COUNTY OF NEVADA
STATE OF CALIFORNIA

BIDDING DOCUMENTS, SPECIFICATIONS AND CONTRACT DOCUMENTS

FOR

ELECTRIC BUS CHARGING PROJECT

TINLOY STREET TRANSIT CENTER

COUNTY PROJECT NO. 889830-10

BIDS DUE: February 6th, 2025

The County will conduct this public bid opening through the following on-line site:
Nevada County is inviting you to a scheduled TEAMS meeting at 2:30 p.m. February 6, 2025
Microsoft Teams Need help?
Join the meeting now
Meeting ID: 256 800 372 402
Passcode: YM944xm7

Dial in by phone
+1 530-414-9282,,134790928# United States, Truckee
Find a local number
Phone conference ID: 134 790 928#
For organizers: Meeting options | Reset dial-in PIN

H:\PW\Engineering\CONTRACT\County Standard Contracts\LOCAL Contract Boilerplate (JAN 16 2020).doc

PROFESSIONAL ENGINEERS SIGNATURE PAGE

THE CIVIL SPECIAL PROVISIONS CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER THE DIRECTION OF THE FOLLOWING REGISTERED PERSON.

PATRICK PERKINS, REGISTERED CIVIL ENGINEER

THE ELECTRICAL SPECIAL PROVISIONS ATTACHMENT 1 CONTAINED HEREIN HAVE BEEN PREPARED BY OR UNDER THE DIRECTION OF THE FOLLOWING REGISTERED PERSON.

SCOTT WHEELER REGISTERED ELECTRICAL ENGINEER

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CONTRACT TIME LINE

1. BIDS DUE: **February 6, 2025, at 2:30 p.m.**

2. BID OPENING: **February 6, 2025, at 2:30 p.m.**

3. BIDS TO REMAIN OPEN FOR **60 DAYS** FROM DATE OF OPENING OF BIDS.

4. NOTICE OF AWARD DUE WITHIN **60 DAYS** OF OPENING OF BIDS.

5. BID BONDS OF UNSUCCESSFUL BIDDERS TO BE RETURNED WITHIN **10 DAYS** OF AWARD BY COUNTY.

6. SIGNED CONTRACT AND BONDS DUE WITHIN **30 DAYS** OF NOTICE OF AWARD.

7. NOTICE TO PROCEED WITH WORK WILL BE ISSUED WITHIN **60 DAYS** OF CONTRACT SIGNING.

8. CONSTRUCTION MUST BEGIN WITHIN **7 DAYS** AFTER ISSUANCE OF NOTICE TO PROCEED.

9. CONTRACTOR MUST GIVE **72** HOURS WRITTEN NOTICE OF DATE WORK WILL COMMENCE.

10. PRECONSTRUCTION CONFERENCE WITHIN **7 DAYS** OF NOTICE TO PROCEED.

11. SCHEDULES AND BREAKDOWN OF PHASES OF CONSTRUCTION DUE IN **5 DAYS** AFTER RECEIPT OF NOTICE TO PROCEED.

12. <u>WORK MUST BE COMPLETED WITHIN 55 WORKING DAYS</u>

COUNTY OF NEVADA
DEPARTMENT OF PUBLIC WORKS

INVITATION TO BID

FOR: Electric Bus Charging Project Tinloy Street Transit Center

COUNTY PROJECT NO. – 889830-10

LOCATED AT: Tinloy Street Transit Center, Grass Valley, California

Sealed bids will be received at the office of:

Nevada County Purchasing Division
Eric Rood Administration Center
Suite 129
950 Maidu Avenue
PO BOX 599002
Nevada City, CA 95959-7902

Submittals are to be received by mail, or if hand delivered, must be placed in a sealed envelope with the name of the project clearly printed on the front of the envelope and should be delivered to the Purchasing Division in the Eric Rood Administration Center. All bids will be dated and time-stamped once received by the County representative.

Until **2:30 p.m**. **February 6, 2025** local time for the above-referenced project.

Bids received after said time will not be accepted and will be returned unopened.

At said place and time, and promptly thereafter, all bids that have been properly submitted will be publicly opened and read aloud. Bids received after said time will not be accepted and will be returned unopened. All interested parties are invited to attend.

The work to be performed includes the following:

The work to be done, in general, consists of installation of 3 inductive inground charging units within the roadway, installation of switchgear and 3 charger unit cabinets and slabs, installation of underground conduit banks, removal and replacement of concrete and landscaping features, minor curb painting, as well as installation, maintenance, and removal of temporary traffic control measures. Owner will furnish the switchgear cabinets, as well as all three Momentum 300kW Flush Mount Inductive Chargers, sockets, and cabinets. Contractor will be responsible for furnishing and installing all conduit, slurry backfill, wiring from switchgear to charger cabinets, additional 125A and 30A breakers in switchgear, paint for curbs, rub rail systems, and traffic rated pull box. The contractor will be responsible for providing all civil and electrical work necessary for installation of chargers as well as any materials not provided by the owner.

The Engineer's Estimate for this contract is $820,000

Bids shall be **UNIT PRICES**

Bids must be for all of the work described herein unless the Bid Form specifically indicates a bid item is optional.

Complete work within **55** working days.

The work covered by this bid is not state or federally funded. As such, there are no DBE or DBVE goals and no small Business requirement.

Obtaining Contract Documents: Official copies of the Contract Documents for bidding may be downloaded free of charge at the following link: www.mynevadacounty.com/purchasing. Alternatively, these documents may be purchased for approximately $60.00 in person at the Purchasing Division, 950 Maidu Ave, Nevada City, CA 95959 if arranged and confirmed in advance.

Questions regarding the work or the contract documents shall be submitted online on Public Purchase.

Contractor will be required to possess a **CLASS A** contractor's license or a **combination of classes required by the categories and types of work** included in this contract at the time the bid is submitted. The contractor must be properly licensed as a contractor from contract award through contract acceptance (Public Contract Code § 10164).

A pre-bid conference or walk-through will **NOT** be held.

DEPARTMENT OF INDUSTRIAL RELATIONS CONTRACTOR REGISTRATION. The Department of Industrial Relations (DIR) has launched an online application at https://www.dir.ca.gov/Public-Works/Contractor-Registration.html for public works contractors to meet the requirements of Senate Bill 854. Contractors must register and meet requirements using the new online application before bidding on public works contracts in California.

In accordance with California Labor Code Section 1771.1, a contractor or subcontractor shall not be qualified to bid on, be listed in a Bid Form, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work, as defined in this chapter, unless currently registered and qualified to perform public work pursuant to Section 1725.5. Bids cannot be accepted from unregistered contractors except as provided in Section 1771.1.

Contractor and all subcontractors must comply with the requirements of labor code Section 1771.1(a), pertaining to registration of contractors pursuant to Section 1725.5 Registration and all related requirements of those Sections must be maintained throughout the performance of the contract.

This project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. Each contractor and subcontractor must furnish certified payroll records to the Labor Commissioner at least monthly.

The County is required to provide notice to the Department of Industrial Relations of any public work contract subject to prevailing wages within five (5) days of the award. The County of Nevada encourages its contractors and subcontractors to use the US. Citizenship and Immigration Services E-Verify system to verify that employees are eligible to work in the United States. Information about the E-Verify system is available at www.dhs.gov/e-verify.

Each bidder must submit a cashier's check, certified check or a bidder's bond in an amount equal to 10% of the total amount of the bid. The bidder to whom a contract is awarded will be required to furnish a performance bond and a payment bond guaranteeing faithful performance and payment of all debts related to this contract.

The County of Nevada, in accordance with Title VI of the Civil Rights Act of 1964 (78 Stat. 252) and the regulations of the Department of Commerce (15 C.F.R., Part 8), issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in

response to this invitation and will not be discriminated against on the grounds of race, color, or national origin in consideration for an award.

This is a public works project. Pursuant to Sections 1770 and 1773 of the Labor Code of the State of California, the County of Nevada has ascertained that prevailing wage rates are applicable to the work to be done and are available at the State of California Department of Industrial Relations website http://www.dir.ca.gov/dlsr/PWD/index.htm. Contractor shall not pay less than the prevailing rate of wages.

No bid will be considered unless it is made on a blank form furnished by the County of Nevada and is made in accordance with the provisions of the bid requirements and conditions set forth in the contract documents.

County reserves the right, acting in its sole discretion, to waive immaterial bid irregularities, to accept or reject any and all bids, or to abandon the Project entirely.

COUNTY OF NEVADA
STATE OF CALIFORNIA

By: _____ Dated: _____
Chair, Board of Supervisors

INSTRUCTIONS TO BIDDERS

FOR: **Electric Bus Charging Project Tinloy Street Transit Center**

LOCATED AT: **NEVADA COUNTY, CALIFORNIA**

1. DEFINITIONS

Bidder: One who submits a bid directly to County as distinct from a sub-bidder who submits a bid to a bidder.

Successful Bidder: The lowest, qualified, responsive, responsible bidder to whom County makes an award.

Bidding Documents:
Invitation to Bid
Instructions to Bidders
Checklist of Documents Enclosed by Bidder
Bid Form
Bidder's Bond or other security
Experience Statement
Subcontractor List
Bidder's Representations
Proposed Contract Documents
Any and all Addenda

2. COPIES OF BIDDING DOCUMENTS

Complete copies of the bid documents and specifications for use in preparing bids may be obtained in accordance with the Invitation for Bid. Bid documents are also available electronically and can be downloaded from www.mynevadacounty.com/purchasing under the Requests for Bids and Proposals section. Addenda will also be posted to this location. Vendors must register with the County in order to be notified of addendums and other notices. To register, please go to: https://www.publicpurchase.com/gems/register/vendor/register.

Partial sets of bidding documents will not be issued. Complete sets of bidding documents shall be used in preparing bids. County assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of bidding documents. If bidder believes its set of bidding documents is incomplete, it shall be the responsibility of bidder to contact County to confirm that Bidder has a complete set.

County, in making copies of bidding documents available on the above terms, does so only for the purpose of obtaining bids on the work and does not confer a license or grant for any other use.

3. QUALIFICATIONS OF BIDDERS

Each bidder must submit, with their bid, written evidence of bidder's qualifications to perform the work. Bidders will be required to submit evidence that they have a practical knowledge of the particular work bid upon, and that they have the financial resources to complete the proposed work. In determining the bidder's qualifications, the following factors will be considered: work previously completed by the bidder and whether the bidder (a) maintains a permanent place of business; (b) has adequate plant and equipment to do the work properly and expeditiously; (c) has the financial resources to meet all obligations incident to the work; and (d) has appropriate technical experience. Each bidder will be required to show that he or she has handled former work so that no just claims are pending against such work. No bid will be accepted without submittal of a completed experience statement form or from a bidder who is engaged on any work which would impair his or her ability to perform or finance this work.

Each bidder must hold a current valid contractor's license at the time of bidding or the bid will be rejected.

4. INSPECTION OF SITE OF WORK

Bidders are required to inspect the site of the work in order to satisfy themselves, by personal examination or by such other means as they may prefer, of the location of the proposed work and as to the actual conditions of and at the site of work. If, during the course of the examination, bidder finds facts or conditions that appear confusing to bidder, bidder shall apply to County for additional information and explanation before submitting the bid. However, no such supplemental information so requested or furnished shall vary the terms of the specifications or the Contractor's sole responsibility to satisfy himself or herself as to the conditions of the work to be performed, unless an addendum has been issued.

The submission of a bid by the bidder shall constitute the acknowledgement that, if awarded the contract, bidder has relied and is relying on bidder's examination of (a) the site of the work, (b) the access to the site, and (c) all other data, matters, and things requisite to the fulfillment of the work and on bidder's own knowledge of existing conditions on and in the vicinity of the site of the work to be constructed under the contract, and not on any representation or warranty of County. No claim for additional compensation will be allowed which is based upon a lack of knowledge of the above items.

Where technical reports or data have been utilized in the preparation of the contract documents, bidder may rely upon the accuracy of the technical data contained in such reports but not upon the interpretations or opinions contained therein for the completeness thereof for the purpose of bidding or construction.

Where plans and specifications contain drawings of physical conditions in or relating to existing surface conditions, including underground facilities, which are at or contiguous to the site, bidder may rely upon the accuracy of the data contained in such drawings but not upon the completeness thereof for the purposes of bidding or construction. If a mass diagram has been prepared for a project, it is for design purposes only. If it is made available to bidders, County assumes no responsibility whatever for the information contained therein and makes no guarantees with respect to reliance thereon.

Before submitting a bid, each bidder will, at bidder's own expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and underground facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing of the work and which bidder deems necessary to determine its bid for performing and furnishing the work in accordance with the time, price and other terms and conditions of the contract documents.

On request in advance, County will provide each bidder access to the site to conduct such explorations and tests, as each bidder deems necessary for the submission of a bid. Bidder shall fill all holes, clean up and restore the site to its former condition upon completion of such explorations.

The lands upon which the work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by Contractor in performing the work are identified in the contract documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Contractor. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by County unless otherwise provided in the contract documents.

5. EXAMINATION OF CONTRACT DOCUMENTS

The contract documents shall consist of the following:

1. Invitation to Bid;
2. Instructions to Bidders;
3. Contractor's Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award);
4. Contract;
5. Addenda which pertain to the Contract;
6. The Bonds or other security;
7. Any supplementary conditions or any and all written agreements amending or extending the work, time or price contemplated;
8. The Plans, Specifications and Estimate (PS&E) including Special Provisions, and Drawings as identified in the Contract;
9. Certificates of Insurance;
10. Other: _____

Each bidder shall thoroughly examine and be familiar with legal and procedural documents, general conditions, Specifications, drawings and addenda (if any). The submission of a bid shall constitute an acknowledgement upon which County may rely that the bidder has thoroughly examined and is familiar with the contract documents. The failure or neglect of a bidder to receive or examine any of the contract documents shall in no way relieve that bidder from any obligation with respect to that bidder's bid or to the contract. No claim for additional compensation will be allowed which is based upon a lack of knowledge of any contract documents.

6. INTERPRETATION OF CONTRACT DOCUMENTS

No oral representations or interpretations will be made to any bidder as to the meaning of the contract documents. Any ambiguities, inconsistencies in the plans and specifications or other contract documents, or problems which are visible by an inspection of the site or review of the contract documents shall be resolved prior to bidding. Request for an interpretation shall be made in writing and delivered to County at least ten (10) days before the time announced for opening of the bids. Interpretations by County will be in the form of an addendum to the contract documents and, when issued, will be sent as promptly as is practical to all parties to whom the bid documents have been issued. All such addenda shall become part of the contract. County reserves the right to amend any contract language, which it determines, is ambiguous prior to award of the bid.

7. ADDENDA

Each bid shall include specific acknowledgment, in the space provided, of receipt of all addenda issued during the bidding period. Failure to so acknowledge will result in the bid being rejected as not responsive. The Contractor is responsible for verifying that all addenda have been received and for obtaining all addenda prior to submitting bids for the work.

Only questions answered by formal written addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Addenda may also be issued to modify the bidding documents as deemed advisable by County.

No addenda will be issued later than four (4) days prior to the date for receipt of bids except an addendum, if necessary, postponing the date for receipt of bids or withdrawing the request for bids.

8. BIDS

Bids shall be made on the blank forms prepared by County and included herein. Bidders may extract these pages from the book of specifications or submit the entire book. All bids shall give prices, both in writing and in figures, and shall be signed by the bidder or bidder's authorized representative with bidder's address and shall provide all other information requested on the Bid Form. If the bid is made by an individual, his or her name, signature and post office address must be shown; if made by a firm or partnership, the name and post office address of the firm or

partnership must be shown; if made by a corporation, the bid shall show the name of the state under the laws of which the corporation is chartered, the name and post office address of the corporation, and the title of the person who signs on behalf of the corporation.

9. SUBMISSION OF BIDS

Bids shall be submitted at the time and place indicated in the Invitation for Bid and shall be included in a sealed envelope addressed to the Nevada County Purchasing Division. If mailed, the bids shall be addressed to:

USPS, Fed Ex, UPS, etc. to:
Nevada County Purchasing Division
Eric Rood Administration Center
Suite 129
950 Maidu Avenue
PO BOX 599002
Nevada City, CA 95959-7902

or

Hand deliver to:
Nevada County Purchasing Division
Eric Rood Administration Center
Suite 129
950 Maidu Avenue
Nevada City, CA 95959

The bid shall be identified on the outside with the bidder's name, license number and address and with the project title: **Electric Bus Charging Project Tinloy Street Transit Center**.

Each bid shall be accompanied by the bid security and other required documents.

If the bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof.

Bids shall be deposited at the designated location prior to the time and date for receipt of bids indicated in the Invitation to Bid, or the modified time and date indicated by addendum. Bids received after the time and date for receipt of bids will be returned unopened. Bidder shall assume full responsibility for timely delivery at the location designated for receipt of bids.

Oral, telephone, or fax bids are invalid and will not receive consideration. No bidder may submit more than one bid. Multiple bids under different names will not be accepted from one firm or association.

10. PRE-BID CONFERENCE OR WALK-THROUGH

A pre-bid conference or walk-through will **not** be held.

11. BID PRICE

The bid price shall include everything necessary for the completion of construction and fulfillment of the contract including, but not limited to, furnishing all materials, equipment, tools, plant and other facilities and all management, superintendence, labor and services, except as may be provided otherwise in the contract documents.

In the event of a difference between the price quoted in words and a price quoted in figures for the same quotation, the words shall be considered the amount bid. Discrepancies between the indicated sum or total of figures and the correct sum or total will be resolved in favor of the correct sum or total.

12. BASIS OF BIDS

The bidder shall submit both a lump sum price and prices for all unit cost items and alternatives shown on the Bid Form. Failure to comply may be cause for rejection.

Where specific quantities are given, they are approximate only, being given as a basis for the comparison of bids, and the County of Nevada does not, expressly or by implication, warrant that the actual amount of work will correspond therewith, but reserves the right to increase or decrease the amount of any class or portion of the work or to omit portions of the work as may be deemed necessary or advisable by County. The amount of the bid for comparison purposes will be the total

of all items. The total of unit basis items will be determined by extension of the item price bid on the basis of the estimated quantity set forth for the item.

The bidder shall set forth for each item of work in clearly legible figures, an item price and a total for the item in the respective spaces provided for this purpose. In the case of unit basis items, the amount set forth under the "Total" column shall be the extension of the item price bid on the basis of the estimated quantity for the item.

In case of discrepancy between the item price and the total set forth for the item, the item price shall prevail; however, if the amount set forth as an item price is ambiguous, unintelligible or uncertain for any cause, or is omitted, or in the case of unit basis items is the same amount as the entry in the "Total" column, then the amount set forth in the "Total" column for the item shall prevail in accordance with the following:

a. As to unit basis items, the amount set forth in the "Total" column shall be divided by the estimated quantity for the item and the price thus obtained shall be the item price.
b. As to the lump sum items, the amount set forth in the "Total" column shall be the item price.

In accordance with the provision of Section 6707 of the State Labor Code, each bidder shall list, in any bid item calling for trenching of five (5) feet or more in depth, the amount contained in the bid for adequate trench and excavation sheeting, shoring, and bracing or equivalent method for the protection of life and limb which shall conform to applicable Safety Orders.

13. TAXES

Bid prices shall include allowance for all federal, state and local taxes.

14. CONTRACT TIME

The date by which the work is to be completed (the contract time) is set forth in the Invitation to Bid and contract documents.

15. SUBSTITUTE MATERIAL AND EQUIPMENT

The contract, if awarded, will be on the basis of material and equipment described in the drawings or specified in the specifications without consideration of possible substitute or "co-equal" items. Whenever it is indicated in the drawings or specified in the specifications that a substitute or "co-equal" item of material or equipment may be furnished or used by Contractor if acceptable to County, application for such acceptance will not be considered by County until after the effective date of the contract unless an addendum is issued to all bidders authorizing the use of a specified substitute. The procedure for submittal of any such application by Contractor and consideration by County is set forth in the contract documents.

16. SUBCONTRACTOR LIST

Each bid shall have listed on the form provided herewith the name and address of each subcontractor to whom the bidder proposes to sublet portions of the work in excess of one-half of one percent of the total amount of the bid or $10,000, whichever is greater, per Public Contracts Code Sections 4104. For the purpose of this paragraph, a subcontractor is defined as one who contracts with the Contractor to furnish materials and labor, or labor only for the performance of work at the site of the work.

County has the right to review the suitability and qualifications of any subcontractor or supplier proposed by the Contractor. As part of this review County may request an experience statement with pertinent information as to similar projects and other evidence of qualification for each subcontractor, person and organization. If County, after due investigation, has reasonable objection to any proposed subcontractor, County may, before giving the notice of award, request the apparent successful bidder to submit an acceptable substitute without an increase in bid price. If the apparent successful bidder does not make such substitution, the contract shall not be awarded to such bidder, but Contractor's failure to make such substitution will not constitute

grounds for sacrificing the bid security. Any subcontractor, other person or organization so listed and to whom County does not make written objection prior to the giving of the notice of award will be deemed acceptable to County subject to revocation of such acceptance after the effective date of the agreement as provided in the contract documents.

No Contractor shall be required to employ any subcontractor, other person or organization against whom Contractor has reasonable objection.

The Contractor may not change any subcontractor listed on its bid without written approval from County after a determination that the requirements of Public Contracts Code Section 4107 have been met.

