIAQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\ELWOOD ROAD-SHED\999-E002 ELECTRICAL PANEL LAYOUT.DWG



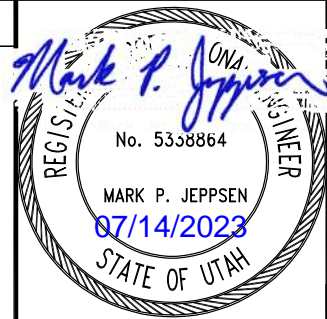
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NOTES

- ① DESIGN AND SPECIFICATION HAVE BEEN DEVELOPED AROUND THE TILT-A-WAY HYJG MASTER AND SLAVE GATE SYSTEM. CONTRACTOR TO SUPPLY AND INSTALL GATES AND ACCESSORIES PER THE DESIGN AND SPECIFICATIONS. IF THE CONTRACTORS INTENTION IS TO PROCURE AN EQUAL GATE VENDOR, THE ENGINEERS APPROVAL IS REQUIRED PRIOR TO AWARD OF BID.
- ② CONTRACTOR TO TERMINATE CUSTOMER POWER AT THESE TERMINALS, USING CONTRACTOR PROVIDED WIRE PER CONDUIT SCHEDULE.
- ③ CONTRACTOR TO INSTALL MASTER/SLAVE CONTROL WIRE SUPPLIED WITH TILT-A-WAY GATE SYSTEM. TERMINATE AT THESE POINTS ACCORDING TO OWNER MANUALS, DRAWINGS, AND SPECIFICATIONS.
- ④ CONTRACTOR TO INSTALL LOOP WIRE SUPPLIED WITH TILT-A-WAY GATE SYSTEM PER OWNER MANUALS AND TILT-A-WAY SPECIFICATION. CONTRACTOR TO TERMINATE ON CONTROL BOARD AT THIS LOCATION.
- ⑤ OPTIONAL ITEMS SHOWN HATCHED SHALL NOT BE PROVIDED BY THE CONTRACTOR AS PART OF THE GATE SYSTEM.



NO.	DATE	DESIGN	DRAWN	CHECKED	REVISIONS
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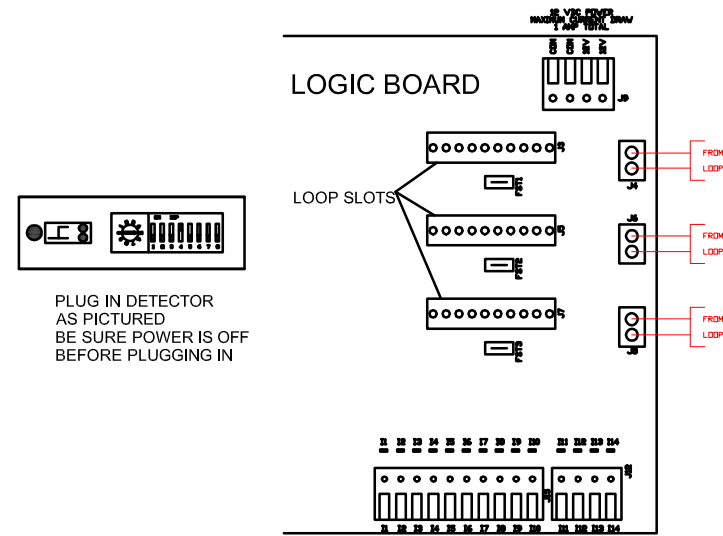
BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
ELWOOD ROAD SHED
GATE CONTROL SCHEMATIC

533 W 2600 S, Suite 25
Bountiful, Utah 84010
Phone: (801) 677-0011
www.skmeng.com

DRAWING NO.
E002
SHEET

C:\USERS\ELGEO\KIM\AQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\989-E004 GATE ACCESSORY CONTROL WIRING.DWG

TILT-A-WAY HYJG LOOP DETECTOR SOCKET DIAGRAM



TILT-A-WAY HYJG
THERE ARE THREE LOOP SLOTS J3, J5, AND J7 THAT CAN BE PROGRAMMED FOR SEVERAL DIFFERENT FUNCTIONS
LOOP SLOT DISABLED / SAFETY LOOP / FREE EXIT LOOP / SHADOW LOOP / ARMING LOOP
TO ACCESS THESE FUNCTIONS PRESS AND HOLD BUTTON SW2 ON THE INTERFACE BOARD FOR ABOUT 4 SECONDS
UNTIL THE DISPLAY CHANGES TO SHOW