17. BID GUARANTY (BID BOND)

The bid shall be accompanied by a bid guaranty bond (bid bond) duly completed on the form provided herewith or a form which is substantially similar, by a guaranty company authorized to carry on business in the State of California, for payment to County in the sum of at least ten (10%) percent of the total amount of the bid, or alternatively by a certified or cashier's check, payable to County in the sum of at least ten (10%) percent of the total amount of the bid. A bid bond form which provides further payment of attorney's fees or which contains a termination date will not be considered to be "substantially similar". The amount payable to County under the guaranty bond, or the certified or cashier's check and the amount thereof, as the case may be, shall be forfeited to County as liquidated damages in case of a failure or neglect of the bidder to furnish, execute and deliver to County the required performance and payment bonds, evidence of insurance, and to enter into, execute and deliver to County the contract on the form provided herewith, within **14 days** after being notified in writing by County that the award has been made and the agreement is ready for execution.

All bonds shall have a power of attorney authorizing the signature of the person authorized to sign on behalf of the Surety attached to the bond. The power of attorney signature and the principal's signature shall each (both) be notarized.

The bid bond shall name County as beneficiary and shall specify that the bond is valid for the bid opening of this project as scheduled in the Invitation to Bid.

18. RETURN OF BID GUARANTEES

Within **ten (10) days** after the bids are awarded, County will return the bid guarantees (other than bid bonds) accompanying the bids for bids not considered in making the award. All other bid guaranties will be held until the contract has been fully executed, after which they will be returned to the respective bidders whose bids they accompany.

19. MODIFICATION OR WITHDRAWAL OF BIDS

Bids submitted early may be modified or withdrawn by notice to the party receiving bids at the place and prior to the time designated for receipt of bids. Such notice shall be in writing over the signature of the bidder or be by fax; if by fax, written confirmation over the signature of bidder must have been mailed and postmarked on or before the date and time set for receipt of bids; it shall be so worded as not to reveal the amount of original bid. Bids may also be modified or withdrawn in person by the bidder or an authorized representative provided bidder can prove bidder's identity and authority. Withdrawn bids may be resubmitted up to the time designated for the receipt of bids provided that they are then fully in conformance with these instructions to bidders.

If, within 24 hours after bids are opened, any bidder files a duly signed written notice with County and promptly thereafter demonstrates to the reasonable satisfaction of County that there was a material and substantial mistake in the preparation of the bid, that bidder may withdraw his or her bid and the bid security will be returned. Thereafter, that bidder will be disqualified from further bidding on the work.

20. OPENING OF BIDS

Bids will be opened publicly and read aloud. An abstract of the amounts of the base bids and major alternates (if any) will be made available after the opening of the bids.

21. BIDS TO REMAIN OPEN

All bids shall remain open and subject to acceptance for a period of **60 days** from the date of opening, but County may, in County's discretion, release any bid and return the bid security prior to that date.

22. POSTPONEMENT OF OPENING

County reserves the right to postpone the date and time for opening of bids at any time prior to the date and time announced in the advertisement.

23. AWARD OF CONTRACT-PROTESTS

The Contract, if it is awarded, will be awarded to the lowest responsible bidder whose bid complies with the requirements set forth herein. The lowest bidder shall be the bidder submitting the lowest price for the work as specified.

Within **60** days after the time of opening the bids, County will act either to accept a bid or to reject all bids. The acceptance of a bid will be evidenced by a notice of award of contract in writing.

County will use email to notify bidders of the decision of the County on the award of this Bid. Therefore, it is essential that bidders identify one or more contact persons on the Bid Form who have frequent access to email. The County will not be responsible for delivery failure of email due to firewalls, spam filters, or individuals' failure to retrieve email messages. The County will not attempt to re-deliver any messages which fail due to no fault of the County.

The award of contract shall obligate the bidder whose bid is accepted to furnish a performance bond, payment bond, warranty bond, and evidences of insurance (certificates of insurance and endorsements specified in the contract) and execute the agreement set forth in the contract documents.

In addition but not limited to the following, the County reserves the right to reject any and all bids and to waive any and all formalities, and the right to disregard all nonconforming, non-responsive, or conditional bids. County reserves the right to reject the bid of any bidder if County believes that it would not be in the best interest of the project to make an award to that bidder, whether because the bid is not responsive or the bidder is unqualified or of doubtful financial ability or fails to meet any other pertinent standard or criteria established by County. County reserves the right to reject any bids which omit a bid on any one or more items on which bids are required; any bids which omit unit prices if unit prices are required; any bids in which unit prices are unbalanced in the opinion of County; any bid accompanied by insufficient or irregular bid security; and any bids from bidders who have previously failed to perform properly or to complete on time contracts of any nature.

County may consider the qualifications and experience of subcontractors and other persons and organizations (including those who are to furnish the principal items of material or equipment) proposed for those portions of the work as to which the identity of subcontractors and other persons and organizations must be submitted as provided herein. Operating costs, maintenance considerations, performance data and guarantees of materials and equipment may also be considered by County.

If there is reason to believe that collusion exists among the bidders, none of the bids of the participants in such collusion will be considered, and County may likewise elect to reject all bids received.

Protests and Appeals:

Bid Protest. Any bid protest must be in writing, received by the Purchasing Agent at Nevada County Purchasing Division, Suite 129, 950 Maidu Avenue, PO BOX 599002, Nevada City, CA 95959-

7902, before 5:00 p.m. no later than five working days following the notice of intent to award (herein referred to as the Bid Protest Deadline), and must comply with the following requirements:

1. General. Only a bidder who has actually submitted a Bid Form is eligible to submit a bid protest. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest. If required by County, the protesting bidder must submit a non-refundable fee in the amount specified by County, based upon County's reasonable costs to administer the bid protest. Any such fee must be submitted to County no later than the Bid Protest Deadline, unless otherwise specified. For purposes of this Section 1, a "working day" means a day that County is open for normal business, and excludes weekends and holidays observed by County.
2. Protest Contents. The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder if different from the protesting bidder.
3. Copy to Protested Bidder(s). A copy of the protest and all supporting documents must be concurrently transmitted by fax or by email, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
4. Bidders Response to Protest. The protested bidder may submit to the County a written response to the protest, provided the response is received before 5:00 p.m., within two working days after the Bid Protest Deadline or after actual receipt of the bid protest, whichever is sooner (the "Response Deadline"). The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder if different from the protested bidder.
    4.1 Copy to Protesting Bidder. A copy of the response and all supporting documents must be concurrently transmitted by fax or by email, by or before the Bid Protest Deadline, to the protesting bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
5. Exclusive Remedy. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. A bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including filing a Government Code Claim or initiation of legal proceedings.
6. Right to Award. The County Board of Supervisors reserves the right to award the Contract to the bidder it has determined to be the responsive, responsible bidder submitting the lowest bid, and to issue a notice to proceed with the Work notwithstanding any pending or continuing challenge to its determination.

24. SIGNING OF AGREEMENT

When County gives a Notice of Award to the successful bidder, it will be accompanied by unsigned counterparts of the agreement and all other contract documents.

Three (3) copies of the contract documents will be prepared by County. All copies will be submitted to Contractor, and Contractor shall execute the contract, insert executed copies of the required bonds and power of attorney, and submit all copies to County within **30 days**. The date of execution of the contract shall be left blank for filling in by County.

County will execute all copies, insert the date of signing the contract on the contract and bond forms and on the power-of-attorney and distribute one copy each to County and Contractor. Contractor shall be responsible for distribution of copies to the Surety(ies).

Notwithstanding any action by County to the contrary or by the Board of Supervisors in accepting a bid, there shall be no contract between bidder and County until the contract documents are signed by County.

Failure of the Contractor to execute the contract within the specified time shall be just cause for withdrawal of the contract award by the County and forfeiture by the Contractor of the bid guaranty bond.

25. NOTICE TO PROCEED

County shall give the successful bidder written notice to proceed with the work within **60 days** of the execution of the contract. Notwithstanding any other provision of the contract, County shall not be obligated to accept or to pay for any work furnished by the Contractor prior to delivery of notice to proceed whether or not County has knowledge of the furnishing of such work.

26. PERFORMANCE AND OTHER BONDS

The contract documents set forth County's requirements as to performance and other bonds. When the successful bidder delivers the executed contract to County, it shall be accompanied by the required contract security. The bonds shall be provided on County's forms or on forms which are substantially similar. Notwithstanding any language contained in the bonds, County shall not be liable for attorney's fees either for the enforcement of the bond or for any other action under this Contract. Bonds shall not contain any date of termination.

27. CONTRACTUAL RESTRICTIONS

No official of County who is authorized in such capacity and on behalf of County to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspecting, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for County who is authorized in such capacity and on behalf of County who is in any legislative, executive, supervisory, or other similar function in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

28. POSTING SECURITY IN LIEU OF RETENTION

The Contractor may elect to receive one hundred percent (100%) of payments due under this contract from time to time, without retention of any portion of the payment by the public agency, by depositing securities of equivalent value with County in accordance with the provisions of Section 22300 of the California Public Contract Code; except that no such substitution shall be allowed where federal money is funding the project and federal regulations or policies would prohibit such substitution of securities for the retention. Securities eligible for investment shall include those listed in Section 16430 of the California Government Code, or bank or savings and loan certificates of deposits. Such securities, if deposited by the bidder, shall be valued by County whose decision on the valuation of the securities shall be final. The bidder shall be the beneficial owner of any securities substituted for money withheld and shall receive any interest thereon.

29. LIQUIDATED DAMAGES

The County is authorized by Government Code Section 53069.85 to assess liquidated damages for delay. County refers bidders to the Contract for review of the liquidated damages provision to be included in this contract.

CHECKLIST OF DOCUMENTS ENCLOSED BY BIDDER

Bidder shall acknowledge he or she has enclosed all required Bidding Documents listed herein by signing his or her initials in “Bidder” column, after each item.

DOCUMENT	SIGNATURES	
	BIDDER	COUNTY REP.
1. BID FORM (signed)		
2. ACKNOWLEDGMENT OF ADDENDA		
3. BID SECURITY: Bid Bond (must be signed by corporate surety); or Cashier’s check; or Certified Check; or Cash		
4. EXPERIENCE STATEMENT (signed)		
5. SUBCONTRACTOR LIST (signed)		
6. BIDDER’S REPRESENTATIONS: (BIDDER’S QUALIFICATIONS, WORKER’S COMPENSATION CERTIFICATION, NONCOLLUSION DECLARATION)		
7. PUBLIC CONTRACT CODE: 10285.1, 10162, AND 10232 (signed)		

BID FORM

(Nevada County Standard Form Bid Document)

BID TO THE COUNTY OF NEVADA FOR: _____

Name of Bidder: _____

The work to be done and referred to herein is in Nevada County, State of California, and shall be constructed in accordance with the Plans, Specifications (including the payment of not less than the wage rates set forth therein) and the Contract annexed hereto.

The work to be done is shown on project documents entitled: _____

The undersigned, as bidder, declares that the only persons or parties interested in this bid as principals are those named herein; that this bid is made without collusion with any other person, firm, or corporation, and in submitting this bid, the undersigned bidder agrees that he or she has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to and all other documents listed or incorporated in the bidding documents and contract documents; and bidder proposes, and agrees if this bid is accepted, that bidder will contract with the County of Nevada in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus, and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of County as therein set forth, and that bidder will take in full payment therefor the following:

BID SHEET

Item No.	Item	Unit of Measure	Estimated Quantity	Unit Price	Total
1.	Water Pollution Control Plan	LS	1		
2.	Traffic Control	LS	1		
3.	Pothole Utilities (Min 6)	LS	1		
4.	Remove Concrete Pavement	CY	89		
5.	Clearing and Grubbing / Irrigation System Modification	LS	1		
6.	Earthwork (Final Pay)	CY	150		
7.	Rock Excavation (Contingent)	CY	10		
8.	Installation of Duct Banks	LS	1		
9.	Furnish and Install Ground Rod System	LS	1		
10.	PCC Equipment Pads	EA	4		
11.	PCC Planter Wall	LS	1		
12.	Furnish and Install Pull Box 48”x72”x42”	LS	1		
13.	4” Reinforced PCC Sidewalk	SF	1,040		
14.	8” Reinforced PCC Bus Turnout	SF	2,800		
15.	Installation of Electrical System	LS	1		
16.	Curb Painting	LS	1		
17.	Furnish and Install Rub Rail	EA	3		
18.	Provide Temp Power For System Testing and Commissioning	LS	1		

TOTAL OF BID (in figures): _____

TOTAL OF BID (in words): _____

Bidder shall bid each item. Failure to bid an item shall be just cause for considering the bid as non-responsive. County reserves the right to reject all bids

The undersigned bidder agrees to furnish the required bonds or other security and to enter into a contract within the time specified in the Instructions to Bidders, and further agrees to complete all work by the bid, in accordance with all requirements of the contract.

The undersigned, as bidder, declares that the only persons or parties interested in this bid as principals are those named herein; that this bid is made without collusion with any other person, firm, or corporation, and in submitting this bid, the undersigned bidder agrees that he or she has carefully examined the location of the proposed work, the annexed proposed form of contract, and the plans therein referred to and all other documents listed or incorporated in the bidding documents and contract documents; and bidder proposes, and agrees if this bid is accepted, that bidder will contract with the County of Nevada in the form of the copy of the contract annexed hereto, to provide all necessary machinery, tools, apparatus, and other means of construction, and to do all the work and furnish all the materials specified in the contract, in the manner and time therein prescribed, and according to the requirements of County as therein set forth, and that bidder will take in full payment therefore the following

Contract shall be awarded based upon the Base Bid Package (Items 1 – 18)

Receipt of copies of the following addenda is hereby acknowledged.

Addendum No.	Bidder's Signature	Date Acknowledged
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

All addenda received have been considered in preparation of this bid.

Enclosed herewith are the Bid Form, Bid Bond or other security, Experience Statement, Subcontractor List and Bidder's Representations form and Public Contract Code form.

In submitting this bid it is understood that the right is reserved by County to reject any and all bids, and it is understood that this bid may not be withdrawn during the period set forth in the Instructions to Bidders.

Envelopes containing bids must be marked as required by the Instructions to Bidders.

County reserves the right to reject any and all bids and to waive any irregularities in bids.

The amount of the bid for comparison purposes will be the total of all items. The total of unit basis items will be determined by extension of the item price bid on the basis of the estimated quantity set forth for the item.

Prices bid shall include overhead, profit and all applicable taxes.

By submission of this bid, each bidder certified, and in the case of a joint bid each party thereto certifies as to its own organization, that this bid has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this bid with any other bidder or with any competitor.

A bid bond will accompany this bid in a sum of not less than ten percent (10%) of the total amount of the bid and shall be on a form approved by County or a form which is substantially similar, which is attached thereto.

If this bid shall be accepted and the undersigned shall fail to contract as aforesaid, and to give the performance bond and payment bond as required in the contract with a surety satisfactory to County within the number of days set forth in the Instructions to Bidders after receipt of notice that the contract has been awarded to the undersigned, County may, at its option, determine that the bidder has abandoned the contract and thereupon the award of the contract shall be null and void and the bidder and surety shall forfeit the security accompanying this bid to the County of Nevada.

Accompanying this bid is:

_____

("Bidder's Bond", "Cashier's Check", "Certified Check" or "Cash")

for $_____ an amount equal to ten percent (10%) of the total bid.

The names of individuals who are principals in any partnership, joint venture, business association or corporation in the foregoing bid are as follows:

_____ _____

_____ _____

Licensed in accordance with an act providing for the registration of contractors, License No.

_____

Dated: _____ _____

_____
Authorized Signature of Bidder(s)

BUSINESS ADDRESS: _____

CITY, STATE & ZIP CODE: _____

TELEPHONE NUMBER: _____

EMAIL ADDRESS: _____

CLASSIFICATION OF CONTRACTOR'S LICENSE: _____

EXPIRATION DATE OF CONTRACTOR'S LICENSE: _____

DIR# _____FEDERAL TAX ID. No.: _____

NOTE: If bidder is a corporation, the legal name of the corporation shall be set forth above together with the signature of the officer or officers authorized to sign contracts on behalf of the corporation; if bidder is a co-partnership, the true name of the firm shall be set forth above together with the signature of the partner or partners authorized to sign contracts on behalf of the co-partnership; and if bidder is an individual, his or her signature shall be placed above. If a bidder is a joint venture, the documents must be signed by an authorized officer of each firm to the joint venture and shall include the California Contractor's License number of each partner to the joint venture. The signature of any attorney-in-fact must be notarized.

BIDDER'S BOND

STATE OF CALIFORNIA

COUNTY OF NEVADA

KNOW ALL PERSONS BY THESE PRESENT,

That we _____

_____

_____

_____, as contractor, and _____

_____

_____

_____

as surety, are held and firmly bound unto the County of Nevada in the sum of ten percent (10%) of the total amount of the bid of the contractor above named, submitted by said contractor to the County of Nevada for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, to the County of Nevada, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents. In no case shall the liability of the surety hereunder exceed the sum of $_____.

The condition of this obligation is such that whereas the contractor has submitted the above-mentioned bid to the County of Nevada, as aforesaid, for certain construction specifically described as follows, for which bids are to be opened at Nevada City, California, on _____, for:

_____

NOW, THEREFORE, if the aforesaid contractor is awarded the contract, and within the time and manner required by the contract documents, after the prescribed forms are presented to him or her for signature, enters into a written Contract, in the prescribed form, in accordance with the bid, and files two bonds with the County of Nevada, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by law, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect.

Notice to Surety shall be provided at:

_____

_____

_____

IN WITNESS WHEREOF, we have hereunto set our hands and seals on this _____ day of _____ A. D. 20_____.

_____Seal

_____Seal

_____Seal
Contractor

_____Seal

_____Seal

_____Seal
Surety

NOTE: Signature of Surety shall be notarized. Power of attorney for surety with corporate seal affixed must be attached.

EXPERIENCE STATEMENT

The following outline is a record of the bidder's or subcontractor's recent experience in construction of a type similar in magnitude and character to that contemplated under this contract. Additional numbered pages shall be attached to this page as required. Each page shall be headed "Experience Statement" and signed.

FAILURE TO COMPLETE WILL RESULT IN BID DISQUALIFICATION

1.) PROJECT NAME: _____
DATE: _____
INSPECTOR NAME _____
PHONE # _____
CONTRACT AMOUNT: _____
WORK PERFORMED: _____

2.) PROJECT NAME: _____
DATE: _____
INSPECTOR NAME _____
PHONE # _____
CONTRACT AMOUNT: _____
WORK PERFORMED: _____

3.) PROJECT NAME: _____
DATE: _____
INSPECTOR NAME _____
PHONE # _____
CONTRACT AMOUNT: _____
WORK PERFORMED: _____

4.) PROJECT NAME: _____
DATE: _____
INSPECTOR NAME _____
PHONE # _____
CONTRACT AMOUNT: _____
WORK PERFORMED: _____

_____
Signature of Contractor

SUBCONTRACTOR LIST

Listed hereunder is the name, Contractor's license number, the address of place of business, and the category of the work on the Contract for each subcontractor who will perform work or labor or render service to the undersigned bidder in or about the construction of the work hereinabove described, in excess of one-half of one percent (0.5%) of the total bid, if the contract for the said work is awarded to the undersigned.

(Attach additional sheet, if necessary, and note attachment on this page.)

Name of Subcontractor	Contractor's License #	DIR Registration Number	Location of Business	Category of Work To Be Performed	% of Total Work

Signature of Contractor/Bidder: _____

(THE BIDDER'S EXECUTION ON THE SIGNATURE PORTION OF THIS BID FORM SHALL ALSO CONSTITUTE AN ENDORSEMENT AND EXECUTION OF THOSE CERTIFICATIONS WHICH ARE A PART OF THIS BID)

BIDDER'S REPRESENTATIONS

I, the undersigned, declare as follows:

1. BIDDER'S QUALIFICATIONS: That neither I nor a company of which I am more than 50% owner have been disqualified from bidding, removed from a public works construction project or otherwise been prevented from bidding because of a violation of law or a safety regulation.

Further, I declare under penalty of perjury that neither I nor a company of which I am more than a 50% owner, have had more than one final, unappealable finding of contempt of court by a federal court within the immediately preceding two year period because of failure to comply with an order of the Federal court (Public Contract Code Section 10232), which orders the Contractor to comply with an order of the National Labor Relations Board.

Further, I declare under penalty of perjury that I have not been convicted by any court of any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of state or federal antitrust law in connection with the bidding upon, award of, or performance of any public works contract.

2. WORKER'S COMPENSATION CERTIFICATION (LABOR CODE SECTION 1861): That I am aware of the provisions of Section 3700 of the Labor Code of the State of California, which requires every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this Contract.

3. NONCOLLUSION DECLARATION: I, the undersigned, declare that I am the _____ of _____, the party making the foregoing bid, that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Date: _____ BIDDER:

By: _____

PUBLIC CONTRACT CODE

PUBLIC CONTRACT SECTION 10285.1 STATEMENT

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder **has ___ , has not ___** been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The bidder must place a checkmark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Bid Form. Signing this Bid Form on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

PUBLIC CONTRACT CODE SECTION 10162 QUESTIONNAIRE

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

☐ Yes ☐ No

If the answer is yes, explain the circumstances in the following space.

PUBLIC CONTRACT CODE 10232 STATEMENT

In conformance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Bid Form. Signing this Bid Form on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

_____

Signature of Contractor

CERTIFICATION OF COMPLIANCE WITH SECTION 8103 OF THE FAIR EMPLOYMENT AND HOUSING COMMISSION REGULATIONS

By my signature on the Bid Form I certify, under penalty of perjury under the laws of the State of California, that the bidder has complied with the requirements of Section 8103 of the Fair Employment and Housing Commission Regulations (Chapter 5, Title 2 of the California Administrative Code).

COUNTY SPECIAL PROVISIONS

COUNTY OF NEVADA
STATE OF CALIFORNIA

SPECIAL PROVISIONS

For

Electric Bus Charging Project
Tinloy Street Transit Center

County Project No. 889830-10

The work embraced herein shall be done in accordance with the Project Plans, the Standard Plans and Standard Specifications dated 2024 of the California Department of Transportation, the Nevada County Road Standards and Nevada County Standard Road Drawings, and these Special Provisions.

Some sections of the Caltrans Standard Specifications are superseded by these County Special Provisions. While the County Special Provisions may appear to be similar to the Caltrans 2024 Standard Specifications in some respects, they are not the same. Bidders and Contractors are advised to read these County Special Provisions carefully, and to not assume that provisions that are similar to Caltrans provisions are actually the same. It is the responsibility of all Bidders to read and understand the County Special Provisions before submitting a Bid.

DIVISION I GENERAL PROVISIONS

SECTION 1 GENERAL

Conform to Section 1, “General” of the Standard Specifications, and these Special Provisions.

The work embraced herein shall be done in accordance with the State of California Standard Specifications, Revised Standard Specifications, Standard Plans and Revised Standard Plans, dated 2024, consistent with the County Standard Form Contract and in accordance with the following Special Provisions.

Wherever these Provisions require conforming to the Standard Specifications it must be interpreted to be conforming to the Standard Specifications and Revised Standard Specifications. Conforming to the Standard Specifications and Revised Standard Specifications is required unless specifically excluded or revised.

In case of conflict between the Standard Specifications or Standard Plans and these Special Provisions, the Special Provisions shall take precedence over and be used in lieu of such conflicting portions.

Wherever in the Standard Specifications, Special Provisions, Invitation to Bid, Instructions to Bidders, Bid Form, Contract, or other Contract documents the following terms are used, the intent and meaning shall be interpreted as follows:

STATE OR COUNTY OR STATE OF CALIFORNIA	County of Nevada
DEPARTMENT OR DEPARTMENT OF PUBLIC WORKS	County of Nevada Department of Public Works
DIRECTOR OR DIRECTOR OF PUBLIC WORKS	Board of Supervisors County of Nevada

ENGINEER OR CHIEF ENGINEER	Director of the Department of Public Works County of Nevada acting either directly or through properly authorized agent and consultants
NOTICE TO BIDDERS NOTICE TO CONTRACTORS	INVITATION TO BID
REVISED STANDARD SPECIFICATIONS	New or revised standard specifications. These specifications are available at the following website: https://dot.ca.gov/programs/design/ccs-standard-plans-and-standard-specifications and as stated in Section 2-1.06B of the Standard Specifications.

SECTION 2 BIDDING

Conform to Section 2, “Bidding” of the Standard Specifications, and these Special Provisions.

The Bidder's attention is directed to the bidding documents preceding these Special Provisions, and the Standard Form Contract following these Special Provisions.

2-1.01 GENERAL

Bidding shall conform to Section 2, “Bidding” of the Standard Specifications, and these Special Provisions.

The bidder's bond shall conform to the bond form in the Bid Book for the project and shall be properly filled out and executed. The bidder’s bond form included in that book may be used.

In conformance with Public Contract Code Section 7106, a Non-collusion Affidavit is included in the Bid Book. Signing the Bid Book shall also constitute signature of the Non-collusion Affidavit.

The contractor, subrecipient or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of Title 49 CFR (Code of Federal Regulations) part 26 in the award and administration of US DOT assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy, as the recipient deems appropriate. Each subcontract signed by the bidder must include this assurance.

SECTION 3 CONTRACT AWARD AND EXECUTION

3-1.01 GENERAL

The bidder's attention is directed to the provisions of Section 3, "Contract Award and Execution" of the Standard Specifications and these Special Provisions for the requirements and conditions concerning the award and execution of the contract.

Bid protests are to be delivered to the following address:

USPS, Fed Ex, UPS, etc. to:
Nevada County Purchasing Division
Eric Rood Administration Center
Suite 129
950 Maidu Avenue
PO BOX 599002
Nevada City, CA 95959-7902

or

Hand deliver to:
Nevada County Purchasing Division
Eric Rood Administration Center
Suite 129
950 Maidu Avenue
Nevada City, CA 95959

The contract shall be executed by the successful bidder and shall be returned, together with the contract bonds and insurance, to the Agency so that it is received within **10 days,** not including Saturdays, Sundays and legal holidays, after the bidder has received the contract for execution. Failure to do so shall be just cause for forfeiture of the bid guaranty. The executed contract documents shall be delivered to the following address:

Nevada County Department of Public Works
Eric Rood Administration Center
Suite 170
950 Maidu Avenue
PO BOX 599002
Nevada City, CA 95959-7902

3-1.04 CONTRACT AWARD

Conform to 3-1.04, "Contract Award" of the Standard Specifications, and these Special Provisions.

The right is reserved to reject any and all bids.

If the Agency awards the contract, the award is made to the lowest responsible and responsive bidder.

3-1.05 CONTRACT BONDS (PUBLIC CONTRACT CODE §§ 10221 AND 10222)

Conform to Section 3-1.05, "Contract Bonds (Pub Cont Code §§ 10221 and 10222" of the Standard Specifications, and these Special Provisions.

The successful bidder must furnish 2 bonds:

1. Payment bond to secure the claim payments of laborers, workers, mechanics, or materialmen providing goods, labor, or services under the Contract. This bond must be equal to at least 100 percent of the total bid.
2. Performance bond to guarantee the faithful performance of the Contract. This bond must be equal to at least 100 percent of the total bid.

Signed contract and bonds are due within 30 days of Notice of Award.

Sureties on each of said bonds shall be satisfactory to the County Attorney.

Should any bond become insufficient, the Contractor shall renew the bond within ten (10) working days after receiving notice from the Engineer.

Should any Surety at any time be unsatisfactory to the County, notice will be given the Contractor to that effect. No further payments shall be deemed due or will be made under said agreement until a new Surety shall qualify and be accepted by the County.

Changes in said agreement of extensions of time, made pursuant to the agreement, shall in no way release the Contractor or Surety from its obligations. Notice of such changes or extensions shall be waived by the Surety.

3-1.06 CONTRACTOR LICENSE

Conform to 3-1.06, "Contractor License" of the Standard Specifications, and these Special Provisions.

The Contractor must be properly licensed as a contractor from contract award through contract acceptance (Public Contract Code § 10164).

Delete Section 3-1.08

Delete Section 3-1.11

SECTION 4 SCOPE OF WORK

4-1.03 WORK DESCRIPTION

Perform work as described in the Invitation to Bid.

4-1.05B WORK-CHARACTER CHANGES

Conform to Section 4-1.05B, “Work-Character Changes” of the Standard Specifications, and these Special Provisions.

SIGNIFICANT CHANGES IN THE CHARACTER OF WORK

1. The engineer reserves the right to make, in writing, at any time during the work, such changes in quantities and such alterations in the work as are necessary to satisfactorily complete the project. Such changes in quantities and alterations shall not invalidate the contract nor release the surety, and the contractor agrees to perform the work as altered.
2. If the alterations or changes in quantities significantly change the character of the work under the contract, whether such alterations or changes are in themselves significant changes to the character of the work or by affecting other work cause such other work to become significantly different in character, an adjustment, excluding anticipated profit, will be made to the contract. The basis for the adjustment shall be agreed upon prior to the performance of the work. If a basis cannot be agreed upon, then an adjustment will be made either for or against the contractor in such amount as the engineer may determine to be fair and equitable.
3. If the alterations or changes in quantities do not significantly change the character of the work to be performed under the contract, the altered work will be paid for as provided elsewhere in the contract.
4. The term “significant change” shall be construed to apply only to the following circumstances:
   - When the character of the work as altered differs materially in kind or nature from that involved or included in the original proposed construction; or
   - When a major item of work, as defined elsewhere in the contract, is increased in excess of 125 percent or decreased below 75 percent of the original contract quantity. Any allowance for an increase in quantity shall apply only to that portion in excess of 125 percent of original contract item quantity, or in case of a decrease below 75 percent, to the actual amount of work performed.

4-1.06 DIFFERING SITE CONDITIONS (23 CFR 635.109)

The following shall be substituted for Section 4-1.06, "Differing Site Conditions (23 CFR 635.109)," of the Standard Specifications:

4-1.06A GENERAL

Not used

4-1.06B CONTRACTOR’S NOTIFICATION

Conform to Section 4-1.06B, “Contractor’s Notification” of the Standard Specifications, and these Special Provisions.

During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.

No contract adjustment which results in a benefit to the contractor will be allowed unless the contractor has provided the required written notice.

No contract adjustment will be allowed under this clause for any effects caused on unchanged work.

4-1.06C ENGINEER'S INVESTIGATION AND DECISION

Upon written notification, the engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding anticipated profits, will be made and the contract modified in writing accordingly. The engineer will notify the contractor of the determination whether or not an adjustment of the contract is warranted.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 5-1.43C, "Supplemental Potential Claim Record", of the Standard Specifications and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information", a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

4-1.13 CLEANUP

Conform to Section 4-1.13, "Cleanup" of the Standard Specifications, and these Special Provisions.

Cleanup shall consist of removing and disposing of all construction materials in connection with work. All parts of the work shall be left in a neat presentable condition.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

SECTION 5 CONTROL OF WORK

5-1.02 CONTRACT COMPONENTS

Conform to Section 5-1.02, "Contract Components" of the Standard Specifications, and these Special Provisions.

A component in one Contract part applies as if appearing in each. The parts are complementary and describe and provide for a complete work.

In the case of ambiguity or conflict, the documents shall be given the following priority:

1. Governing ranking of Contract parts in descending order is:
    - 1.1. Contract
    - 1.2. Instructions to Bidders, including addendums
    - 1.3. Project Special Provisions
    - 1.4. Project plans
    - 1.5. Revised standard specifications
    - 1.6. Standard specifications
    - 1.7. Revised standard plans
    - 1.8. Standard plans
    - 1.9. Supplemental project information
    - 1.10. Nevada County Road Standards and Nevada County Standard Road Drawings

2. Written numbers and notes on a drawing govern over graphics
3. Detail drawing governs over a general drawing
4. Specific specification governs over a general specification
5. Specification in a section governs over a specification referenced by that section

If a discrepancy is found or confusion arises, submit an RFI.

5-1.13 SUBCONTRACTING

Conform to Section 5-1.13, “Subcontracting” of the Standard Specifications, and these Special Provisions.

No subcontract releases the Contractor from the contract or relieves the Contractor of their responsibility for a subcontractor's work.

If the Contractor violates Pub Cont. Code § 4100 et seq., the County of Nevada may exercise the remedies provided under Pub Cont. Code § 4110. The County of Nevada may refer the violation to the Contractors State License Board as provided under Pub Cont. Code § 4111.

The Contractor shall perform work equaling at least 30 percent of the value of the original total bid with the Contractor's own employees and equipment owned or rented, with or without operators.

Each subcontract must comply with the contract.

Each subcontractor must have an active and valid State contractor's license with a classification appropriate for the work to be performed (Bus & Prof Code, § 7000 et seq.).

Submit copies of subcontracts upon request by the Engineer.

Before subcontracted work starts, submit a Subcontracting Request form.

Do not use a debarred contractor; a current list of debarred contractors is available at the Department of Industrial Relations' Web site.

Upon request by the Engineer, immediately remove and not again use a subcontractor who fails to prosecute the work satisfactorily.

Each subcontract and any lower tier subcontract that may in tum be made shall include the "Required Contract Provisions Federal-Aid Construction Contracts". Noncompliance shall be corrected. Payment for subcontracted work involved will be withheld from progress payments due, or to become due, until correction is made. Failure to comply may result in termination of the contract.

5-1.24 CONSTRUCTION SURVEYS

Section 5-1.24, “Construction Surveys” is deleted in its entirety.

5-1.26 CONSTRUCTION SURVEYS

Section 5-1.26, is amended to read:

This project will require construction staking to establish the lines and grades required for the completion of the work specified on the Plans, in the Standard Specification, and in the Special Provisions.

The Contractor is responsible for providing all construction staking necessary to control lines and grades in conformance with the plans, and staking must be adequate to accurately locate all design elements of contract work within tolerances set forth in the Standard Specifications. Any deviation from specified lines and grades requires prior approval from Engineer. All construction staking must be performed by or under the direction of a California licensed Land Surveyor.

Construction staking must include the following, as applicable:

1. Clearing limits (as required for demolition, vegetation removal, and other construction staking)
2. Slope and rough grading

3. Finish grading
4. Curbing and flatwork
5. Storm drains and culverts
6. Utilities (electrical, sanitary, water, etc.)
7. Right of way and fencing
8. Any buildings or structures
9. Any other item of work requiring precise location, either horizontally and/or vertically

"Working stakes" or fill-in staking may be set by contractor's forces.

Contractor is responsible for maintenance and integrity of stakes during both work and non-work hours. Construction staking lost or damaged during non-work hours must be replaced at no expense to County of Nevada.

Supply the County for review any Construction Survey data as requested. Such data typically may include: cut sheets, point plots, electronic files and field notes. County reserves right to review and approve said data prior to placement and/or construction and may confirm accuracy of construction.

Prior to bridge concrete pours, the Contractor shall develop and submit to the Engineer for approval bridge pour grades that include: Abutment/wingwall pour grades, and deck pour grades. The Engineer will have 5 working days to review and approve bridge grades.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for completing all the work involved in conforming to the requirements of this section shall be considered as included in the contract prices paid for the various items of work involved in this project and no additional compensation will be allowed therefor.

5-1.32 AREAS FOR USE

Conform to Section 5-1.32, "Areas for Use" of the Standard Specifications, and these Special Provisions.

The highway right-of-way shall be used only for purposes that are necessary to perform the required work. The Contractor shall not occupy the right-of-way, or allow others to occupy the right-of-way, for purposes which are not necessary to perform the required work except as provided below.

No area is available within the project area for the exclusive use of the Contractor. However, where available, temporary storage of equipment and materials on County Property may be arranged with the Engineer but space may be limited. Use of the Contractor's work areas and other County-owned property shall be at the Contractor's own risk, and the County shall not be held liable for any damage to or loss of materials or equipment located within such areas.

The Contractor shall obtain encroachment permits prior to occupying County-owned parcels outside the contract limits. The required encroachment permits may be obtained from the Nevada County Department of Public Works. Fees apply for permit processing, but not inspection.

For any work in the State right-of-way, the Contractor is responsible to obtain a State of California (Caltrans) encroachment permit in the form of a Double Permit to the current Caltrans Encroachment Permit Number XXXXXX. The Contractor is responsible for any State assessed encroachment permit fee.

Residence trailers will not be allowed within the highway right-of-way, except that one office trailer may be placed in the County right-of-way at a location to be designated by the Engineer.

The Contractor shall remove all equipment, materials and rubbish from the work areas and other County-owned property which it occupies and shall leave the areas in a presentable condition.

The Contractor shall secure at its own expense any area required for plant sites, storage of equipment or materials or for other purposes if sufficient area is not available to it within the contract limits or at the sites designated on the plans outside the contract limits.

Personal vehicles of employees must not be parked on the traveled way or shoulders, including sections closed to traffic.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

5-1.36C NONHIGHWAY FACILITIES

COORDINATION WITH PUBLIC UTILITIES

Prior to the Contractor beginning construction, public utilities may need to relocate their facilities to avoid conflicts with the new structural section.

The Contractor will have the project limits marked and give a minimum notice to the utility companies of five (5) working days and coordinate with the utility company's crews for their relocation of all other services and meter boxes not indicated on the plans but within the limits of the project.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

5-1.43 POTENTIAL CLAIMS AND DISPUTE RESOLUTION

Conform to Section 5-1.43, “Potential Claims and Dispute Resolution” of the Standard Specifications, and these Special Provisions.

Revisions to Section 5-1.43A dated 10-19-18 are deleted in their entirety.

SECTION 6-2 CONTROL OF MATERIALS - QUALITY ASSURANCE

6-2.01 GENERAL

Conform to Section 6-2, "Quality Assurance" of the Standard Specifications, and these Special Provisions.

The Local Agency uses a Quality Assurance Program (QAP) to ensure a material is produced to comply with the contract. The Local Agency may examine the records and reports of tests the prime contractor performs if they are available at the job site.

The contractor may examine the records and reports for the tests the Agency performs if they are available at the job site.

Schedule work to allow time for QAP.

6-2.03D PAYMENT

Full compensation for conforming to the requirements of Section 6-2, “Quality Assurance” and these Special Provisions shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

SECTION 7 LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Conform to Section 7, “Legal Relations and Responsibility to the Public” of the Standard Specifications, and these Special Provisions.

Revisions to Section 7-1.02K(3) dated 10-19-18 are deleted in their entirety.

7-1.02I(2) NONDISCRIMINATION

Conform to Section 7-1.02I(2), "Nondiscrimination" of the Standard Specifications, and these Special Provisions.

Attention is directed to the following Notice that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations.

NOTICE OF REQUIREMENT FOR NONDISCRIMINATION PROGRAM (GOV. CODE, SECTION 12990)

Your attention is called to the "Nondiscrimination Clause", set forth in Section 7-1.02I(2), "Nondiscrimination", of the Standard Specifications, which is applicable to all nonexempt state contracts and subcontracts and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth therein. The Specifications are applicable to all nonexempt state construction contracts and subcontracts of $5,000 or more.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

7-1.02K(2) WAGES

PREVAILING WAGE

Conform to Section 7-1.02K(2), “Wages” of the Standard Specifications, and these Special Provisions.

The general prevailing wage rates determined by the Director of Industrial Relations, for the county or counties in which the work is to be done, are available from the California Department of Industrial Relations' (CA DIR) website at http://www.dir.ca.gov. These wage rates are not included in the Bid Form and Contract for the project. Changes, if any, to the general prevailing wage rates will be available at the same location.

Attention is directed to Section 7-1.02K(3), "Certified Payroll Records (Labor Code 1776)", of the Standard Specifications. In addition to the specification, effective January 1, 2016, all contractors and subcontractors are required to submit Electronic Certified Payroll through the CA DIR website's 'Electronic Certified Payroll Reporting System'. Contractors shall submit copies of the Electronic Certified Payroll directly to the County in addition to the CA DIR requirement.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

7-1.04 PUBLIC SAFETY

Conform to Sections 7-1.04, “Public Safety”, and 12-4.02, “Traffic Control Systems” of the Standard Specifications, and these Special Provisions.

Install temporary railing (Type K) between any lane carrying public traffic and any excavation, obstacle, or storage area when the following conditions exist:

1. Excavations.--Any excavation where near edge of the excavation is within 12-feet from the edge of the open traffic lane, except:
   a. Excavations covered with sheet steel or concrete covers of adequate thickness to prevent accidental entry by traffic or the public.
   b. Excavations less than 0.15 feet deep.
   c. Excavations in side slopes where the slope is steeper than 4:1.
   d. Excavations protected by barrier or railing.
2. Temporarily Unprotected Permanent Obstacles.--Whenever the work includes the installation of a fixed obstacle together with a protective system, such as a sign structure together with protective railing and the Contractor elects to install the obstacle prior to installing the protective

system; or whenever the Contractor, for its convenience and with permission of the Engineer, removes a portion of an existing protective railing at an obstacle and does not replace such railing complete in place during the same day.

3. Storage Areas.--Whenever material or equipment is stored within 12 feet of the lane and such storage is not otherwise prohibited by the specifications.

When traffic cones or delineators are used to delineate a temporary edge of traffic lane, the line of cones or delineators shall be considered to be the edge of traffic lane, however, the Contractor shall not reduce the width of an existing lane to less than 10 feet without written approval from the Engineer. The lane closure provisions of this section shall not apply if the work area is protected by permanent or temporary railing or barrier.

When work is not in progress on a trench or other excavation that required a lane closure, the traffic cones or portable delineators used for the lane closure shall be placed off of and adjacent to the edge of the traveled way. The spacing of the cones or delineators shall be not more than the spacing used for the lane closure.

Full compensation for conforming to the provisions in this section "Public Safety", including furnishing and installing temporary railing (Type K) and temporary crash cushion modules, shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed therefor.

7-1.06 INSURANCE

Section 7-1.06C shall be modified to increase the Employer's Liability Insurance to not less than:

1. $2,000,000 for each accident for bodily injury by accident
2. $2,000,000 policy limit for bodily injury by disease
3. $2,000,000 for each employee for bodily injury by disease

Section 7-1.06D(2) shall be modified to require not less than $2,000,000 for each occurrence

Section 7-1.06E shall be modified to require a minimum of $2,000,000 automobile liability insurance

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

SECTION 8 PROSECUTION AND PROGRESS

8-1.02 SCHEDULE

PROGRESS SCHEDULE

A progress schedule shall be submitted to the Engineer in accordance with Section 8-1.02, "Schedule" of the Standard Specifications. The schedule shall be prepared using the critical path method (CPM) format.