MAIN MENU
UP / DOWN - VIEW MENUS
SELECT - VIEW / EDIT
RESET - EXIT

PRESS AND RELEASE BUTTON SW4 UNTIL THE DISPLAY CHANGES TO
TIMING AND OPTIONS

PRESS AND RELEASE BUTTON SW1 TO ENTER THIS MENU
PRESS AND RELEASE BUTTON SW4 UNTIL THE DISPLAY SHOWS
LOOP AND REMOTE ASSIGNMENT

PRESS AND RELEASE BUTTON SW1 TO ENTER SUBMENU
THE DISPLAY WILL SHOW

LOOP FUNCTIONALITY ASSIGNMENT J3 SLOT

USE BUTTON SW4 TO SCROLL THRU THE SUBMENU UNTIL THE SLOT THAT YOU WANT TO ACCESS IS SHOW
PRESS AND RELEASE BUTTON SW1 TO ENTER

USE BUTTON SW4 TO SCROLL THRU THE FUNCTION ASSIGNMENTS UNTIL THE DESIRE FUNCTION IS SHOW
PRESS AND RELEASE BUTTON SW1 TO SAVE

USE BUTTON SW4 TO CHANGE TO THE NEXT LOOP SLOT TO BE PROGRAMMED AND REPEAT
TO ASSIGN FUNCTIONS TO ALL SLOTS USED

WHEN ALL SLOTS HAVE BEEN PROGRAMMED PRESS AND RELEASE BUTTON SW2 TO EXIT SUBMENU
REPEAT UNTIL YOU HAVE EXITED ALL MENUS

SAFETY LOOP WILL STOP AND REVERSE A CLOSING GATE, AND HOLD AN OPEN GATE OPEN UNTIL CLEARED
FREE EXIT WILL OPEN A CLOSED GATE AND STOP AND REVERSE A CLOSING GATE AND HOLD IT OPEN UNTIL CLEARED
SHADOW LOOP WILL HOLD OPEN A FULLY OPENED GATE UNTIL CLEARED
ARMING LOOP WILL LATCH AN AUXILIARY OUTPUT RELAY IF THE AUXILIARY OUTPUT RELAY FUNCTION
HOLD AUX RELAY ON ARMING LOOP ASSERTION HAS BEEN SELECTED IN THE AUXILIARY I/O SUBMENU IN
TIMING AND OPTIONS MENU

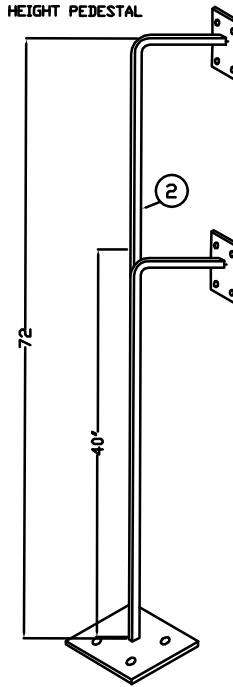
IDEAL MANUFACTURING INC.

3/24/2016

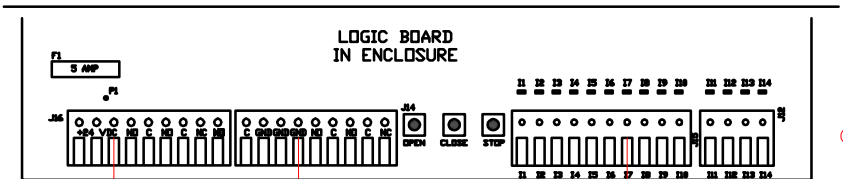
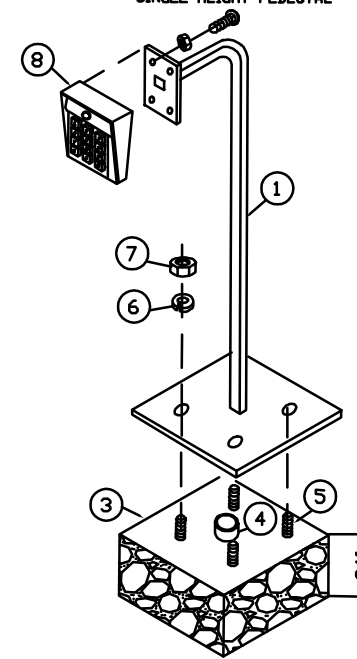
HYJG-230