Retention

The Department will retain an amount equal to 5 percent of the estimated value of the work performed during each estimate period in which the Contractor fails to submit an acceptable schedule conforming to the requirements of these provisions as determined by the Engineer. Schedule retentions will be released for payment on the next monthly estimate for partial payment following the date that acceptable schedules are submitted to the Engineer or as otherwise specified herein. Upon completion of all contract work and submittal of the final update schedule and certification, any remaining retained funds associated with this section, "Progress Schedule", will be released for payment. Retentions held in conformance with this section shall be in addition to other retentions provided for in the contract. No interest will be due the Contractor on retention amounts.

8-1.02C(10) PAYMENT

Payment for the required schedules and software is included in the payment for the bid items involved and no additional compensation will be allowed therefor.

8-1.04 START OF JOB SITE ACTIVITIES

Conform to Section 8-1.04, "Start of Job Site Activities", Section 8-1.05, "Time", and Section 8-1.10, "Liquidated Damages" of the Standard Specifications, and these Special Provisions.

County shall not be obligated to accept or to pay for any work furnished by the Contractor prior to delivery of notice to proceed whether or not County has knowledge of the furnishing of such work.

8-1.04B STANDARD START

Section 8-1.04B, “Standard Start” is deleted in its entirety.

8-1.05 TIME

Construction activity is limited to between 7 a.m. and 7 p.m. Monday through Friday, and between 8 a.m. and 6 p.m. on Saturday. No work is permitted on Sunday.

8-1.06 SUSPENSIONS

Conform to Section 8-1.06, “Suspensions” of the Standard Specifications, and these Special Provisions.

SUSPENSIONS OF WORK ORDERED BY THE ENGINEER

1. If the performance of all or any portion of the work is suspended or delayed by the engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the contractor believes that additional compensation and/or contract time is due as a result of such suspension or delay, the contractor shall submit to the engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for such adjustment.
2. Upon receipt, the engineer will evaluate the contractor's request. If the engineer agrees that the cost and/or time required for the performance of the contract has increased as a result of such suspension and the suspension was caused by conditions beyond the control of and not the fault of the contractor, its suppliers, or subcontractors at any approved tier, and not caused by weather, the engineer will make an adjustment (excluding profit) and modify the contract in writing accordingly. The contractor will be notified of the engineer's determination whether or not an adjustment of the contract is warranted.
3. No contract adjustment will be allowed unless the contractor has submitted the request for adjustment within the time prescribed.
4. No contract adjustment will be allowed under this clause to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided or excluded under any other term or condition of this contract.

SECTION 9 PAYMENT

9-1.03 PAYMENT SCOPE

PROMPT PAYMENT FROM THE AGENCY TO THE CONTRACTORS

The Agency shall make any progress payment within 30 days after receipt of an undisputed and properly submitted payment request from a contractor on a construction contract. If the Agency fails to pay promptly, the Agency shall pay interest to the contractor, which accrues at the rate of 10 percent per annum on the principal amount of a money judgment remaining unsatisfied. Upon receipt of a payment request, the Agency shall act in accordance with both of the following:

1. Each payment request shall be reviewed by the Agency as soon as practicable after receipt for the purpose of determining that it is a proper payment request.

2. Any payment request determined not to be a proper payment request suitable for payment shall be returned to the contractor as soon as practicable, but not later than seven (7) days, after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.

PROMPT PAYMENT OF WITHHELD FUNDS TO SUBCONTRACTORS

The agency may hold retainage from the prime contractor and shall make prompt and regular incremental acceptances of portions, as determined by the agency, of the contract work, and pay retainage to the prime contractor based on these acceptances. The prime contractor, or subcontractor, shall return all monies withheld in retention from a subcontractor within seven (7) days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the contract work by the agency, unless as agreed to in writing by the prime contractor and subcontractor, pursuant to Section 7108.5 of the Business and Professions Code. Any violation of this provision shall subject the violating prime contractor or subcontractor to the penalties, sanctions and other remedies specified in this code Section. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the prime contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

9-1.16 PROGRESS PAYMENTS

Conform to Section 9-1.16, “Progress Payments” of the Standard Specifications, and these Special Provisions.

9-1.16D MOBILIZATION

Conform to Section 9-1.16D, “Mobilization”, of the Standard Specifications, and these Special Provisions.

In addition, payment shall be as follows:

Full compensation for project mobilization shall be considered as included in the contract prices paid for the various items of work involved and no additional compensation will be allowed.

9-1.16F RETENTIONS

Section 9-1.16F, “Retentions” shall be replaced with the following:

Pursuant to Public Contract Code §7201, the County shall retain **five percent (5%)** of Progress Payments as part of security for the fulfillment of the contract by the Contractor, and shall monthly pay to the Contractor, while carrying on the work, the balance not retained as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provision of the contract. The County will release retention proceeds after the “Date of Completion” in accordance with California Civil Code §3260(c). No such estimate or payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the contract.

For the purpose of making partial payments pursuant to Section 9-1.16, "Progress Payments", of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work, which will be recognized for progress payment purposes.

Clearing and Grubbing 100%

After acceptance of the contract pursuant to the provisions in Section 5-1.46, "Final Inspection and Contract Acceptance", of the Standard Specifications, the amount, if any, payable for a contract item of work in excess of the maximum value for progress payment purposes hereinabove listed for the item, will be included for payment in the first estimate made after acceptance of the contract.

No partial payment will be made for any materials on hand which are furnished but not incorporated in the work.

In determining the partial payments to be made to the Contractor, only the following listed materials will be considered for inclusion in the payment as materials furnished but not incorporated in the work: None

9-1.17 PAYMENT AFTER CONTRACT ACCEPTANCE

Conform to Section 9-1.17, "Payment After Contract Acceptance" of the Standard Specifications, and these Special Provisions.

PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

A prime contractor or subcontractor shall pay any subcontractor not later than 7 days of receipt of each progress payment in accordance with the provisions of Section 7108.5 of the California Business and Professions Code concerning prompt payment to subcontractors. The 7 days is applicable unless a longer period is agreed to in writing. Any delay or postponement of payment over 30 days may take place only for good cause and with the agency's prior written approval. Any violation of Section 7108.5 shall subject the violating contractor or subcontractor to the penalties, sanction and other remedies of that section. This requirement shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the prime contractor, deficient subcontract performance, or noncompliance by a subcontractor.

9-1.17C PROPOSED FINAL ESTIMATE

Conform to Section 9-1.17C, "Proposed Final Estimate" of the Standard Specifications, and these Special Provisions.

The third paragraph is deleted in its entirety.

9-1.22 ARBITRATION

Conform to Section 9-1.22, "Arbitration", of the Standard Specifications, and these Special Provisions.

Effective January 1, 2017, Public Contract Code §9204, as enacted by AB 626, establishes a claim resolution process required for public works projects. In the event of any conflict between the provisions of Article XXI and Public Contract Code §9204, the provisions of the Public Contract Code shall prevail. The entire section can be found at the following link:
https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PCC&division=2.&title=&part=1.&chapter=9.&article

DIVISION II GENERAL CONSTRUCTION

SECTION 10 GENERAL

10-5 DUST CONTROL

Conform to Section 10-5 "Dust Control" of the Standard Specifications, and these Special Provisions.

Dust control shall be provided by the Contractor on a daily basis including weekends and holidays. Water shall be applied as specified in Section 10-6, "Watering" of the Standard specifications and these Special Provisions.

The application of water shall be subject to control by the Engineer at all times and shall be applied in the amounts at the locations and at the times designated by the Engineer.

PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for completing all the work involved in Dust Control and Watering shall be considered as included in the contract prices paid for the various items of work involved in this project and no additional compensation will be allowed therefor.

SECTION 12 TEMPORARY TRAFFIC CONTROL

12-1 GENERAL

Conform to Sections 7-1.04, "Public Safety", and 12-4.02, "Traffic Control Systems" of the Standard Specifications, and these Special Provisions.

The Contractor shall prepare and submit to the Engineer a Traffic Control Plan in conformance with these requirements as the first order of work. Control Plans shall be developed and submitted by a qualified person, reviewed and approved by the Engineer, and implemented by the Contractor prior to the beginning of work.

The Engineer approved Traffic Control Plan must be submitted to Caltrans for review when requesting your encroachment permit rider for work in the State right-of-way.

Road closures shall not be permitted.

As the work progresses, it may be necessary to amend or supplement this Plan. All such modifications shall be as approved or otherwise directed by the Engineer. Access to street intersections, public and private parking lots, commercial premises, residences, and other public and private properties must be maintained. **At least 72 hours in advance of starting any work that may affect access to private properties, the Contractor shall provide written notice to property owners.** Contractor shall submit notice of work to the engineer for approval prior to posting notices. Access to and from commercial and residential driveways and parking lots may be restricted when performing items of work which cannot be accomplished without access restriction. The road shall be open and access shall be provided during non-working hours.

All traffic control shall conform to the minimum standards as set forth in the latest edition of the Manual of Traffic Controls for Construction and Maintenance Work Zones, published by the California Department of Transportation as supplemented by the Standard Specifications and these provisions and as directed by the Engineer. **No work will begin prior to approval of the Traffic Control Plan**

The provisions of the Control Plans shall identify various segments of the work site by areas of control requirements and should be used in conjunction with other requirements of the Plans and Specifications. The Contractor is not restricted to operations within any one (1) area or combination of areas and may elect to work more than one (1) area concurrently pursuant to other requirements of the Plans and Special Provisions. The Control Plans should be considered as a minimum requirement during the Contractor's active performance of items of work. Other or additional requirements may be necessary depending upon the character of the work involved and/or times when construction activity is not in progress. At a minimum, the Traffic Control Plan shall consist of the following:

a. Placement of the traffic controls as described in Section 12-4.
b. The base material of construction area signs shall not be plywood.

12-1.04 PAYMENT

Payment for preparing and submitting the Traffic Control Plan and for furnishing, installing and maintaining all construction area traffic controls including all signs, lights, flaggers, pilot vehicles, temporary railing, barricades and other warning and safety devices as described, the Traffic Control Plan, the Standard Specifications, and as directed by the Engineer is included in the payment for the bid items involved.

12-3.02B MATERIALS

Conform to Section 12-3.02B, “Materials” of the Standard Specifications, and these Special Provisions.

Retroreflective traffic cones when used during the hours of darkness shall comply with Section 12-3.02B, “Materials”, of the Standard Specifications, except that the sleeves shall be seven (7) inches long.

12-3.10 BARRICADES
12-3.10A General
Conform to Section 12-3.10, “Barricades” of the Standard Specifications, and these Special Provisions.

Section 12-3.10 includes specifications for placing barricades.

12-3.10B Materials
Markings for barricade rails must be alternating orange and white retroreflective stripes.

Orange retroreflective sheeting must match color PR no. 6, Highway Orange, of the FHWA Color Tolerance Chart.

The interface between the rail surface and the retroreflective sheeting must be free of air bubbles or voids.

The predominant color of barricade components other than the rails must be white or unpainted galvanized metal or aluminum.

A sign panel for a construction area sign or marker panel to be mounted on a barricade must comply with section 12-3.11B(2).

Do not imprint an owner identification on the retroreflective face of any rail.

12-3.10C Construction
Place each barricade such that the stripes slope downward in the direction road users are to pass.

Moving a barricade from location to location is NOT considered change order work.

12-3.20 TEMPORARY BARRIER SYSTEMS
12-3.20A General
12-3.20A(1) Summary
Section 12-3.20 includes specifications for placing, maintaining, repairing, and removing temporary barrier systems.

Temporary barrier system consists of:

1. New or undamaged used interconnected barrier segments
2. Segment connection hardware
3. Stakes and anchor bolts

12-3.20A(3) Submittals
Submit as informational submittal for each type of temporary barrier system:

1. Certificate of compliance
2. Manufacturer’s installation instructions except for Type K temporary railing

Submit a signed manufacturer’s replacement evaluation report within 10 days of damage to a temporary steel barrier system.

12-3.20A(4) Quality Assurance
12-3.20A(4)(a) General
Except for Type K temporary railing, temporary barrier systems must:

1. Be on the Authorized Materials List for highway safety features
2. Comply with MASH Test Level 3 requirements
3. Comply with the manufacturer's drawings shown on the Department's Division of Safety Programs website and the manufacturer's installation instructions

If a discrepancy exists, governing ranking in descending order is:

1. These specifications
2. Manufacturer's drawings
3. Manufacturer's installation instructions

12-3.20A(4)(b) Quality Control
Replace damaged temporary concrete barrier segments with exposed reinforcing steel or concrete spalls 1-1/2 inches in depth and 4 inches width or greater.

Replace damaged temporary steel barrier segments with permanent bends, tearing, or buckling as described in the signed manufacturer's replacement evaluation report.

Realign temporary barrier system within 2 days of impact or displacement when displaced more than 3 inches.

12-3.20B Materials
12-3.20B(1) General
Temporary barrier segments must:

1. Be a minimum 31-1/2 inches in height
2. Have at least two lifting holes
3. Be designed to be used with temporary traffic screen when required

Temporary barrier segment may have your name or logo on each barrier segment. The name or logo muct be no more than 4 inches in height and must be located no more than 12 inches above the bottom of the barrier segment.

12-3.20B(2) Temporary Concrete Barriers
12-3.20B(2)(a) General
Temporary concrete barrier segment must:

1. Be precast concrete with a minimum 4,000-psi compressive strength.
2. Have reinforcing steel that complies with section 52.
3. Have a finished surface that complies with section 51-1.03F(2)
4. Comply with the requirements for precast concrete.
5. Include the manufacturer's name, lot number, and month and year of manufacture stamped on the top of each barrier segment except for Type K temporary railing. The stamped information must be:
   5.1. No more than 6 inches in height.
   5.2. No more than 12 inches in length.
   5.3. From 3/16 to ¼ inch in depth.
   5.4. Centered on the top width of the barrier segment.

Segment connection hardware must be one of the following:

1. Steel bar loops and connecting pins
2. “J” hook steel plates

Steel bar loops must comply with ASTM A36/A36M.

Connecting pins must comply with ASTM A307. A round bar of the same diameter may be substituted for the connecting pins, the round bar must:

1. Comply with ASTM A36/A36M
2. Have a minimum length of 26 inches
3. Have a 3-inch-diameter, 3/8-inch-thick plate welded on the upper end using a 3/16-inch fillet weld

“J” hook steel plates must be a minimum 18 inches in height.

12-3.20C(2)(c) Type K Temporary Railing
Install a minimum 160 feet of Type K temporary railing. Type K Temporary railing shall be placed as shown of the plans or as directed by the Engineer.

Place Type K temporary railing on a firm, stable surface.

12-3.20D Payment
Payment for preparing and submitting the Temporary Barrier System submittal and for furnishing, installing, maintaining, relocating, and removing all construction area barricades and other warning and safety devices as described, the Traffic Control Plan, the Standard Specifications, and as directed by the Engineer is included in the payment for the bid items involved.

12-4 MAINTAINING TRAFFIC

Conform to Section 12-4, “Maintaining Traffic” of the Standard Specifications, and these Special Provisions.

Whenever vehicles or equipment are parked on the shoulder within six (6) feet of a traffic lane, the shoulder area shall be closed with fluorescent traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at twenty-five (25) foot intervals to a point not less than twenty-five (25) feet past the last vehicle or piece of equipment. A minimum of nine (9) cones or portable delineators shall be used for the taper. A C23 (Road Work Ahead) or C24 (Shoulder Work Ahead) sign shall be mounted on a telescoping flag tree with flags. The flag tree shall be placed where directed by the Engineer.

A minimum of one traffic lane, not less than 10-feet wide, shall be open for use by public traffic. When construction operations are not actively in progress, not less than two such lanes shall be open to public traffic.

As directed by the Engineer when possible, the full width of the traveled way shall be open for use by public traffic on Saturdays, Sundays and designated legal holidays, after 3:00 p.m. on Fridays, and the day preceding designated legal holidays and when construction operations are not actively in progress.

12-4.02 TRAFFIC CONTROL SYSTEMS

Conform to Sections 12, “Temporary Traffic Control”, and 7-1.04, “Public Safety” of the Standard Specifications, and these Special Provisions.

When lane closures are made for work periods only, at the end of each work period all components of the traffic control system, except barriers and portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If

the Contractor so elects, said components may be stored at selected central locations, approved by the Engineer, within the limits of the right-of-way.

12-4.02C(2) LANE CLOSURE SYSTEM

TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

Conform to Sections 12, “Temporary Traffic Control” and 12-4, “Maintaining Traffic” of the Standard Specifications and these Special Provisions.

The provisions of this section do not relieve the Contractor from its responsibility to provide such additional devices or take such measures as may be necessary to conform to Section 7-1.04, "Public Safety", of the Standard Specifications.

During the hours of darkness, as defined in Division 1, Section 280, of the Vehicle Code, portable signs shall be, at the option of the Contractor, either illuminated signs conforming to Section 12-3.11B(3), "Portable signs", of the Standard Specifications, or Reflexite vinyl microprism reflective sheeting signs, or 3M high intensity reflectorized sheeting on aluminum substrate signs, or Seibulite Brand Ultralite Grade Series encapsulated lens retroreflective sheeting signs, or equal.

If any component of the traffic control system is displaced or ceases to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the component to its original condition or replace the component, and shall restore the component to its original location.

When lane closures are made for work periods only, at the end of each work period, all components of the traffic control system, except barriers or portable delineators placed along open trenches or excavation adjacent to the traveled way shall be removed from the traveled way and shoulder. If the Contractor so elects, said components may be stored at selected central locations, approved by the Engineer, within the limits of the right-of-way.

12-4.02D PAYMENT

Section 12-4.02D, “Payment”, is amended to read:

Full compensation for providing the traffic control system including costs for all flaggers, pilot vehicles, signs, barriers, and lights shall be considered as included in the lump sum price paid under traffic control and no additional compensation will be allowed therefore.

The Department pays for change order work for a traffic control system by force account for increased traffic control, as provided in Article VI of the Contract, and uses a force account analysis for decreased traffic control.

SECTION 13 WATER POLLUTION CONTROL

Conform to Section 13, “Water Pollution Control” of the Standard Specifications, and these Special Provisions.

13-1.01 GENERAL

13-1.01A SUMMARY

Water pollution control work applies to project where work activities result in less than 1 acre of soil disturbance and projects that qualify for an erosivity waiver. Manage work activities to reduce the discharge of pollutants to surface waters, groundwater, or municipal separate storm sewer systems including contract work item for Water Pollution Control Program.

Do not begin work until the WPCP is accepted.

Your Engineer approved Water Pollution Control Program must be submitted to Caltrans for approval when requesting your encroachment permit rider.

13-1.01C SUBMITTALS

Conform to Section 13-1.01C, “Submittals” of the Standard Specifications, and these Special Provisions.

13-1.01C(1) GENERAL

Within 10 calendar days, not including Saturdays, Sundays, and legal holidays, of receipt of the executed contract, start the following process for WPCP acceptance:

1. Submit 2 copies of the WPCP and allow 5 days for the Engineer's review. If revisions are required, the Engineer provides comments and specifies the date that the review stopped.
2. Change and resubmit the WPCP within 5 days of receipt of the Engineer's comments. The Engineer's review resumes when the complete WPCP is resubmitted.
3. When the Engineer accepts the WPCP, submit an electronic and 3 printed copies of the accepted WPCP.

If you operate construction support facilities, protect storm water systems or receiving waters from the discharge of potential pollutants by using water pollution control practices. Construction support facilities include:

1. Staging areas
2. Storage yards for equipment and materials
4. Mobile operations
5. Batch plants for PCC and HMA
6. Crushing plants for rock and aggregate
7. Other facilities installed for your convenience such as haul roads

For the Preparation Manual and other water pollution control references, go to the Department's "Construction Storm Water and Water Pollution Control" web site at: https://dot.ca.gov/programs/construction/storm-water-and-water-pollution-control

13-1.01D QUALITY ASSURANCE

13-1.01D(4) WATER POLLUTION CONTROL MANAGER

Conform to Section 13-1.01D(4), “Water Pollution Control Manager” of the Standard Specifications, and these Special Provisions.

13-1.01D(4)(a) GENERAL

The Contractor shall designate in writing a Water Pollution Control Manager (WPCM).

13-1.03 CONSTRUCTION

13-1.03C INSPECTIONS

Inspections shall conform to Section 13-1.03C “Inspections”, of the Standard Specifications, and these Special Provisions.

If the following occur, notify the Engineer within 6 hours:

1. You identify discharges into receiving waters or drainage systems causing or potentially causing pollution
2. The job receives a written notice or order from a regulatory agency

No later than 48 hours after the conclusion of a storm event resulting in a discharge, a nonstormwater discharge, or receiving the notice or order, submit:

1. Date, time, location, and nature of the activity, type of discharge and quantity, and the cause of the notice or order
2. Water pollution control practices used before the discharge, or before receiving the notice or order
3. Description of water pollution control practices and corrective actions taken to manage the discharge or cause of the notice.

13-2 WATER POLLUTION CONTROL PROGRAM

13-2.01 GENERAL

13-2.01A SUMMARY

Conform to Section 13-2.01A, "Summary" of the Standard Specifications, and these Special Provisions.

The work includes preparing a WPCP, obtaining WPCP acceptance, amending the WPCP, and reporting on water pollution control practices at the job site. The WPCP must comply with the Preparation Manual.

You may request, or the Engineer may order, changes to the water pollution control work. Changes may include addition of new water pollution control practices. Additional water pollution control work is change order work.

The WPCP must include water pollution control practices:

1. For storm water and nonstormwater from areas outside of the job site related to project work activities such as:
    1.1. Staging areas
    1.2. Storage yards
    1.3. Access roads
2. For activities or mobile operations related to contractor obtained NPDES Permits
3. Construction support facilities

The WPCP must include a copy of permits obtained by the County such as Fish & Game permits, US Army Corps of Engineers permits, RWQCB 401 Certifications, and RWQCB Waste Discharge Requirements for Aerially Deposited Lead Reuse. The County will provide copies of the permits to you before completion of the WPCP.

WPCP Amendments

You must amend the WPCP when:

1. Changes in work activities could affect the discharge of pollutants
2. Water pollution control practices are added by change order work
3. Water pollution control practices are added by your discretion

If you amend the WPCP, follow the same process specified for WPCP acceptance.

Retain a printed copy of the accepted WPCP at the job site.

WPCP Schedule

The WPCP schedule must:

1. Describe when work activities will be performed that could cause the discharge of pollutants in storm water
2. Describe water pollution control practices associated with each construction phase
3. Identify soil stabilization and sediment control practices for disturbed soil areas

13-2.03 CONSTRUCTION

IMPLEMENTATION REQUIREMENTS:

Monitor the National Weather Service Forecast Office on a daily basis. For forecasts, go to: https://www.weather.gov/forecastmaps

Whenever you or the Engineer identifies a deficiency in the implementation of the accepted WPCP:

1. Correct the deficiency immediately, unless the Engineer authorizes an agreed date for correction
2. Correct the deficiency before precipitation occurs

If you fail to correct the deficiency by the agreed date or before the onset of precipitation, the County may correct the deficiency and deduct the cost of correcting the deficiency from payment.

If you fail to comply with "Water Pollution Control" of these Special Provisions, the Engineer will order a suspension of work until the project complies with the requirements of "Water Pollution Control" of these Special Provisions.

The Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work" of the Standard Specifications.

Install water pollution control practices within 15 days or before predicted precipitation, whichever occurs first except as required sooner as required elsewhere by these Special Provisions.

If actions for the Contractor's convenience disturb one or more acres, the Contractor must pay all costs and be responsible for all delays associated with complying with Order No. 2009-0009- DWQ, NPDES General Permit No. CAS000002) issued by the SWRCB for "Storm Water Discharges Associated with Construction and Land Disturbance Activities".

The General Permit is available at:
https://www.waterboards.ca.gov

Inspection

The Water Pollution Control Manager must oversee inspections for water pollution control practices identified in the WPCP:

1. Before a forecasted storm
2. After precipitation that causes site runoff
3. At 24-hour intervals during extended precipitation
4. On a predetermined schedule, a minimum of once a week

The Water Pollution Control Manager must oversee daily inspections of:

1. Storage areas for hazardous materials and wastes
2. Hazardous waste disposal and transporting activities
3. Hazardous material delivery and storage activities
4. Water pollution control practices specified under "Construction Site Management" of these Special Provisions

The Water Pollution Control Manager must use the Storm Water Site Inspection Report provided in the Preparation Manual.

The Water Pollution Control Manager must prepare BMP status reports that include the following:

1. Location and quantity of installed water pollution control practices
2. Location and quantity of disturbed soil for the active or inactive areas

Within 24 hours of finishing the weekly inspection, the Water Pollution Control Manager must submit:

1. Copy of the completed site inspection report
2. Copy of the BMP status report

13-2.04 PAYMENT

Conform to Section 13-2.04, "Payment" of the Standard Specifications, and these Special Provisions.

If you fail to comply with "Water Pollution Control" of these Special Provisions or fail to implement water pollution control practices during each estimate period, the County withholds 25 percent from progress payment.

Withholds for failure to perform water pollution control work are in addition to all other withholds provided for in the contract. The County returns performance failure withholds in the progress payment following the correction for noncompliance.

The contract item Water Pollution Control Program includes preparing the Water Pollution Control Program (WPCP), obtaining WPCP acceptance, amending, and implementing the WPCP, and installation, maintenance, monitoring, and inspecting water pollution control practices at the job site, except for items listed separately in the bid list, as specified in the Standard Specifications and these Special Provisions, and as directed by the Engineer.

The County does not pay for implementation of water pollution control practices in areas outside the right of way not specifically provided for in the drawings or in the Special Provisions. The County does not pay for water pollution control practices installed at construction support facilities as included in other items of work and no separate payment will be made therefore.

The County does not share maintenance costs.

SECTION 14 ENVIRONMENTAL STEWARDSHIP

PROTECTION OF ARCHAEOLOGICAL ARTIFACTS

Attention is directed to Section 14-2.03, "Archaeological Resources" of the Standard Specifications.

In the event that archaeological artifacts or human remains are uncovered during construction activities, the Contractor shall stop work at that location and immediately notify the Engineer.

The Contractor shall dedicate any discovered artifacts, determined as "removable" by a qualified archaeologist, to the appropriate preservation center, or to the County of Nevada.

If buried cultural resources, such as chipped or ground stone, historic debris, building foundations, or human bone, are discovered during ground-disturbing activities, contractors shall stop work within 100 feet of the find.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

14-8.02 NOISE CONTROL

Conform to 14-8.02, "Noise Control" of the Standard Specifications, and these Special Provisions.

The noise level from the Contractor's operations, between the hours of 9:00 p.m. and 6:00 a.m. shall not exceed 86 dba at a distance of 50-feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise level.

Said noise level requirement shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Operation of construction equipment or noise generating activities shall be limited to the daytime hours of 7:00 a.m. to 7:00 p.m. All internal combustion engines in use on site must be equipped with the original manufacturer's silencers or their aftermarket equivalents in good working order.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

14-11.02 DISCOVERY OF UNANTICIPATED ASBESTOS AND HAZARDOUS SUBSTANCES

NATURALLY OCCURING ASBESTOS (NOA)

Conform to Section 14-11.02, "Discovery of Unanticipated Asbestos and Hazardous Substances"

of the Standard Specifications, and these Special Provisions.

The Northern Sierra Air Quality Management District (NSAQMD) enforces the Statewide Asbestos Airborne Toxic Control Measure (ATCM) for construction and grading operations (California Code of Regulations, Title 17, Section 93105). This ATCM specifies the geologic map (The Chico Quadrangle) to be used in determining its applicability.

The geologic map indicates the presence of ultramafic rock in the project area, so the likelihood of encountering naturally occurring Asbestos (NOA) is high. The ATCM applies to this area, as well as to any other area where ultramafic rock or serpentine is discovered during grading.

The following requirements shall apply to this project:

1. No person shall conduct any road construction or maintenance activities that disturb any area that meet any criterion listed in subsections (b)(1) or (b)(2) unless all of the following conditions are met.
   (A) The Air Pollution Control Office (APCO) is notified in writing at least fourteen (14) days before the beginning of the activity or in accordance with a procedure approved by the district.
   (B) All of the following dust control measures are implemented during any road construction or maintenance activity:
      1. Unpaved areas subject to vehicle traffic must be stabilized by being kept adequately wetted, treated with a chemical dust suppressant, or covered with material that contains less than 0.25 percent asbestos.
      2. The speed of any vehicles and equipment traveling across unpaved areas must be no more than fifteen(15) miles per hour unless the road surface and surrounding area is sufficiently stabilized to prevent vehicles and equipment traveling more than 15 miles per hour from raising dust that is visible crossing the project boundaries.
      3. Storage piles and disturbed areas not subject to vehicular traffic must be stabilized by being kept adequately wetted, treated with a chemical dust suppressant, or covered with material that contains less than 0.25 percent asbestos; and
      4. Activities must be conducted so that no track-out from any road construction project is visible on any paved roadway open to the public.
   (C) Equipment and operations must not raise any dust that is visible crossing the project boundaries.

Full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

14-11.03 HAZARDOUS WASTE MANAGEMENT

Conform to Section 14-11.03, “Hazardous Waste Management” of the Standard Specifications, and these Special Provisions.

When the presence of asbestos or hazardous substances is not shown on the plans or indicated in the specifications, and the Contractor encounters materials which the Contractor reasonably believes to be asbestos or a hazardous substance as defined in Section 25914.1 of the Health and Safety Code, and the asbestos or hazardous substance has not been rendered harmless, the Contractor may continue work in unaffected areas reasonably believed to be safe. The Contractor shall immediately cease work in the affected area and report the condition to the Engineer in writing.

In conformance with Section 25914.1 of the Health and Safety Code, removal of asbestos or hazardous substances including exploratory work to identify and determine the extent of the asbestos or hazardous substance will be performed by separate contract.

If delay of work in the area delays the current controlling operation, the delay will be considered a

right of way delay and the Contractor will be compensated for the delay in conformance with the provisions in Section 8-1.07, "Delays", of the Standard Specifications.

DIVISION III EARTHWORK AND LANDSCAPE

SECTION 17 GENERAL

17-2 CLEARING AND GRUBBING

Conform to Section 17-2, "Clearing and Grubbing" of the Standard Specifications, and these Special Provisions.

All vegetation shall be cleared and grubbed within the excavation and embankment slope lines.

All existing vegetation outside the areas to be cleared and grubbed shall be protected from injury or damage resulting from the Contractor's operations.

All activities controlled by the Contractor, except cleanup or other required work, shall be confined within the project limits.

Relocation of signs and mailboxes as required shall be included in clearing and grubbing.

It is the responsibility of the Contractor to verify trees and stumps that will be located within the clearing limits.

Nothing herein shall be construed as relieving the Contractor of its responsibility for final cleanup of the highway.

17-2.01 GENERAL

Conform to Section 17-2.01, "General" of the Standard Specifications, and these Special Provisions.

Trim trees as required to perform the work.

Coordinate tree trimming and tree removal with the Engineer. Trim any trees within 10 feet of high voltage power lines or obstructing the operation of construction equipment.

Do not remove trees between February 15 to September 1 unless you have a qualified biologist conduct a bird survey before tree removal and there are no nesting birds found. Conform to Section 14-6.03, "Species Protection" of the Standard Specifications.

17-2.03 CONSTRUCTION

17-2.03A GENERAL

Replace the 4th paragraph of Section 17-2.03A, "General", with:

Clear and grub vegetation only within the excavation and embankment slope lines and any additional areas required for drainage and irrigation facility installations. Remove only the trees shown on the plans and as directed by the Engineer.

Modification of the irrigation system included in the clearing a grubbing item.

Conform to Section 20-2, "IRRIGATION" of the Standard Specifications, and these Special Provisions.

17-2.03B CLEARING

Vegetation shall be cleared and grubbed fully within areas being replaced with concrete. Contractor will also need to remove certain trees and bushes in order to make modifications to planter bed. Tree removal shall be as directed by the Engineer.

All existing vegetation, outside the areas to be cleared and grubbed, shall be protected from injury or damage resulting from the Contractor's operations.

All activities controlled by the Contractor, except cleanup or other required work, shall be confined within the project limits.

17-2.04 PAYMENT

Full compensation for all labor, materials, tools and equipment for doing all work required under clearing and grubbing, including removal and disposal of tree stumps, removal of vegetation, existing structures, irrigation system modification, and other items shall be considered included in the lump sum price for “Clearing and Grubbing / Irrigation System Modification” and no additional compensation will be allowed.

SECTION 19 EARTHWORK

19-1 GENERAL

Conform to Section 19, "Earthwork" of the Standard Specifications, and these Special Provisions.

This work "earthwork" shall consist of excavating, backfilling, grading, scarifying, watering, compacting, disposing of surplus material, and obliterating roads, oversize rock and unsuitable material as shown on the plans and specified herein.

The two and one-half (2.5) feet requirement in the second paragraph of Section 19-5.03B, "Relative Compaction (95 percent)", of the Standard Specifications shall be modified to require ninety-five percent (95%) relative compaction for a minimum depth of one (1.0) foot below subgrade for the width between the outer edges of excavation.

Excavated material surplus to the needs of constructing embankments shall be transported to a disposal site outside the "Highway Right-of-Way" chosen by the Contractor. The Contractor shall make its own determination as to the quantity of surplus materials involved and shall satisfy itself that there is sufficient material available for the completion of backfill or embankments before disposing of any material offsite. Any shortage of material caused by premature disposal of any excavated material by the Contractor shall be replaced by the Contractor and no compensation will be allowed to the Contractor for such replacement.

Trench excavation, sloping, shoring, and protection shall be maintained in accordance with OSHA requirements.

No overhaul will be paid for. No mass diagram has been prepared for this project.

No extra payment will be made for rock excavation whether requiring blasting or not.

No ponding or jetting will be allowed.

19-1.03A GENERAL

Conform to Section 19-1.03A, “General”, of the Standard Specifications, and these Special Provisions.

Double handling of earthwork materials may be required.

19-1.04 PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing excavation and backfill in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including excavation, removal and disposal of concrete, backfill around structures, compaction, disposal of surplus material and oversize rock, watering, dust control, removal and disposal of unsuitable material encountered in excavation and finished subgrade preparation including watering, compacting and finish grading, shall be included in the contract unit price for Earthwork and no separate payment will be made therefore. This is a final pay item.

19-2.03B SURPLUS MATERIAL

Replace the 2nd, 3rd, and 4th paragraphs of Section 19-2.03B, “Surplus Material”, with:

Dispose of surplus material. Ensure enough material is available to complete the backfill as needed before disposing of it.

19-2.04 PAYMENT

Conform to Section 19-2.04, “Payment” of the Standard Specifications, and these Special Provisions.

Payment for double handling of earthwork materials is included in the payment for roadway excavation.

19-4.05 ROCK EXCAVATION

Rock excavation is defined as all that excavation that cannot be accomplished with, at a minimum, a caterpillar D8-H bulldozer with rippers or equivalent. During trenching operations, rock excavation is defined as all that excavation that cannot be accomplished with a backhoe with a minimum factory rating of 125 SAE net HP weighing 46,100 pounds equipped with a minimum bucket size of 20-inches. The bucket shall be suitable for rock excavation.

The Contractor shall furnish the above specified equipment in order to demonstrate the nature of the rock. The Engineer shall be the sole judge as to what excavation is determined to be rock excavation and his or her decision shall be final and binding.

The Engineer will cross section the area determined to require rock excavation after all possible above defined excavation has been removed by the Contractor.

Excavated rock material surplus to the needs for constructing embankments and that suitable as 1-ton rock used for bank stabilization shall be transported to a disposal site outside the “highway right-of-way” chosen by contractor. The Contractor shall make its own determination as to the quantity of surplus materials involved and shall satisfy itself that there is sufficient material available for the completion of backfill or embankments before disposing of any material off-site.

This item is a contingent item of work, therefore the quantities of the above item of work as set forth on the bidding sheet are for bidding comparison purposes only and do not represent an actual quantity estimate. The actual quantity may be greatly increased, decreased or reduced to zero. This bid item is not subject to the provisions of Section 9-1.06B, “Increases of More Than 25 Percent”, or Section 9-1.06C, “Decreases of More Than 25 Percent”, of the Standard Specifications and therefore shall not constitute a basis for claim by the Contractor for extra payment or damages regardless of the actual quantity constructed.

The use of the above item of work is not shown on the plans and will be as directed in writing by the Engineer.

DIVISION IV SUBBASES AND BASES

SECTION 26 AGGREGATE BASES

26-1.02B CLASS 2 AGGREGATE BASE

Class 2 aggregate base (3/4-inch maximum) shall conform to the provisions of Section 26, "Aggregate Bases” of the Standard Specifications for Class 2 aggregate base, and these Special Provisions.

The coarse aggregate (material retained on the No. 4 sieve) shall contain at least 50 percent by weight of crushed pieces having 2 or more freshly fractured faces with the area of each fracture being at least equal to 75 percent of the smallest midsectional area of the piece. When two fractured faces are adjacent, the angle between the planes of the fractures must be at least 30 degrees to count as two fractured faces. The amount of flat or elongated particles shall not exceed

30 percent. A flat particle is one having a ratio of width to thickness greater than 3, and an elongated particle is one having a ratio of length to width greater than 3. The coarse aggregate shall consist of angular fragments reasonably uniform in density and quality. The specific gravity (bulk saturated surface dry) as determined by California Test 206 shall be at a minimum 2.58 at an average with no more than 15 percent by weight consisting of particles with a bulk specific gravity below 2.50.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in placing and compacting Class 2 aggregate base shall be included in other items of work, and no additional compensation will be allowed.

DIVISION V SURFACING AND PAVEMENTS

SECTION 40 CONCRETE PAVEMENT

40-1.01 GENERAL

40-1.01A Summary

Section 40-1 Includes general specifications for constructing concrete pavement.

Conform to Section 40, “CONCRETE PAVEMENT” of the Standard Specifications, and these Special Provisions.

Colored and textured concrete in bus turnout is being replaced with non-textured and non-colored concrete. All sidewalk and bus turnout concrete finish is to match existing sidewalk finish.

40-1.01B Definitions

Action limit: Test results at which corrective action must be made while production continues.

Raveling: Progressive disintegration of the concrete pavement surface resulting in dislodged aggregate.

Suspension limit: Test results at which production must be suspended while corrections are made.

Uncontrolled crack: Any crack in JPCP that is not a working crack.

Working crack: Crack parallel to and within 4 inches of a planned JPCP contraction joint.

40-1.01C Submittals

40-1.01C(1) General

At least 15 days before delivery to the job site, submit the manufacturer’s instructions for storage and installation of:

1. Splice couplers for threaded tie bars
2. Joint filler

Submit calibration documentation and operational guidelines for frequency measuring devices for concrete vibrators as an informational submittal.

Submit updated QC charts each paving day and an informational submittal.

If repair of replacement of noncompliant concrete is required, submit a repair or replacement plan.

40-1.01C(2) Certificates of Compliance

Submit a certificate of compliance for:

1. Tie bars
2. Splice couplers for threaded tie bars
3. Dowel bars
4. Tie bar baskets
5. Dowel bar baskets
6. Joint filler
7. Epoxy-powder coating

40-1.01C(3) Quality Control Plan
Submit a concrete pavement QC plan. Allow 30 days for review.

40-1.01C(4) Mix Design
At least 15 days before testing for mix proportions, submit a copy of the AASHTO accreditation for the laboratory determining the mix proportions as an informational submittal.

At least 15 days before starting field qualification, submit the proposed concrete mix proportions, the corresponding mix identification, and laboratory test reports, including measurements of 3 modulus of rupture and 3 compressive strength, for each trial mixture at 3, 7, 14, 21, 28, and 42 days.

It is recommended to use a high-early concrete mix design.

40-1.01C(6) Concrete Field Qualification
Submit field qualification data and test reports, including:

1. Mixing date
2. Mixing equipment and procedures used
3. Batch volume in cubic yards
4. Type and source of ingredients used
5. Penetration of the concrete
6. Air content of the plastic concrete
7. Age and strength at the time of concrete beam testing

The minimum batch size for field qualification is 5 cu yd.

Field qualification test reports must be certified with a signature by an official in responsible charge of the laboratory performing the tests.

40-1.02D Dowel Bar Lubricant
Dowel bar lubricant must be curing compound no. 3 or paraffin based. Paraffin-based lubricant must be Bradley Coatings Group BCG 6116 or Valvoline Tectyl 506 or an authorized wqual and must be factory-applied.

40-1.02E Joint Filler
Joint filler for an isolation joint must be preformed, bituminous-type, expansion joint filler for concrete complying with ASTM D994.

40-1.03 CONSTRUCTION
40-1.03A General
Proportion aggregate and bulk cementitious materials by weight using and authorized automatic proportioning device.

For widening and lane reconstruction, construct only the portion of the pavement where the work will be completed during the same closure. If you do not complete the construction during the same closure, construct temporary roadway pavement under section 41-1.02E.

40-1.03B Joints
40-1.03B(1) General
Do not bend tie bars or reinforcement in existing concrete pavement joints.

For contraction joints and isolation joints, saw cut a groove with a power-driven saw equipped with a diamond blade. After cutting, immediately wash slurry from the joint with water below 100 psi gauge pressure.

Keep joints free from foreign material, including soil, gravel, concrete, and asphalt. To keep foreign material out of the joint, you may use filler material. The filler material must not react adversely with the concrete or damage the pavement. After sawing and washing, install the material such that it keeps moisture in the adjacent concrete during the 72 hours after paving. If you install filler material, the specifications for spraying the sawed joint with additional curing compound is section 40-1.03I do not apply. If you use absorptive filler material, moisten the filler immediately before or after installation.

40-1.03B(2) Construction Joints
Construction joints must be vertical.

Before placing fresh concrete against hardened concrete, existing concrete pavement, or structures, apply curing compound no.1 or 2 to the vertical surface and allow to dry.

At joints between concrete pavement and asphalt concrete pavement, apply a tack coat between the two pavements.

Use a metal or wooden bulkhead to form transverse construction joints. If dowel bars are described, the bulkhead must allow dowel bar installation.

40-1.03B(3) Contraction Joints
Saw contraction joints before cracking occurs and after the concrete is hard enough to saw without spalling, raveling, or tearing.

Except for longitudinal joints parallel to a curving centerline, saw the contraction joints such that they are no more than 0.1 foot from either side of a 12-foot straight line.

Cut transverse contraction joints within 0.5 foot of the spacing described. Adjust spacing if needed such that slabs are at least 10 feet long.

Cut transverse contraction joints straight across the full width of the concrete pavement between isolation joints and edges of pavement. In areas of converging and diverging pavements, space transverse contraction joints such that the joint is continuous across the maximum pavement width. Longitudinal contraction joints must be parallel with the concrete pavement centerline except where lane converge or diverge.