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DUAL HEIGHT PEDESTAL



SINGLE HEIGHT PEDESTAL



TILT-A-WAY HYJG REMOTE CONTROL STATION PEDESTAL AND GATELOCK

REF NO.	PART NO.	DESCRIPTION	REQ NO
1	N/A	Single Height Pedestal	1
2	N/A	Dual Height Pedestal 72" in Height	1
3	N/A	Concrete Support Pier 15" X 15" X 24" Deep	1
4	N/A	1" in Diameter Electrical Conduit with 2 1/2" projection above Concrete. Conduit Routed from Barrier Pedestal.	1
5	N/A	1/2" x 8" Expansion Bolt	4
6	N/A	1/2" Lock Washer	4
7	N/A	1/2" Hex Nut	4
8	N/A	Remote Control Station of Choice (Included are bolts, nuts, keys and plate.	4

IDEAL MANUFACTURING INC.

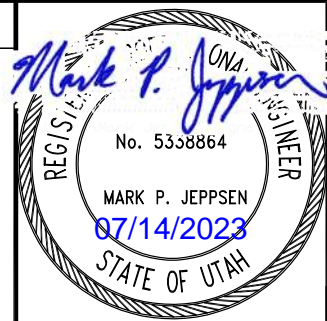
3/24/2016

HYJG-233

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NOTES

- 1 CONTRACTOR TO FURNISH AND INSTALL KEYPADS FOR VEHICLE ENTRY. KEYPADS SHOULD BE INSTALLED PER CIVIL DESIGN AND SPECIFICATIONS. TERMINATE CONTROL WIRE ON MASTER CONTROL BOARD AT THESE LOCATIONS.



DRAWING IS TO SCALE
IF BAR MEASURES:
1" = FULL SCALE
1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED	REVISIONS
0	00/00/0000	MPJ	MGJ	MPJ	

BOX ELDER COUNTY, UTAH
PUBLIC SAFETY GATE AND FENCING PROJECT
ELWOOD ROAD SHED
GATE ACCESSORY CONTROL WIRING

533 W 2600 S, Suite 25
Bountiful, Utah 84010
Phone: (801) 677-0011
www.skmeng.com

DRAWING NO.
E003
SHEET

C:\USERS\ELGEO\KIM\AQUA ENGINEERING\BOX ELDER-COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\ELWOOD ROAD-SHED\999-E201 SITE ELECTRICAL PLAN LAYOUT.DWG

7/14/2023

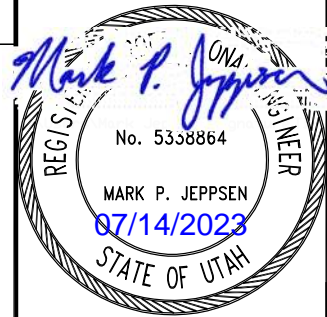


SITE ELECTRICAL PLAN LAYOUT

SCALE: 1:20
 0 20 40
 Scale in Feet

NOTES

- ① EXISTING LIGHTING PANEL AT THIS LOCATION CALLED LIGHTING PANEL WEST OR LP-WEST HAS EXISTING SPARE BREAKER SLOTS FOR 4-240VAC CIRCUITS. CONTRACTOR SHALL INSTALL NEW 20AMP BREAKERS AND FEED WEST GATES MASTER CONTROL PANELS PER THE CONDUIT SCHEDULE AND SPECIFICATIONS.
- ② EXISTING LIGHTING PANEL AT THIS LOCATION CALLED LIGHTING PANEL EAST OR LP-EAST HAS EXISTING SPARE BREAKER SLOTS FOR 2-240VAC CIRCUITS. CONTRACTOR SHALL INSTALL 2 NEW 20AMP BREAKERS AND FEED EAST GATE MASTER CONTROL PANELS PER THE CONDUIT SCHEDULE AND SPECIFICATIONS.
- ③ CONDUITS TO EXIT THE BUILDING AT THESE LOCATIONS. CONTRACTOR TO FURNISH AND INSTALL TWO 6" X 6" X 6" JUNCTION BOXES AND MOUNT THEM TO THE WALL. CONDUCTORS TO PROCEED UNDERGROUND FROM THE JUNCTION BOXES TO GATE LOCATIONS. SEE DETAILS 012 AND 301.
- ④ CONDUIT FROM LP-WEST TO JB-WEST MUST RUN INSIDE THE BUILDING ABOVE THE GARAGE DOORS AND DOWN TO AN LB WHERE THE WALL PENETRATION WILL BE INSTALLED OPPOSITE THE JB. JB MUST BE INSTALLED AT THIS LOCATION SUCH THAT CONCRETE DRIVEWAY IS NOT DISTURBED WHILE INSTALLING CONDUITS TO GATE CONTROLLERS.
- ⑤ GATES SHALL BE GROUNDED USING DETAIL NUMBER 101, GROUND SHOULD BE BONDED PER THE TILT-A-WAY INSTALLATION GUIDE AND SPECIFICATIONS. GROUNDING FOR THE CONTROL BOARD SHALL BE TIED INTO BUILDING GROUND GRID AT LIGHTING PANELS. GROUNDS TO KEYPAD ENTRIES MUST BE BONDED TO METAL ENCLOSURES AND RETURN TO CONTROL BOARD, SEE CONDUIT DEVELOPMENT.

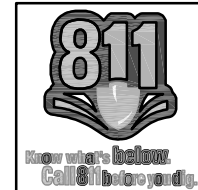


DRAWING IS TO SCALE
 IF BAR MEASURES:
 1" = FULL SCALE
 1/2" = HALF SCALE

NO.	DATE	DESIGN	DRAWN	CHECKED	REVISIONS		
					MPJ	MGJ	MPJ
0	00/00/0000						

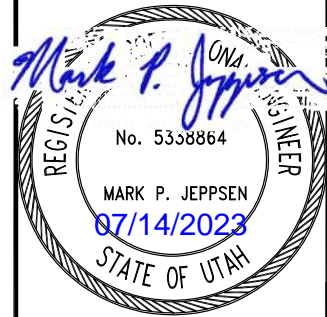
BOX ELDER COUNTY, UTAH
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 SITE ELECTRICAL PLAN LAYOUT

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DRAWING NO.
E201
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7/14/2023 C:\USERS\ELUNGEOL\KIMIAQUA\ENGINEERING\BOX ELDER COUNTY - 002405.D\BOX ELDER-PUBLIC SAFETY GATE AND FENCING\050 DRAFTING\999 ELECTRICAL\ELWOOD ROAD-SHED\999-E501 SCHEDULES & CONDUIT DEVELOPMENT.DWG



ELWOOD POWER CONDUIT						
CONDUIT SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES	
P001	1"	8#10 W#10 GND	240VAC	LP-WEST	JB-WEST	
P002	1"	2#10 W#10 GND	240VAC	JB-WEST	GATE 1 MASTER	
P003	1"	2#10 W#10 GND	240VAC	JB-WEST	GATE 1 SLAVE	
P004	1"	4#10 W#10 GND	240VAC	JB-WEST	PB-1	THROUGH PB-1
P005	1"	2#10 W#10 GND	240VAC	PB-1	GATE 2 MASTER	
P006	1"	2#10 W#10 GND	240VAC	PB-1	GATE 2 SLAVE	
P007	1"	4#12 W#12 GND	240VAC	LP-EAST	GATE 3 MASTER	THROUGH JB-EAST
P008	1"	2#12 W#12 GND	240VAC	GATE 3 MASTER	GATE 3 SLAVE	