40-1.03B(4) Isolation Joints
Before placing concrete at isolation joints, saw cut the existing concrete face to make a clean, flat, vertical surface and secure the joint filler. Make the cut the same depth as the depth of the new pavement.

40-1.03C Bar Reinforcement
Place bar reinforcement as described in the plans.

Bar reinforcement must be more than ½ inch below the saw cut depth at concrete pavement joints.

40-1.03D Dowel Bar Placement

Dowel bar placement must comply with the tolerances shown in the following table:

Dowel Bar Placement

Dimension	Tolerance
Horizontal offset (inch)	+- 1
Longitudinal translation (inch)	+- 2
Horizontal skew (max, inch)	5/8
Vertical skew (max, inch)	5/8
Vertical depth	The minimum distance measured from the concrete pavement surface to any point along the top of the dowel bar must be: DB+ 1/2inch Where: DB= ½ of the pavement thickness or the saw cut depth in inches, whichever is greater The maximum distance below the depth shown must be 5/8 inch.

NOTE: Tolerances are measured relative to the completed joint.

If you are using curing compound as a lubricant, apply the curing compound to the dowels:

1. In 2 separate applications. Apply the last application no more than 8 hours before placing the dowels.
2. Such that each dowel is completely lubricated before placement.
3. At a rate of 1 gallon per 150 square feet.

Install dowel bars using one of the following methods:

1. Drill and bond the bars under section 41-10.
2. Mechanically insert the bars. Eliminate evidence of the insertion by reworking the concrete over the dowels.
3. Use dowel bar baskets to hold the dowels at the specified depth and alignment before concrete placement. Anchor the baskets with at least 1 fastener per foot of basket section and at least 200 feet in advance of the pavement placement activity. You may request not to perform advance anchoring due to construction limitations or restricted access. After anchoring the baskets and before placing the concrete, demonstrate the dowel bars do not move from their specified depth and alignment during concrete placement.

If installation of dowel bars is noncompliant, stop paving, demonstrate your correction , and obtain verbal authorization.

40-1.03E Tie Bar Placement

Tie bar placement must comply with the tolerances shown in the following table:

Tie Bar Placement

Dimension	Tolerance
Horizontal and vertical skew (max, inch)	5-1/4
Longitudinal translation (inch)	+- 2
Horizontal offset (embedment, inch)	+- 2
Vertical depth	1. At least ½ inch below the bottom of the saw

	cut 2. At least 2 inches from any point along the bar to the pavement surface of bottom

NOTE: Tolerances are measured relative to the completed joint.

40-1.03F Placing Concrete

40-1.03F(1) General

Immediately before placing concrete, the surface to receive the concrete must be:

1. Within the compaction and elevation tolerances
2. Free of loos and extraneous material
3. Uniformly moist but free of standing or flowing water

Place concrete pavement with stationary side forms or slip form paving equipment.

Place consecutive concrete loads within 30minutes of each other. Construct a transverse construction joint if the concrete placement is interrupted by more than 30 minutes. The transverse construction joint must be at the same longitudinal location as the contraction joint in the adjacent lane location, or you must remove the concrete pavement to the preceding transverse joint.

Place the concrete pavement in full-lane widths separated by construction joints or monolithically with contraction joints.

Do not retemper concrete.

If the surface width is constructed as shown, you may construct the pavement on a batter not flatter the 6:1 (vertical:horizontal).

40-1.03F(2) Paving Adjacent to Existing Concrete Pavement

Wherever pavement is placed adjacent to existing concrete pavement match the existing concrete pavement.

40-1.03H Finishing

40-1.03H(1) General

Reserved

40-1.03H(2) Preliminary Finishing

40-1.03H(2)(a) General

Preliminary finishing must produce a smooth and true-to-grade finish. After preliminary finishing, mark the bus turnout with a date stamp showing month and year of construction. The stamp must be authorized before paving starts. The stamp must form a uniform mark from 1/8 to 1/4 inch deep.

Do not apply water to the pavement surface before float finishing.

40-1.03H(3) Final Finishing

After completing preliminary finishing, round the edges of the initial paving widths to a 0.04-foot radius. Round the transverse and longitudinal construction joints to a 0.02-foot radius.

Texture the pavement before curing it. Perform the initial texturing with a burlap drag or broom device that produces striations parallel to the centerline. Perform the final texturing with a spring-steel tined device that produces grooves parallel with the centerline.

40-1.03I Curing

Cure the concrete pavement exposed area using the waterproof membrane method or curing compound method with curing compound no. 1 or 2. If you remove the side forms within 72 hours of the start of curing, also cure the pavement edges.

Apply curing compound with mechanical sprayers. Reapply curing compound to saw cuts and disturbed areas.

40-1.03J Protecting Concrete Pavement
Maintain the concrete pavement surface temperature at not less than 40 degrees F for the initial 72 hours.

Protect the surface from activities that cause damage and reduce the texture. Prevent soil, gravel, petroleum products, concrete, or asphalt mixes from being deposited on the pavement surface.

Do not allow traffic or use equipment on concrete pavement before the concrete has attained a modulus of rupture of 550 psi, or equivalent compressive strength if using maturity per section 40-1.03L, based on the testing unless:

1. Equipment is for sawing contraction joints
2. One side of the paving equipment tracks may be on the concrete pavement after a modulus of rupture of 350 psi has been attained if:
    - 2.1. Unit pressure exerted on the pavement by the paver does not exceed 20 psi
    - 2.2. You change the paving equipment tracks to prevent damage, or the paving equipment tracks travel on protective material, such as planks
    - 2.3. No part of the track is closer than 1 foot to the concrete pavement edge
    - 2.4. Authorized
    - 2.5. You must monitor for damage and immediately discontinue access and suspend operations if any damage becomes apparent

Contractor shall not place or drive any item over 2,000lbs on new concrete until concrete has reached 80% of the design strength unless authorized by the Engineer.

If visible cracking or other damage occurs to the concrete pavement, stop operating the paving equipment on the pavement and repair the damage.

40-1.03K Early Use of Concrete Pavement
To request early use of concrete pavement:

1. Furnish molds and machines for the modulus of rupture testing
2. Sample the concrete
3. Fabricate beam specimens
4. Test the beams for the modulus of rupture under California test 523

The pavement must have modulus of rupture of at least 350 psi. Protect the pavement under section 40-1.03J.

40-1.03L Use of the maturity to Determine Opening to Traffic Concrete Strength
As an alternative to modulus of rupture testing, you can use the maturity method uder ASTM C1074 to estimate the equivalent compressive strength for opening ot traffic, use of equipment, and for early use of concrete pavement under section 40-1.03K.

Provide, install, and maintain all the maturity testing equipment.

Develop the strength-maturity relationship using:

1. Specimens prepared under ASTM C1074
2. Datum temperature of 14 degrees F
3. Nurse-Saul Method
4. Logarithmic best-fit curve with a R^2 value of at least 0.90

Develop the strength-maturity relationship in the laboratory when you are designing your mix or in the field during the test strip or first day of production and submit the results to the Engineer. During test strip and production:

1. Place a sensor at mid-depth and at 1.5ft from the edge of pavement at the beginning and at the end of placement
2. Estimate in-place strength of concrete based on your strength-maturity relationship per ASTM C1074
3. Validate once for test strip and every 15,000 cubic yards or 30 days of concrete production, whichever comes first.

The maturity method is not used to estimate compressive strength for acceptance of concrete pavements.

40-1.03M Drilling Cores
Drill concrete pavement cores under ASTM C42/C42M. Use diamond-impregnated drill bits.

Clean, dry, and fill core holes with nonshrink, hydraulic-cement grout or concrete. Coat hole walls with epoxy adhesive for bonding new concrete to old concrete. Finish the fill to match the adjacent surface elevation and texture.

40-1.03N Spall and Ravel Repair
Repair spalled or raveled areas that are any of the following:

1. Deeper than 0.05 foot
2. Wider than 0.10 foot
3. Longer than 0.30 foot

Repair spalls or ravels under section 41-4 and complete the repairs before opening a lane or lanes to traffic. Remove and replace JPCP salbs that have combined raveled areas more than 5 percent of the total slab area or a single raveled area more than 4 sq ft.

40-1.03O Smoothness and Texture Correction
Correct pavement that is noncompliant for:

1. Smoothness by grinding under section 42-3
2. Texture by grooving or grinding under section 42

Do not start corrective work until:

1. Pavement has at least 550 psi modulus of rupture or equivalent compressive strength of using maturity under section 40-1.03L
2. Corrective method is authorized

Correct the entire lane width. Start and end grinding at lines perpendicular to the roadway centerline. The corrected area must have a uniform texture and appearance.

If corrections are made within areas where testing with an inertial profiler is required, retest the entire lane length with an inertial profiler.

If corrections are made within areas where testing with a 12-foot straightedge is required, retest the corrected area with a straightedge.

40-1.04 PAYMENT

The payment quantity for any type of concrete pavement is the square footage determined by the dimensions shown.

The Department does not pay for additional coring that you request to check dowel or tie bar alignment.

If the Engineer authorizes a test strip that remains in place as part of the pavement, the payment quantity for any type of concrete pavement includes the area of the test strip.

The Department does not pay for additional tie bars required due to the curvature of the pavement slab.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing concrete installation in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including preparation, reinforcement, formwork, isolation joints, finishing, and any other operations and materials involved shall be included in the contract unit price for items involved with concrete and no separate payment will be made therefore.

SECTION 41 EXISTING CONCRETE PAVEMENT

41-11 GENERAL

Section 41-11 includes general specifications for removing concrete pavement and base.

Remove concrete pavement or concrete pavement and base to the depth shown.

Before placing subsequent layers of subbase, base, pavement, or other material, the subgrade must comply with section 19-1.03C.

Section 36-1.01D(2) does not apply.

41-11.02 MATERIALS

Not Used

41-11.03 CONSTRUCTION

41-11.03A General

Reserved

41-11.03B Remove Concrete Pavement

If there is overlaying material on the concrete pavement, remove it with the pavement.

Saw cut using a diamond blade and make cuts perpendicular to the pavement surface. Saw cutting is not required where concrete pavement is adjacent to asphalt concrete pavement.

You may make additional saw cuts within the sawed outline.

Saw cuts must be the full pavement depth unless otherwise shown.

Saw cut at longitudinal and transverse joints to remove entire slabs. For partial-slab areas, the Engineer determines the exact saw-cut locations.

Do not impact the surface with 18 inches of pavement remaining in place. Slab-lifting equipment must attach to the pavement.

41-11.03C Remove Base

Before removing any type of asphalt treated, cement treated, or concrete base, saw cut the outline of the base removal area using a power-driven saw with a diamond blade. Cut asphalt treated base at least 2 inches deep on a neat line perpendicular to the base surface. Cut cement treated or concrete base full-depth.

Remove unbonded granular base materials by means that will not disturb base to remain in place.

41-11.04 PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing removal of concrete pavement in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including excavation, removal and offsite disposal of concrete, shall be included in the contract unit price for Remove Concrete Pavement and no separate payment will be made therefore.

DIVISION VIII MISCELLANEOUS CONSTRUCTION

SECTION 77-1 TRENCHING AND BACKFILLING

77-1.01 GENERAL

77-1.01A SUMMARY

This section includes specifications for trenching and backfilling for the construction of underground pipelines, signposts, light foundations, and conduits. All trenching will be open cut, unless otherwise approved in writing. The work includes all clearing and grubbing, trenching or tunneling, dewatering, incidental work, and providing specified backfill.

Earthwork shall conform to Section 19, “Earthwork”, of the Standard Specifications.

Excavation shall conform to Section 19, "Earthwork" of the Standard Specifications, and these Special Provisions. Excavation shall consist of removing soil, rock, durable rocky material, earthen material, or other unyielding material as shown on the plans using hydraulic hammers, pneumatic hammers, roadway excavation techniques, or other methods approved by the Engineer in writing.

Trenches must be backfilled as shown on the plans. Intermediate layers of trench backfill shall be two sack slurry cement (min. 188 lb cement per cubic yard of material). Native material meeting the gradation and compaction requirements may be used as structure backfill, where approved by the Engineer.

Trench surfaces shall be paved or plated prior to being opened to public traffic.

77-1.01B SUBMITTALS

Submit three (3) copies of a report from a testing laboratory verifying that material conforms to the specified gradations and characteristics for granular material, imported sand, rock refill for foundation stabilization, and water.

77-1.01C PROJECT CONDITIONS

Obtain all required permits and licenses before installing utilities under existing roads, and follow the rules and requirements of the authority having jurisdiction.

Arrange construction sequences to provide the shortest practical time that the trenches will be open to avoid hazard to other contractors and public, and to minimize the possibility of trench collapse.

77-1.01D TESTING FOR COMPACTION

The Engineer will test for compaction at locations determined by the Engineer.

Relative compaction is defined as the ratio, in percent, of the as-compacted dry density to the laboratory maximum dry density. The laboratory maximum dry density is defined in accordance with

ASTM D1557, latest edition. As-compacted dry density will be determined in accordance with ASTM D3017 or D2922, latest edition.

Where compaction tests indicate a failure to meet the specified compaction, the Engineer will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved.

77-1.02 MATERIALS

77-1.02B IMPORTED SAND (TYPE 2)

Imported washed sand used for the pipe bedding and pipe zones shall be free of clay or organic material and gradation have the following gradation:

Sieve Size	Percent Passing by Weight
3/8-inch	100
No. 4	95 – 100
No. 30	30-50
No. 100	2-10
No. 200	0-5

Imported sand shall have a sand equivalent not less than 28 per ASTM D 2419.

77-1.02E CEMENT SLURRY (TYPE 2)

Slurry cement shall conform to Section 19-3.03F, "Slurry Cement Backfill", of the Standard Specifications, except payment.

Slurry cement shall consist of cement, fine aggregate/sand, and sufficient water for workability. It shall be two sack slurry cement (min. 188 lb cement per cubic yard of material). Slurry shall be thoroughly machine-mixed and shall be placed within one hour after initial mixing.

Slurry cement shall be dyed with Red oxide dye admixture 5lb per cubic yard.

77-1.02J WATER FOR COMPACTION

Water for compaction shall be clean and free of oil, acids, salts, and other deleterious substances. Water shall be supplied by the Contractor at no additional expense to the County. Water shall be drawn from a hydrant meter. Contractor shall make arrangements with the water district to obtain hydrant meter. The Contractor shall coordinate with the Engineer for the use of the water and shall provide all necessary labor and equipment to extract, transport and apply the water for compaction, and shall be responsible for the repair of any damage to the existing facilities which can be attributed to this operation.

77-1.03 CONSTRUCTION

77-1.03A COMPACTION REQUIREMENTS

Compaction shall conform to Section 19-5, “Compaction” of the Standard Specifications, and these Special Provisions.

Unless otherwise shown on the drawings or otherwise described in the specifications for the particular type of pipe installed, relative compaction in pipe trenches shall be as follows:

a) Pipe Base: 90% relative compaction.
b) Pipe Zone: 95% relative compaction.
c) Backfill in Trench Zone: 95% relative compaction.
d) Backfill in Street Zone in Paved Areas or within Limits of Aggregate Base Roadways: 95% relative compaction
e) Refill for Foundation Stabilization: 95% relative compaction.
f) Refill for Overexcavation: 95% relative compaction.

Where compaction tests indicate a failure to meet the specified compaction, the Engineer will take additional tests every 50 feet in each direction until the extent of the failing area is identified. Rework the entire failed area until the specified compaction has been achieved at no expense to the County.

77-1.03B MATERIAL REPLACEMENT

Remove and replace any trenching and backfilling material which does not meet the specifications, at the Contractor's expense. Trenches must be protected during non-working hours.

77-1.03C SLOPING, SHEETING, SHORING AND BRACING OF TRENCHES

Trenches shall have sloping, sheeting, shoring, and bracing conforming to 29CFR Part 1926 Subpart P – Excavations, CAL/OSHA requirements, and the Project Specifications.

77-1.03D TRENCH WIDTHS

Trench widths in the pipe zone shall be as shown in the drawings. If no details are shown, the maximum width shall be 12 inches greater than the pipe outside diameter. Comply with 29CFR Part 1926 Subpart P – Excavations. Trench width at the top of the trench will not be limited except where width of excavation would undercut adjacent structures and footings. In such cases, width of trench shall be such that there is at least two feet between the top edge of the trench and the structure or footing.

77-1.03E TRENCH EXCAVATION

Excavate the trench to the lines and grades shown in the drawings with allowance for pipe thickness, sheeting and shoring if used, and for pipe base or special bedding. If the trench is excavated below the required grade, refill any part of the trench excavated below the grade at no additional cost to the County with foundation stabilization material. Place the refilling material over the full width of trench in compacted layers not exceeding 8-inches deep to the established grade with allowance for the pipe base or special bedding.

77-1.03F LOCATION OF EXCAVATED MATERIAL

During trench excavation, place the excavated material only within the working area. Do not obstruct any roadways or streets. Conform to federal, state, and local codes governing the safe loading of trenches with excavated material. All trenches shall be backfilled at the end of each day's operation.

Until permanent concrete paving can be replaced, the Contractor shall backfill the trench to grade and maintain the subgrade and surface in a condition that is suitable to support and safely carry traffic.

77-1.03G LENGTH OF OPEN TRENCH

At no time shall the length of open trench exceed 100 feet in advance of pipe laying or amount of pipe installed in one working day, whichever is less, and not more than 100 feet in the rear of pipe laying, except as modified by encroachment permit requirements.

For any section of trench that will be left unattended the Contractor shall:

1. Isolate the trench from unauthorized access with rigid barricades and/or temporary fencing and clearly mark and delineate it with warning signs, reflective cones, and warning lights.
2. If within the street right-of-way, plate the trench using trench plates and provide sheeting shoring and bracing to support the trench plates sufficient to carry H-20 traffic loads. Applicable state, county, and municipal traffic safety rules will govern installation and maintenance of trench plates.

77-1.03H FOUNDATION STABILIZATION

After the required excavation has been completed, the Engineer will inspect the exposed subgrade to determine the need for any additional excavation. It is the intent that additional excavation be conducted in all areas within the influence of the pipeline where unacceptable materials exist at the exposed subgrade. Overexcavation shall include the removal of all such unacceptable materials that exists directly beneath the pipeline to the required trench width and to the depth required. Backfill the trench to subgrade of pipe base with refill material for foundation stabilization. Place the foundation stabilization material over the full width of the trench. Refill used by the Contractor for convenience will not receive any additional payment.

77-1.03I INSTALLING BURIED PIPING

Backfill per the detailed piping specification for the particular type of pipe and per the following.

Handle pipe in such a manner as to avoid damage to the pipe. Do not drop or dump pipe into trenches under any circumstances.

Inspect each pipe or fitting prior to placing into the trench. Inspect the interior and exterior protective coatings. Patch damaged areas in the field with material recommended by the protective coating manufacturer. Clean ends of pipe thoroughly. Remove foreign matter and dirt from inside of pipe and keep clean during and after installation.

Grade the bottom of the trench to the line and grade to which the pipe is to be laid, with allowance for pipe thickness and bedding depth. Remove hard spots that would prevent a uniform thickness of bedding. Place the specified thickness pipe base material over the full width of trench. Grade the top of the pipe base ahead of the pipe laying operation to provide firm, continuous, uniform support along the full length of pipe, and compact to the relative compaction specified herein. After laying each section of the pipe, check the grade and alignment and correct any irregularities prior to laying next joint.

After pipe has been bedded, place pipe zone material simultaneously on both sides of the pipe keeping the level of backfill the same on each side. Carefully place the material around the pipe so that the pipe barrel is completely supported and that no voids or compacted areas are left beneath the pipe. Use particular care in placing material on the underside of pipe to prevent lateral movement during subsequent backfilling.

Push the backfill material carefully onto the backfill previously placed in the pipe zone. Do not permit free fall of the material until at least 2 feet of cover is provided over the top of the pipe. Do not drop sharp, heavy pieces of material directly onto the pipe or the material around the pipeline. Do not operate heavy equipment over the pipe until at least 3 feet of backfill has been placed and compacted over the pipe.

When pipe laying is not in progress, including the noon hours, close the open ends of pipe. Do not allow trench water, animals, or foreign material to enter the pipe.

Remove and dispose of all water entering the trench during the process of pipe laying. Keep the trench dry until the pipe laying and jointing are completed.

77-1.03J CEMENT SLURRY BACKFILL

Cement slurry backfill will be utilized, pipe shall be supported by continuous mounding imported backfill material. Pipe shall not be supported on wooden or concrete blocks.

77-1.04 PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing installation duct banks in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including furnishing all conduit, cement slurry backfill, conduit fixtures, conduit templates at equipment pads, and all other equipment and materials, shall be included in the contract unit prices for “Installation of Duct Banks” and no separate payment will be made therefore.

SECTION 79 RUB RAIL

79-1.01 GENERAL

Section 79-1 includes general specifications for installation of rub rails.

79-1.02 MATERIALS

Rub rails shall conform to the plans and these specifications.

Install rails and anchorage in conformance with the plans and manufacture's instructions.

Rub rails shall be installed after curb painting.

Rub rails shall be Polymer Industries Polyslick® or approved equal.

Rub rail anchorage shall be Hilti HAS-R Ø5/8" or approved equal.

Rub rail anchorage epoxy shall be Hilti HVU2 or approved equal.

79-1.03 PAYMENT

Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing installation of rub rails in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including furnishing all equipment and materials, shall be included in the contract unit prices for "Furnish and Install Rub Rail" and no separate payment will be made therefore.