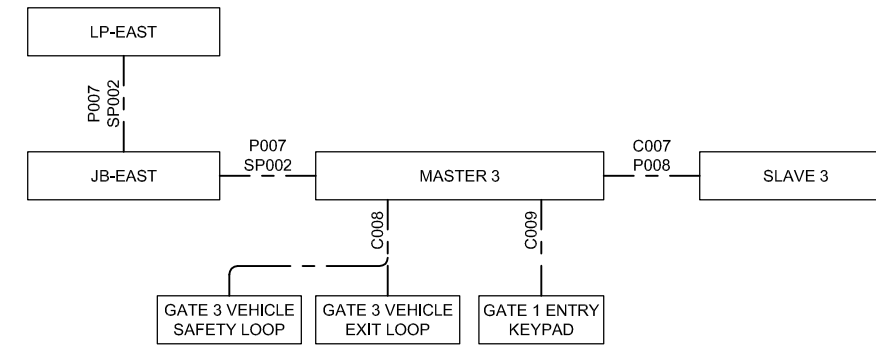
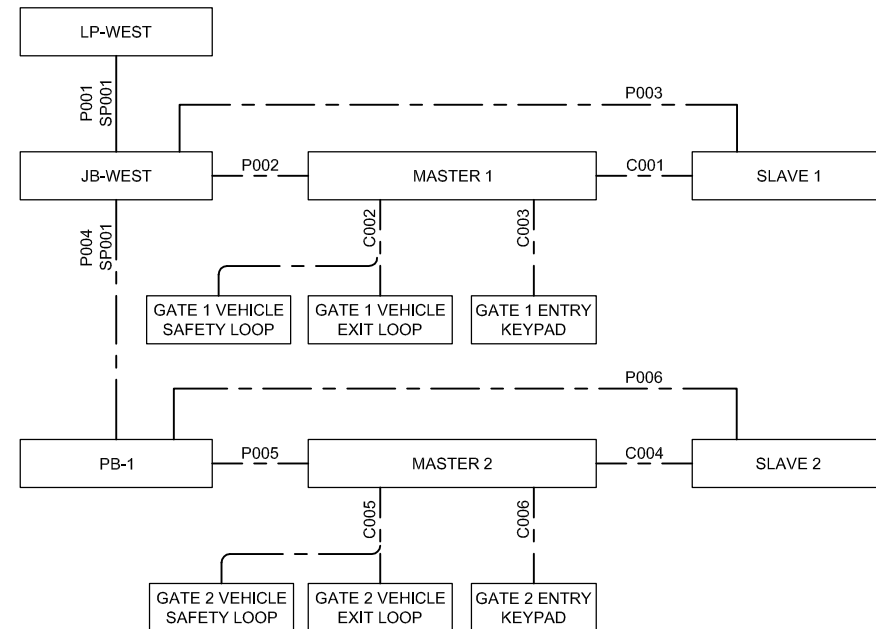
ELWOOD CONTROL CONDUIT						
CONDUIT SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES	
C001	1"	TILT-A-WAY SHIELDED MULTICONDUCTOR	CONTROL	GATE 1 MASTER CONTROL BOARD	GATE 1 SLAVE CONTROL BOARD	
C002	1"	TILT-A-WAY LOOP CABLES	CONTROL	GATE 1 VEHICLE DETECTION CONTROLLER	GATE 1 VEHICLE DETECTION LOOPS	
C003	1"	3#14 W#14 GND	CONTROL	GATE 1 MASTER CONTROL BOARD	GATE 1 KEYPAD	
C004	1"	TILT-A-WAY SHIELDED MULTICONDUCTOR	CONTROL	GATE 2 MASTER CONTROL BOARD	GATE 2 SLAVE CONTROL BOARD	
C005	1"	TILT-A-WAY LOOP CABLES	CONTROL	GATE 2 VEHICLE DETECTION CONTROLLER	GATE 2 VEHICLE DETECTION LOOPS	
C006	1"	3#14 W#14 GND	CONTROL	GATE 2 MASTER CONTROL BOARD	GATE 2 KEYPAD	
C007	1"	TILT-A-WAY SHIELDED MULTICONDUCTOR	CONTROL	GATE 3 MASTER CONTROL BOARD	GATE 3 SLAVE CONTROL BOARD	
C008	1"	TILT-A-WAY LOOP CABLES	CONTROL	GATE 3 VEHICLE DETECTION CONTROLLER	GATE 3 VEHICLE DETECTION LOOPS	
C009	1"	3#14 W#14 GND	CONTROL	GATE 3 MASTER CONTROL BOARD	GATE 3 KEYPAD	

ELWOOD SPARE CONDUIT						
CONDUIT SIZE	CONDUCTORS	SERVICE	FROM	TO	NOTES	
SP001	1"	PULL STRING	240VAC	LP-WEST	PB-1	THROUGH JB-WEST
SP002	1"	PULL STRING	240VAC	LP-EAST	GATE 3 MASTER STUB AREA	THROUGH JB-EAST

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					MPJ	MGJ	MPJ
0	00/00/0000						

CONDUIT SCHEDULE



CONDUIT DEVELOPMENT

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 SCHEDULES & CONDUIT DEVELOPMENT