SECTION 80 FENCES

Fence construction shall conform to Section 80, "Fences" of the Standard Specifications, these Special Provisions, and details shown on the plans.

If fencing is damaged during the course of work contractor will be responsible for replacement of damaged fencing to match existing.

All fences shall be replaced promptly with like material using new material and shall blend with the remaining existing fence as much as possible.

80-1.04 PAYMENT

No additional compensation will be made for replacement of damaged fencing.

DIVISION X ELECTRICAL WORK

SECTION 86 GENERAL

86-1.01 GENERAL

Conform to Attachment 1 Electrical Specifications and Electrical Plans, and these Special Provisions.

Owner Furnished Contractor Installed equipment:

1. 3x InductEV Wireless EV Charging 300kW Flush Mount Charger Systems
2. Ravenvolt Low Voltage Switchgear
    2.1. Switchgear will come equipped with circuit-breakers for one charger. Contractor will be responsible for furnishing and installing circuit-breakers and appurtenances there to for two additional chargers. See Attachment 4 for product data sheets. Circuit-

breakers and any other equipment needed for the two additional chargers shall be the same make and model as the equipment already installed in the switchgear or approved alternate.

Contractor will be responsible for transportation of all owner furnished equipment from the County storage area to the jobsite. Owner furnished equipment may be transported in multiple trips as needed. Access to the storage facility will need to be coordinated with the Engineer. Typical hours to access the storage facility are 7:30am to 3:00pm Monday-Thursday unless otherwise coordinated and approved by the Engineer.

Contractor will be responsible for furnishing and installing all other necessary materials and equipment.

86-1.03 CONSTRUCTION
Charger manufacture (InductEV) cables and hoses will be furnished by the owner and pulled through the conduits by the contractor.

The contractor is responsible for pulling all hoses and cables through the conduits per the manufacture's instructions.

Connections within the charger cabinets and to inductive charger plates will be made by InductEV field technician.

The contractor is responsible for installation and mounting of the charger cabinets and air conditioning units.

The contractor will be responsible for furnishing installing all 480V wiring to the charger cabinets.

InductEV will perform all commissioning of the charging cabinets and bus charging over pads.

The contractor is responsible for coordination with InductEV and the Engineer.

The contractor is responsible for coordination with third party electrical tester and the Engineer for any testing.

86-1.04 PAYMENT
Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing transportation of owner furnished equipment, installation of electrical equipment system, installation of ground rod system, Installation of pull box, and providing temporary power for system commissioning in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including furnishing all equipment and materials not furnished by owner, shall be included in the contract lump sum prices for "Furnish and Install Ground Rod System", "Furnish and Install Pull Box 48''x72''x42''", "Installation of Electrical Equipment System", and "Provide Temp Power For System Testing and Commissioning" and no separate payment will be made therefore.

DIVISION XI MATERIALS

SECTION 91 PAINT

91-1.01 GENERAL
Section 91-1 includes general specifications for furnishing paint used for highway construction.

91-1.02 MATERIALS
Paint containers must be:

1. New
2. Round
3. No more than 6 gallons in capacity
4. Standard full open head with bails
5. Nonreactive with contents
6. Equipped with compatible gaskets
7. Free of bungholes in the lids
8. Labeled with:
    8.1. State Specification number if described
    8.2. Manufacture's name, product number, and batch number
    8.3. Date and manufacture
    8.4. Precautions required by 8 CA Code of Regs §§ 1501-1756 and §§ 3200-3206 concerning the handling and application of paint

Paint must:

1. Be manufactured ready for application. Do not add materials such as thinners after manufacture.
2. Be homogenous and free of contaminants.
3. Be smooth. Settled pigment must be soft and easily dispersed before using.
4. Retain the properties that affect its application, adhesion, and curing for at least 1 year after the date of manufacture.

91-1.03 CONSTRUCTION
Paint curbs as shown in the plans and with colors as called out in the plans.

91-1.04 PAYMENT
Full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in performing curb painting in accordance with the plans, Standard Specifications, these Special Provisions and as directed by the Engineer including preparation, application of paint, masking, protection of paint, and any touchup activities, shall be included in the contract unit price for Curb Painting and no separate payment will be made therefore.

NOTICE TO BIDDERS:

THE FOLLOWING CONTRACT SECTION IS INCLUDED

AS A SAMPLE

FOR INFORMATION ONLY

AND IS NOT TO BE

COMPLETED WITH BID

COUNTY OF NEVADA
STATE OF CALIFORNIA

CONTRACT

FOR

Electric Bus Charging Project
Tinloy Street Transit Center

COUNTY PROJECT NO. 889830-10

March 11 , 2025

(Standard Public Works Contract)

COUNTY OF NEVADA
DEPARTMENT OF PUBLIC WORKS

PERFORMANCE BOND

(To Accompany Contract)

Bond No. _____

WHEREAS, the County of Nevada, acting by and through the Department of Public Works, has awarded to Contractor_____, hereafter designated as the "Contractor", a contract for the work described as follows:

Electric Bus Charging Project Tinloy Street Transit Center

AND WHEREAS, the Contractor is required to furnish a bond in connection with said contract, guaranteeing the faithful performance thereof:

NOW, THEREFORE, we the undersigned Contractor and Surety are held firmly bound to the County of Nevada in the sum of

_____dollars ($ _____), to be paid to said County or its certain attorney, its successors and assigns: for which payment, well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors or assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if the above bound Contractor, its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the foregoing contract and any alteration thereof made as therein provided, on his or their part to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning, and shall indemnify and save harmless the County of Nevada, its officers and agents, as therein stipulated, then this obligation shall become and be null and void; otherwise it shall be and remain in full force and virtue.

IN WITNESS WHEREOF, We have hereunto set our hands and seals on this _____ day of _____, 20___.

Contractor	Surety **(SEAL)**
By	By: Attorney-in-Fact
Name	Name
Title	For correspondence or claims relating to this bond, contact the surety at the following address and telephone number:

NOTE: Signatures of those executing for the surety must be properly acknowledged.

CERTIFICATE OF ACKNOWLEDGEMENT

State of California, County of Nevada

On this _____ day of _____ in the year 20 ___ before me_____,
personally appeared _____, personally
Attorney-in-fact
known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to this instrument as the attorney-in-fact of_____
and acknowledged to me that he/she subscribed the name of the said company thereto as surety, and his/her own name as attorney-in-fact.

(SEAL)

_____
Notary Public

COUNTY OF NEVADA
DEPARTMENT OF PUBLIC WORKS

PAYMENT BOND

(Section 3247, Civil Code)

WHEREAS, The County of Nevada, acting by and through the Department of Public Works, hereafter referred to as "Obligee", has awarded to Contractor_____, hereafter designated as the "Contractor", a contract for the work described as follows:

Electric Bus Charging Project Tinloy Street Transit Center

AND WHEREAS, said Contractor is required to furnish a bond in connection with said contract, to secure the payment of claims of laborers, mechanics, materialmen and other persons as provided by law.

NOW, THEREFORE, we the undersigned Contractor and Surety are bound unto the Obligee in the sum of _____ dollars ($ _____), for which payment, we bind ourselves, jointly and severally.

THE CONDITION OF THIS OBLIGATION IS SUCH,

That if said Contractor or its subcontractors shall fail to pay any of the persons named in Civil Code Section 3181, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by such claimant, or any amounts required to be deducted, withheld, and paid over to the Franchise Tax Board for the wages of employees of the Contractor and his subcontractors pursuant to Section 18806 of the Revenue and Taxation Code, with respect to such work and labor, that the surety herein will pay for the same in an amount not exceeding the sum specified in this bond, otherwise the above obligation shall be void. In case suit is brought upon this bond, the surety will pay a reasonable attorney's fee to be fixed by the court.

This bond shall inure to the benefit of any of the persons named in Civil Code Section 3181 as to give a right of action to such persons or their assigns in any suit brought upon this bond.

Dated: _____, 20 ____

Contractor	Surety **(SEAL)**
By	By: Attorney-in-Fact
Name	Name
Title	For correspondence or claims relating to this bond, contact the surety at the following address and telephone number:

NOTE: Signatures of those executing for the surety must be properly acknowledged.

CERTIFICATE OF ACKNOWLEDGEMENT

State of California, County of Nevada

On this _____ day of _____ in the year 20 ___ before me_____,
personally appeared _____, personally
Attorney-in-fact
known to me (or proved to me on the basis of satisfactory evidence) to be the person whose name is subscribed to this instrument as the attorney-in-fact of_____
and acknowledged to me that he/she subscribed the name of the said company thereto as surety, and his/her own name as attorney-in-fact.

(SEAL)

_____
Notary Public

COUNTY OF NEVADA
STATE OF CALIFORNIA

CONTRACT

THIS CONTRACT, made this __ day of _____by and between the COUNTY OF NEVADA, hereinafter referred to as County and_____, hereinafter referred to as Contractor.

WITNESSETH: That the County and Contractor, for the consideration hereinafter mentioned, agree as follows:

ARTICLE I: DEFINITIONS

Wherever used in these general conditions or in the other contract documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

Act of God
"Act of God" means an earthquake or flood, or other cataclysmic phenomenon of nature. A rain, windstorm, high water or other natural phenomenon of unusual intensity for the specific locality of the work, which might reasonably have been anticipated from historical records of the general locality of the work, shall not be construed as an Act of God.

Addenda
Written or graphic instruments issued prior to the opening of bids which clarify, correct or change the bidding documents.

Application for Payment
The form accepted by County which is to be used by Contractor in requesting progress or final payments and which is to include such supporting documentation as is required by the contract documents.

Calendar Days
Consecutive days of the month including Saturdays, Sundays and holidays. A calendar day shall be the 24 hours running from midnight to the next midnight.

Change Order
A document, which is signed by Contractor and County and authorizes an addition, deletion or revision in the work, or an adjustment in the contract price or the contract time, issued on or after the effective date of the contract.

Contract Documents
The written agreement covering the performance of the work and the furnishing of labor, materials and equipment in construction of the work. The agreement shall be construed to include the

1. Invitation to Bid
2. Instructions to Bidders
3. Contractor's Bid (including documentation accompanying the Bid and any post-bid documentation submitted prior to the Notice of Award
4. Contract
5. Addenda which pertain to the Contract
6. The Bonds
7. Any supplementary conditions or any and all written agreements amending or extending the work, time or price contemplated
8. The Plans and Specifications and Drawings as identified in the Contract
9. Certificates of Insurance
10. Other:_____

Contract Price
Either the total lump sum bid of the Contractor or the total of the unit price bids of the Contractor extended based upon the estimated quantities set forth in the bid, or combinations thereof, plus or minus any adjustments made in accordance with the contract.

Contractor
The person or persons, co-partnership, joint venturers or corporation who have entered into a contract with County as party or parties of the second part and/or their legal representatives.

Contractor's Plant and Equipment
Everything, except labor, brought onto the site by the Contractor in order to carry out the work, but not to be incorporated in the work.

County
The County of Nevada and any person or persons to whom the power belonging to County shall be duly designated including but not limited to an engineer or architect. Only those persons designated in writing by the County Administrator or Director of the department overseeing the project shall have authority to act on behalf of County.

Day
A calendar day of 24 hours, except when preceded by "working", as defined below.

Defective
An adjective which when modifying the word "work" refers to work that is unsatisfactory, faulty or deficient, or does not conform to the contract documents, or does not meet the requirements of any inspection, reference standard, test or approval referred to in the contract documents, or has been damaged (unless responsibility for the protection thereof has been assumed by County).

Directed
"Directed", "designated", "permitted", "required", "accepted", and words of like import, wherever and in whatever manner used means as directed, designated, permitted, required, and accepted by County.

Director
"Director" shall mean the Director of the department overseeing the project.

Drawings
The drawings which show the character and scope of the work to be performed and which have been prepared or approved by County and are referred to in the contract documents.

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

Engineer
The person specifically designated in writing by County to function as staff adviser and/or consultant to County on engineering matters relating to this contract. Only those persons designated by County, in writing, shall have authority to act for County in the administration of this contract. Said written designation shall be signed by the County Administrator or Director of the department overseeing the project.

Equal
A device, material, equipment, technique or method that conforms to the intent of that specified or indicated on the Drawing.

Field Order
A written order issued by County which orders minor changes in the work but which does not involve a change in the contract price or the contract time.

Final Acceptance, Date of
The date when all final punch list items are corrected, the final inspection has been completed and when the governing body and/or funding agency formally accepts the project as complete. This date will be used to establish the start date of the one-year warranty period for the contract.

Laboratory
The designated testing laboratory authorized by County to test materials and work involved in the contract.

Lien
Any claim by a person entitled to file a stop notice pursuant to the provisions of California Civil Code Sections 3179, et seq.

Notice of Award
The written notice by County to the apparent successful bidder stating that upon compliance by the apparent successful bidder with the conditions precedent enumerated therein, within the time specified, County will sign and deliver the Contract.

Notice to Proceed
A written notice given by County to Contractor fixing the date on which the contract time will commence to run and on which Contractor shall start to perform Contractor's obligations under the Contract Documents.

Partial Completion
Placing a portion of the work in service for the purpose for which it is intended (or a related purpose) before reaching completion of all the work.

Person
Includes firms, companies and corporations.

Project
The total construction which is required by the Contract Documents which may be all of the work or a part as indicated in the Contract Documents.

Schedule of Values
A list of divisions of the total scope of work under the contract made by the Contractor and approved by the County for purposes of progress payments.

Shall
"Shall" or "will", whenever used, is mandatory.

Shop Drawings
All drawings, diagrams, illustrations, schedules and other data which are specifically prepared by or for Contractor to illustrate some portion of the work and all product data illustrations, brochures, standard schedules, performance charts, instructions, diagrams, samples, and other information prepared by a supplier and submitted by Contractor to illustrate material or equipment for some portion of the work.

Special Provisions
Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, construction systems, standards and workmanship as applied to the work and certain administrative details applicable thereto.

Standard Specifications
Specifications which are authored and authorized by a particular industry or agency which may be incorporated by reference. Where so incorporated, they are incorporated for use of technical data and specifications only. If there is a conflict between the standard specifications and express terms of this contract, the provisions set forth in the contract shall prevail.

Subcontractor
An individual, firm or corporation having a direct contract with Contractor or with any other subcontractor for the performance of a part of the work at the site.

Substitute
A device, material, equipment, technique or method of construction that differs from that intended or indicated on the Drawings.

Sufficient:
"Sufficient", "necessary", "proper", "acceptable", "satisfactory", "desirable", and words of like import, wherever and in whatever manner used, with or without reference to the County, means sufficient, necessary, proper, acceptable, satisfactory and desirable in the judgment of the County.

Supplementary Conditions
An addition to the Contract Documents which supplements the main Contract.

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

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

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

Working Day
A working day is any day except Saturdays, Sundays, or legal holidays and days on which the Contractor is specifically required by Special Provisions, by any labor contract, or by law, to suspend construction operations. Also excepted is any day on which the Contractor is prevented by inclement weather conditions resulting therefrom, or other phenomena of nature from proceeding with at least seventy-five percent (75%) of the normal labor and equipment force for at least five (5) hours toward completion of the current controlling item on the accepted project schedule. Should the conditions prevent the work from beginning at the usual starting time, or prevent the Contractor from proceeding with seventy-five percent (75%) of the normal labor and equipment force for a period of at least five (5) hours, and the crew is dismissed as a result thereof, Contractor will not be charged for a working day whether or not conditions change so that the major portion of the day could be considered to be suitable for work on the controlling item.

ARTICLE II: SCOPE OF WORK

Contractor, at Contractor's own proper costs and expense, shall do all the work and furnish all the materials necessary to construct and/or reconstruct and complete in good workmanlike and substantial manner and to the satisfaction of the County, the following: **Electric Bus Charging Project Tinloy Street Transit Center,** which shall be constructed in accordance with this Contract, the Invitation to Bid, the Instructions to Bidders, the Plans and Specifications and Drawings, and all other contract documents attached hereto and which are incorporated herein by reference and made a part of this Contract as if set forth in full.

ARTICLE III: CONTRACT TIME

Contractor will start work to be performed under this Contract within **7 days** after the Contractor is instructed in writing by County to proceed with the work. Said work shall be diligently prosecuted to completion. **Electric Bus Charging Project Tinloy Street Transit Center work shall be completed and ready for acceptance within 55 working days from the date of issuance of the Notice to Proceed.** When any period of time is referred to in the contract documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

ARTICLE IV: CHANGE OF CONTRACT TIME

Change by Change Order

The contract time may only be changed by change order. A request for an extension or shortening of the contract time shall be based on written notice delivered by the party making the request to County promptly after the occurrence of the event giving rise to the request and stating the general nature of the request. Notice of the extent of the request with supporting data shall be delivered to County and shall be accompanied by the written statement that the adjustment requested is the entire adjustment to which the requesting party has reason to believe it is entitled as a result of the occurrence of said event. No request for an adjustment in the contract time will be valid if not submitted in accordance with the requirements of this paragraph.

Contract Time May Be Extended

The contract time will be extended in an amount equal to time lost due to delays beyond the control of Contractor if the request is made therefor as provided in this Article. Such delays shall include, but not be limited to, acts of neglect by County or others performing additional work, or to fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God.

Delay and Price Change

All time limits stated in the contract documents are of the essence. There shall be no adjustment of contract price due to delays which are not caused by the County, including but not limited to delays for fires, floods, labor disputes, epidemics, abnormal weather conditions or acts of God and the acts of any other person or entity. The provisions of this Article shall not exclude recovery for damages for delay which is caused by the County.

Delays in Completion of the Work

1. **Notice of Delays**
   Whenever the Contractor foresees any delay in the prosecution of the work, and in any event immediately upon the occurrence of any delay which the Contractor regards as unavoidable, Contractor shall notify County in writing of the probability of the occurrence of such delay and its cause in order that County may take immediate steps to prevent, if possible, the occurrence or continuance of the delay or, if this cannot be done, may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work are to be delayed thereby. It will be assumed that any and all delays which have occurred in the prosecution and completion of the work have been avoidable delays, except such delays as shall have been called to the attention of County at the time of their occurrence and found by County to have been unavoidable. The Contractor shall make no requests for extensions of time as to delay not called to the attention of County at the time of its occurrence.

2. **Avoidable Delays**
   Avoidable delays in the prosecution or completion of the work shall include all delays which in the opinion of County would have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or Contractor's subcontractors.

3. **Unavoidable Delays**
   Unavoidable delays in the prosecution or completion of the work shall include all delays which, in the opinion of County, result from causes beyond the control of the Contractor and which

could not have been avoided by the exercise of care, prudence, foresight and diligence on the part of the Contractor or the subcontractors and/or any suppliers. Delay in completion due to contract modifications ordered by County and unforeseeable delays in the completion of work or interference by other contractors employed by County will be considered unavoidable delays insofar as they interfere with the Contractor's completion of the work.

Extension of Time

1. **Avoidable Delays**
   In case the work is not completed in the time specified, including such extensions of time as may have been granted for unavoidable delays, the Contractor will be assessed damages for delay in accordance with the liquidated damages provision. The County, however, shall have the right to grant an extension of time for avoidable delay if it is deemed in County's best interest to do so. During such extension of time, the Contractor will be charged for engineering and inspection services and other costs but will not be assessed damages for the delay.

2. **Unavoidable Delays**
   For delays which County considers to be unavoidable, the Contractor shall, pursuant to Contractor's application, be allowed an extension of time beyond the time herein set forth, proportional to such delay or delays, in which to complete the contract. During such extension of time, neither extra compensation for engineering and inspection provided nor damages for delay will be charged to the Contractor.

Liquidated Damages

County and Contractor recognize that time is of the essence and that County will suffer financial loss if the work is not completed within the time specified above, plus any extensions thereof allowed in accordance with this contract. They also recognize the delays, expense and difficulties involved in proving the actual loss suffered by County if the work is not completed on time. Accordingly, instead of requiring any such proof, and due to impracticality and difficulty of ascertaining exact damages caused by delay, County and Contractor agree that as liquidated damages for delay (but not as a penalty) the Contractor shall pay the County of Nevada the sum of **$3,600.00** per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above. Such damages shall only be payable by Contractor to County if the delay is a result of the failure of Contractor to timely perform on its part and not occasioned by the County or any State or Federal agency. In case of joint responsibility for delay in the final completion of the work, where two or more separate contracts are in force at the same time and cover work at the same site, liquidated damages assessed against any one Contractor will be based upon the individual responsibility of that Contractor for the delay as determined by, and in the judgment of, County. County shall have the right to deduct the liquidated damages from any money in its hands, otherwise due, or to become due, to Contractor, or to sue for and recover compensation for damages for nonperformance of this contract within the time stipulated. It is acknowledged that the subject contract is a public project which is subject to the provisions of the Public Contracts Code. Accordingly, County has determined and the Contractor acknowledges that the liquidated damages as established herein are governed by the provisions of Government Code Section 53069.85 and are predicated upon the reasonable damages accruing to County stemming from any delay in the completion of this project.

ARTICLE V: CONTRACT PRICE

County shall pay Contractor for performance of the work in accordance with the Contract Documents in current funds as follows:_____Dollars ($_____)

ARTICLE VI: CHANGE OF CONTRACT PRICE

Contract Price

The contract price constitutes the total compensation (subject to authorized adjustments) payable to Contractor for performing the work. All duties, responsibilities and obligations assigned to or undertaken by Contractor shall be at Contractor's expense without change in the contract price.