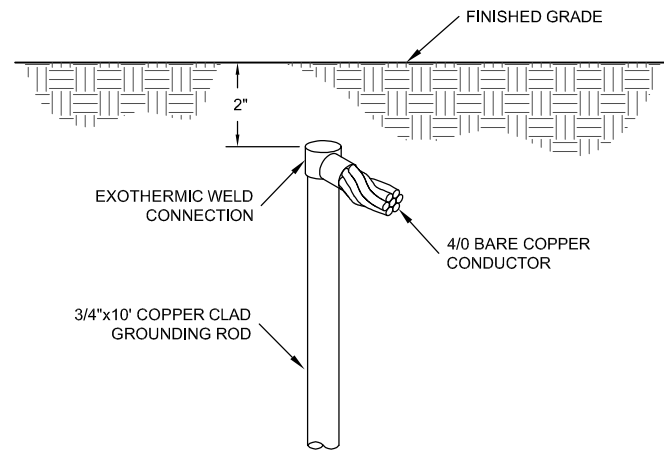
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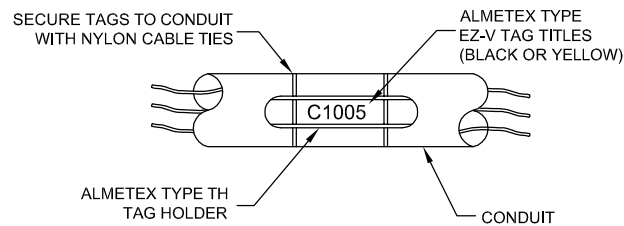
E501

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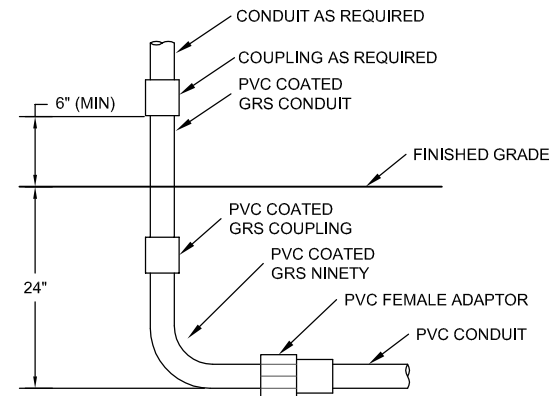
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101
TYP SCALE: NONE
EXOTHERMIC GROUND ROD CONNECTION

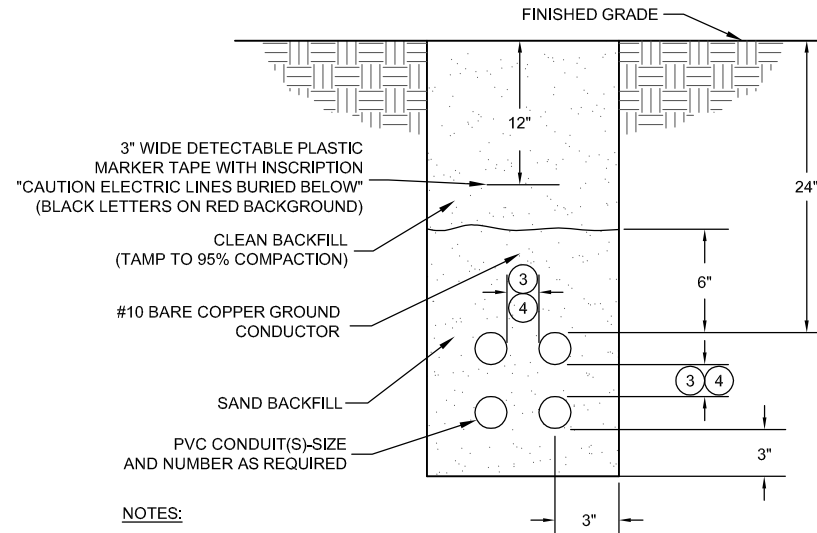


360
TYP SCALE: NONE
CONDUIT MARKING SYSTEM



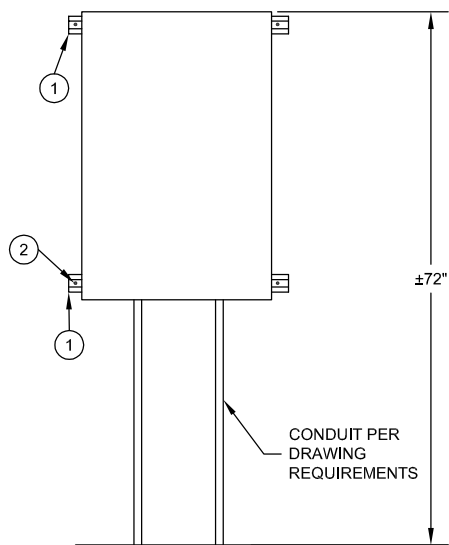
- NOTES:**
- WHERE CONDUITS ARE INSTALLED IN OR UNDER A CONCRETE SLAB, THE 24" DIMENSION DOES NOT APPLY. CONDUITS SHALL BE INSTALLED BETWEEN REBAR MATS OR UNDER A SINGLE REBAR MAT.
 - IN CORROSIVE AREAS, PVC COATED GRS SHALL BE USED.

320
TYP SCALE: NONE
GRS STUB UP DETAIL



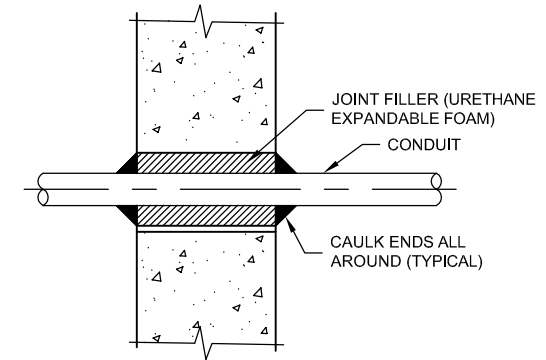
- NOTES:**
- DIMENSIONS ARE MINIMUM.
 - THE GROUND CONDUCTOR SHALL RUN CONTINUOUSLY THROUGH MANHOLES AND PULL BOXES AND SHALL CONTINUE FROM THE DUCTBANK INTO THE ELECTRICAL EQUIPMENT OR BUILDING GROUNDING SYSTEM AND SHALL BE BONDED TO EACH RIDGID METAL CONDUIT. BOND CONDUCTORS TO BE SOLID COPPER #10 AWG OR LARGER AS REQUIRED BY THE NEC.
 - ALL DUCTS OF THE SAME DUTY (480V POWER, 120V POWER, 120V CONTROLS, AND SIGNAL/FIBER) SHALL BE SEPARATED BY A MINIMUM OF 2".
 - SIGNAL AND FIBER DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 12", FROM 120V POWER BY A MIN. OF 6" AND FROM 120V CONTROL BY MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS. 120V POWER AND 120V CONTROL DUCTS SHALL BE SEPARATED FROM 480V POWER BY A MIN. OF 4" UNLESS NOTED OTHERWISE ON THE DRAWINGS.

200
TYP SCALE: NONE
DIRECT BURIED CONDUIT

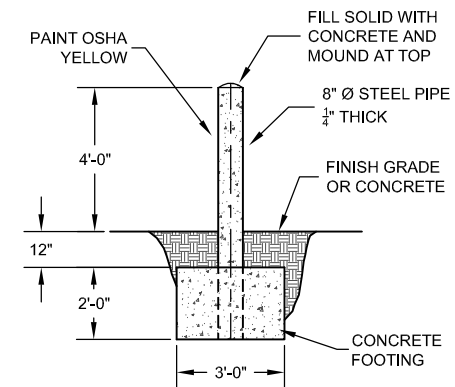


- STAINLESS STEEL 1-5/8" x 1-5/8" UNISTRUT CHANNEL
- 1/2" x 3" SS ANCHOR BOLT OR LAG BOLT WITH WASHER ANCHORED TO WALL (EVERY 18" MAX 2" MIN)

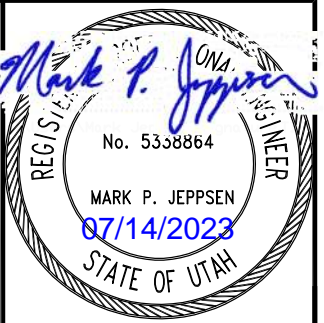
012
TYP SCALE: NONE
WALL MOUNTED J-BOX



301
TYP SCALE: NONE
CONDUIT PENETRATION AT EXISTING WALL OR SLAB



421
TYP SCALE: NTS
PIPE BOLLARD DETAIL



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1/2" = HALF SCALE		NO.		DATE		DESIGN		DRAWN	
0	1/2	0	00/00/0000	MPJ	MGJ	MPJ	MPJ	MPJ	MPJ
				REVISIONS					

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