Change by Change Order

The contract price may only be changed by a written change order. Any request for an increase or decrease in the contract price shall be based on written notice delivered by the party making the request to the other party prior to the commencement of any extra work. Said request shall state the exact nature of the request.

Data regarding any change shall be delivered by Contractor prior to commencing extra work and shall be accompanied by Contractor's written statement that the amount requested covers all amounts (direct, indirect and consequential) to which the Contractor is entitled as a result of the extra work to be done. If said request is granted, County will issue a written change order therefor. No request for an adjustment in the contract price will be valid if not submitted in advance and in accordance with this paragraph.

Determination of Change in Contract Price

The value of any work covered by a change order or of any request for an increase or decrease in the contract price shall be determined in one of the following ways:

1. Where the work involved is covered by unit prices contained in the contract documents, by application of unit prices to the quantities of the items involved (subject to the provisions regarding unit price work set forth below).

2. By mutual agreement, and if there is no mutual agreement, No. 3 directly below shall apply.

3. On the basis of the cost of the work determined as provided below plus a Contractor's fee for overhead and profit as provided below.

Cost of the Work

The term "cost of the work" means the sum of all costs necessarily incurred and paid by Contractor in the proper performance of the extra work required or permitted under a change order. Except as otherwise may be agreed to in writing by County, such costs shall be in amounts no higher than those prevailing in the locality of the project 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 County and Contractor. 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 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, sick leave, vacation and holiday pay applicable thereto. Such employees shall include superintendents and foremen at the site. The expenses of performing work after regular working hours, on Saturday, Sunday or legal holidays, shall be included in the above to the extent authorized by County in writing.

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 County deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to County. All trade discounts, rebates and refunds and all returns from sale of surplus materials and equipment shall accrue to County, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to the subcontractors for work performed by subcontractors. If required by County, Contractor shall obtain competitive bids from subcontractors acceptable to Contractor and shall deliver such bids to County who will then determine which bids will be accepted. If a 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 shall be determined in the same manner as Contractor's cost of the work. All subcontracts shall be subject to the other provisions of the contract documents insofar as applicable.

4. Costs of special consultants (including engineers, architects, testing laboratories, surveyors, and accountants) employed for services specifically, and only, 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 County, and the costs of transportation, loading, unloading, installation, dismantling and removal thereof, all in accordance with 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 or similar taxes related to the work, and for which Contractor is liable, 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), not compensated by insurance or otherwise, to the work or otherwise sustained by contractor in connection with the performance and furnishing of the work (except losses and damages within the deductible amounts of property insurance established by County), provided they 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 County. No such losses, damages and expenses shall be included in the cost of the work for the purpose of determining Contractor's fee. If, however, any such loss or damage requires reconstruction and Contractor is placed in charge thereof, Contractor shall be paid for services a fee proportionate to that stated below under Contractor's fee.

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

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, expressage and similar petty cash items in connection with the work.

i. Cost of premiums for additional bonds and insurance required because of changes in the work and premiums for property insurance coverage within the limits of the deductible amounts established by County in this contract.

Not Included in Cost of the Work
The term "cost of the work" shall not include any of the following:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnership and sole proprietorships), general managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks and other personnel employed by Contractor whether at the site or in Contractor's principal or a branch office for general administration of the work and not specifically included in the agreed upon schedule of job classifications referred to in this contract or specifically covered above under costs of special consultants, all of which are to be considered administrative costs covered by the Contractor's fee.

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

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

4. Cost of premiums for all bonds and for all insurance whether or not Contractor is required by the contract documents to purchase and maintain the same (except for the cost of premiums specifically covered above).

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

6. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included herein.

Contractor's Fee
The Contractor's fee allowed to Contractor for overhead and profit shall be determined by a fee based on the following percentages of the various portions of the cost of the work:

a. For all allowable costs of the work incurred under the paragraphs dealing with payrolled employees and costs of materials and equipment, the Contractor's fee shall be fifteen percent;

b. For all allowable costs of the work incurred under the paragraph dealing with work done by subcontractors, the Contractor's fee shall be five percent; and if a subcontract is on the basis of cost of the work plus a fee, the maximum allowable to Contractor on account of overhead and profit of all subcontractors shall be fifteen percent, for a total add-on of twenty percent.

c. No fee shall be payable on the basis of costs itemized under paragraphs dealing with special consultants, supplemental costs and/or costs not included in cost of the work.

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

e. 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 2(a) through 2(d) above.

Cost Breakdown
Whenever the cost of any work is to be determined as set forth herein, Contractor will submit, in form acceptable to County, an itemized cost breakdown together with supporting data.

Cash Allowances
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 done by such subcontractors or suppliers and for such sums within the limit of the allowances as may be acceptable to County. Contractor agrees that:

1. The allowances include the cost to the 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 cost for unloading and handling on the site, labor, installation costs, overhead, profit and other expenses contemplated for the allowances have been included in the contract price and not in the allowances. No demand for additional payment on account of any thereof will be valid.

Prior to final payment, an appropriate change order will be issued to reflect actual amounts due Contractor on account of work covered by allowances, and the contract price shall be correspondingly adjusted.

Unit Price Work
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 established unit prices for each separately identified item of unit price work times the estimated

quantity of each item as indicated in the contract documents. The estimated quantities of items of unit price work are not guaranteed and are solely for the purpose of comparison of bids and determining an initial contract price. Determinations of the actual quantities and classifications of unit price work performed by Contractor will be made by County. 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. Except for items shown on the bid sheet or in the specifications as "contingency" items where no additional amounts will be allowable, where the quantity of any item of unit price work performed by Contractor differs more than 25 percent from the estimated quantity of such item indicated in the contract documents and there is no corresponding adjustment with respect to any other item of work, and if either party believes that it has incurred additional expense or reduced cost as a result thereof, either party may make a claim for an increase or decrease in the contract price if the parties are unable to agree as to the amount of any such increase or decrease.

Final Pay Quantities
When the estimated quantities for a specific portion of the work are designated on the plans as final pay quantities, said estimated quantities shall be the final quantities for which payment for such specific portion of the work will be made, unless the dimensions of said portions of the work shown on the plans are revised by the Engineer. If such dimensions are revised, and such revisions result in an increase or decrease in the quantities of such work, the final quantities for payment will be revised in the amount represented by the changes in the dimensions. The estimated quantities for such specific portion of the work shall be considered as approximate only and no guarantee is made that the quantities which can be determined by computations, based on the details and dimensions shown on the plans, will equal the estimated quantities. No allowance will be made in the event that the quantities based on computations do not equal the estimated quantities.

When portions of an item have been designated on the plans as final pay quantities, portions not so designated will be measured and paid for in accordance with the applicable provisions of the Standard Specifications and Special Provisions.

In case of a discrepancy between the quantities shown on the plans as final pay quantities and the quantity of the same item shown in the Engineer's Estimate, payment will be based on the final pay quantities shown on the plans.

ARTICLE VII: PAYMENTS TO CONTRACTOR

Schedule of Values
The schedule of values established for the work will serve as the basis for progress payments and will be incorporated into a form of application for payment acceptable to County. Progress payments on account of unit price work will be based on the number of units completed.

Invoices
Invoices or applications for payment to the County shall be detailed and shall contain full documentation of all work performed and all reimbursable expenses incurred. Where the scope of work on the contract is divided into various tasks, invoices shall detail the related expenditures accordingly. Labor expenditures need documentation to support time, subsistence, travel and field expenses. No expense will be reimbursed without adequate documentation. This documentation will include, but not be limited to, receipts for material purchases, rental equipment and subcontractor work.

Progress Payment
Once each month County shall cause an estimate to be made covering the work completed as of the date of the estimate. No materials shall be paid for until incorporated into the work. If, however, County reaches an agreement with Contractor to pay for materials and equipment not yet incorporated into the work due to some special circumstances, then Contractor must show that the materials or equipment were delivered and are suitably stored at the site or at another location agreed to in writing. In that event, the payment shall be based on a bill of sale, invoice or other documentation submitted by Contractor and warranting that County has received the materials and

equipment free and clear of all liens, charges, security interests and encumbrances (which are hereinafter referred to as "liens") and evidence that the materials and equipment are covered by appropriate property insurance and other arrangements to protect County's interest therein, all of which will be satisfactory to County. The amount of retention with respect to progress payments will be five percent (5%).

Amounts of Progress Payments
Prior to completion, progress payments will be in an amount equal to:

1. Ninety five percent (95%) of the work completed, and

2. Where applicable pursuant to the above, ninety percent (90%) of materials and equipment not incorporated in the work but delivered and suitably stored, less in each case the aggregate of payments previously made.

3. Thirty-five days after recording of the Notice of Completion but not later than 60 days after completion of the work as defined in Public Contract Code Section 7107, and upon Contractor providing all required documentation, County will pay an amount sufficient to increase total payments to Contractor to one hundred percent (100%) of the contract price, less such amounts as County shall determine in accordance with this contract. County reserves the right to retain such funds as it shall determine in accordance with the contract documents to complete the work.

4. The Contractor may elect to receive 100% of payments due under this contract from time to time, without retention of any portion of the payment by the public agency, by depositing securities of equivalent value with County in accordance with the provisions of Section 22300 of the California Public Contract Code; except that no such substitution shall be allowed where federal money is funding the project and federal regulations or policies would prohibit such substitution of securities for the retention. Securities eligible for investment shall include those listed in Section 16430 of the California Government Code, or bank or savings and loan certificates of deposits. Such securities, if deposited by the bidder, shall be valued by County whose decision on the valuation of the securities shall be final. The bidder shall be the beneficial owner of any securities substituted for money withheld and shall receive any interest thereon.

Contractor's Warranty of Title
Contractor warrants and guarantees that title to all work, materials and equipment covered by any application for payment, whether incorporated in the project or not, will pass to County no later than the time of payment free and clear of all liens.

Payment of Progress Payment
County will submit each progress pay estimate to Contractor. Upon receipt back from Contractor of a signed copy of the pay estimate, County shall process the pay estimate for payment. The amount approved by County will become due thirty (30) days after receipt of the signed progress pay estimate. Said payment shall be made by County to Contractor unless County has knowledge of claims or liens filed in connection with the work.

Pursuant to Public Contract Code Section 20104.50, if the County fails to make any progress payment within thirty (30) days after receipt of an undisputed and properly submitted payment request it shall pay interest to Contractor at the legal rate set forth in subdivision (a) of Section 685.010 of the Code of Civil Procedure. "Progress payment" for purposes of this paragraph includes all payments due Contractor except that portion of the final payment designated by the contract as retention earnings.

Also, pursuant to Public Contract Code Section 20104.50, each payment request shall be reviewed by County as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request. Any payment request determined not to be a proper payment request suitable for payment shall be returned to Contractor as soon as practicable, but not later than seven (7) days after receipt. A request returned pursuant to this paragraph shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper. The number of days available to County to make a payment without incurring interest

pursuant to Public Contract Code Section 20l04.50 shall be reduced by the number of days by which County exceeds the seven (7) day return requirement. A payment request shall be considered properly executed if funds are available for payment of the payment request, and payment is not delayed due to an audit inquiry by the financial officer of the County.

County's Recommendation of Payment
By County's recommending any payment, Contractor cannot conclude that County represents that exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the work in the contract documents or that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by County or County to withhold payment to Contractor.

County May Refuse to Make Payment
County may refuse to make payment of the full amount or any part if, in County's opinion, it would be incorrect to make such payment. County may also refuse to make any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, nullify any such payment previously recommended, to such extent as may be necessary in County's opinion to protect County from loss because:

1. The work is defective, or completed work has been damaged requiring correction or replacement,
2. The contract price has been reduced by written amendment or change order,
3. Contractor has been required to correct defective work or complete work, or
4. Of County's actual knowledge of the occurrence of any of the events enumerated in paragraphs relating to suspension of work and termination.

County may refuse to make payment of the full amount because claims have been made against County on account of Contractor's performance or furnishing of the work or liens have been filed in connection with the work or there are other items entitling County to a set-off against the amount recommended, but County must give Contractor immediate written notice stating the reasons for such action.

Completion and Final Inspection
When Contractor considers the entire work ready for its intended use, Contractor shall notify County in writing that the entire work is completed. Within a reasonable time thereafter, County and Contractor shall make an inspection of the work to determine the status of completion. If County does not consider the work complete, County will notify Contractor in writing giving the reasons therefor. If County considers the work incomplete, County will prepare and deliver a list of items to be completed or corrected before final payment. Contractor shall immediately take such measures as are necessary to complete or correct the listed items.

Acceptance and Final Application for Payment
After Contractor has completed all such measures to remedy deficiencies to the satisfaction of County and delivered all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, marked-up record documents, property owner's releases and other documents, all as required by the contract documents, and after County has indicated that the work is acceptable, Contractor may make application for final payment. The final application for payment shall be accompanied by all documentation called for in the contract documents, together with complete and legally effective receipts, releases or waivers (satisfactory to County) from all subcontractors or material suppliers and an affidavit of Contractor that the releases and receipts include all labor, services, material and equipment for which a lien could be filed, and that all payrolls, material and equipment bills, and other indebtedness connected with the work for which County or County's property might in any way be responsible, have been paid or otherwise satisfied; and consent of the surety, if any, to final payment. If any subcontractor or supplier fails to furnish a release or receipt in full, or if a stop notice has been filed, Contractor may furnish a bond or other collateral satisfactory to County to indemnify County against any lien.

Final Payment
If, on the basis of County's review of the final application for payment and accompanying documentation, all as required by the contract documents, County is satisfied that Contractor's obligations under the contract documents have been fulfilled, County will, within seven (7) days after receipt of the final application for payment, process the application for payment. Otherwise, County will return the application to Contractor, indicating in writing the reasons for refusing to make final payment, in which case Contractor shall make the necessary corrections and resubmit the application. Thirty-five days after presentation to County of the application and accompanying documentation, in appropriate form and substance, but no later than 60 days after completion of the project as defined in Public Contract Code Section 7107, or thirty-five (35) days after recording of a Notice of Completion, whichever date is later, the full retention will become due and will be paid by County to Contractor.

Delay in Completion Through No Fault of Contractor
If, through no fault of Contractor, final completion of the work is significantly delayed and if County so confirms, County shall, upon receipt of Contractor's final application for payment, and without terminating the Contract, make payment of the balance due for that portion of the work fully completed and accepted. If the remaining balance to be held by County for work not fully completed or corrected is less than the retainage stipulated in the contract, and if the appropriate bonds have been furnished, the written consent of the surety to the payment of the balance due for that portion of the work fully completed and accepted shall be submitted by Contractor to County with the application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

Contractor's Continuing Obligation
Contractor's obligation to perform and complete the work in accordance with the contract documents shall be absolute. Neither the issuance of a certificate of substantial completion, nor any payment by County to Contractor under the contract documents, nor any use or occupancy of the work or any part thereof by County, nor any act of acceptance by County nor any failure to do so, nor any review and approval of a shop drawing or sample submission, nor the issuance of a notice of acceptability, nor any correction of defective work by County will constitute an acceptance of work not in accordance with the contract documents or a release of Contractor's obligation to perform the work in accordance with the contract documents.

Waiver of Claims
The making and acceptance of final payment will constitute:

1. A waiver of all claims by County against Contractor, except claims arising from unsettled liens, or from defective work appearing after final inspection or from failure to comply with the contract documents or the terms of any special guarantees specified therein, or from any outstanding claims; however, it will not constitute a waiver by County of any rights in respect of Contractor's continuing obligations under the contract documents; and

2. A waiver of all claims by Contractor against County other than those previously made in writing and still unsettled.

Books of Account and Audit Provision
Contractor shall maintain on a current basis complete books and records relating to this contract. Such records shall include, but not be limited to, documents supporting all bids, all income and all expenditures. The books and records shall be original entry books with a general ledger itemizing all debits and credits for the work on this contract. In addition, Contractor shall maintain detailed payroll records including all subsistence, travel and field expenses, and canceled checks, receipts and invoices for all items. These documents and records shall be retained for at least five years from the completion of this contract. Contractor will permit County to audit all books, accounts or records relating to this contract or all books, accounts or records of any business entities controlled by Contractor who participated in this contract in any way. Any audit may be conducted on Contractor's premises or, at County's option, Contractor shall provide all books and records within a maximum of fifteen (15) days upon receipt of written notice from County. Contractor shall refund

any moneys erroneously charged. If County ascertains that it has been billed erroneously by Contractor for an amount equaling 5% or more of the original bid, Contractor shall be liable for the costs of the audit in addition to any other penalty to be imposed.

ARTICLE VIII: PRELIMINARY MATTERS

Delivery of Certificates of Insurance
Before any work at the site is started, Contractor shall deliver to County certificates (and other evidence of insurance requested by County) which Contractor is required to purchase and maintain in accordance with the insurance provisions herein.

Delivery of Bonds
When Contractor delivers the executed Agreements to County, Contractor shall also deliver to County the bonds required herein. Notwithstanding the language in bonds authorizing attorneys' fees to be awarded if suit is brought upon the bond, no attorneys' fees shall be payable for any other suit brought under this contract.

Pre-construction Conference
Within **7 days** after receipt of the notice to proceed, but before contractor starts the work at the site, a conference attended by Contractor and County and others as appropriate will be held to discuss schedules, procedures for handling shop drawings and other submittals and for processing applications for payment, and to establish a working understanding among the parties as to the work.

Delivery of Schedules
Within **5 days** after receipt of written notice to proceed, Contractor shall submit to County for review:

1. An estimated progress schedule indicating the starting and completion dates of the various stages of the work;
2. A preliminary schedule of shop drawing submissions;
3. A preliminary schedule of product deliveries;
4. A preliminary schedule of values for all of the work which will include quantities and prices of items aggregating the contract price and will subdivide the work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of work which will be confirmed in writing by Contractor at the time of submission.

Finalizing Schedules
At least ten days before submission of the first application for payment a conference attended by Contractor, County and others as appropriate will be held to finalize schedules. The finalized progress schedule will be acceptable to County as providing an orderly progression of the work to completion within the contract time, but such acceptance will neither impose on County responsibility for the progress or scheduling of the work nor relieve Contractor from full responsibility therefor. The finalized schedule of shop drawing submissions will be acceptable to County as providing a workable arrangement for processing the submissions. The finalized schedule of values will be acceptable to County as to form and substance.

Before Starting Construction
Contractor shall provide County with at least 72 hours written notice of the date on which it intends to commence work. Before undertaking each and every part of the work, Contractor shall carefully study and compare the contract documents and check and verify pertinent figures shown thereon and all applicable field measurements. Contractor shall promptly report in writing to County any conflict, error or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from County before proceeding with any work affected thereby; however, Contractor shall not be liable to County for failure to report any conflict, error or discrepancy in the contract documents, unless Contractor had actual knowledge thereof or should reasonably have known thereof.

Contractor's Representations
In order to induce County to enter into this agreement, Contractor makes the following representations:

1. Contractor has familiarized himself or herself with the nature and extent of the contract documents, work, locality, and with all local conditions and federal, state and local laws, ordinances, rules and regulations that in any manner may affect cost, progress or performance of the work.
2. Contractor has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress or performance of the work which were relied upon by County in the preparation of the drawings and specifications and which have been identified in the contract documents.
3. Contractor has made or caused to be made examinations, investigations, and tests and studies of such reports and related data necessary for the performance of the work at the contract price, within the contract time and in accordance with the other terms and conditions of the contract documents; and no additional examinations, investigations, tests, reports or similar data are or will be required by Contractor for such purposes.
4. Contractor has correlated the results of all such observations, examinations, investigations, tests, reports and data with the terms and conditions of the contract documents.
5. Contractor has given County written notice of all conflicts, errors or discrepancies that have been discovered in the contract documents and the written resolution thereof by County is acceptable to Contractor.

ARTICLE IX: CHANGES IN THE WORK

County May Order Changes
Without invalidating this contract and without notice to any surety, County may, at any time or from time to time, order additions, deletions or revisions in the work; these will be authorized by change order. Upon receipt of any such document, Contractor shall promptly forward any request for change in the contract price and, if instructed to do so, proceed with the work involved which will be performed under the applicable conditions of the contract documents (except as otherwise specifically provided).

Failure to Agree to a Price or Time Change; Claims
If County and Contractor are unable to agree as to the extent, if any, of an increase or decrease in the contract price or an extension or shortening of the contract time that should be allowed, a claim may be made therefor but the work shall proceed if County so instructs.

No Change in Time or Price for Work Not Required
Contractor shall not be entitled to an increase in the contract price or an extension of the contract time with respect to any work performed that is not required by the contract documents as amended, modified and supplemented except in the case of an emergency as set forth herein and except in the case of uncovering work for inspection or testing as set forth in this contract.

Changes in Time or Price
County and Contractor shall execute appropriate change orders (or written amendments) covering:

1. Changes in the work which are ordered by County or are agreed to by the parties;
2. Changes in the contract price or contract time which are agreed to by the parties; and
3. Changes in the contract price or contract time which embody the substance of any written decision rendered by County in response to a request therefor.

Notice to Sureties
If notice 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 time) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility,

and the amount of each applicable bond will be adjusted accordingly. Failure to give such notice shall not release the surety from its obligations to County.

ARTICLE X: CONTRACT DOCUMENTS

Intent
The contract documents comprise the entire agreement between County and Contractor concerning the work. The contract documents are complementary; what is called for by one is as binding as if called for by all. The contract documents will be construed in accordance with California law.

Contract Interpretation
It is the intent of the contract documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the contract documents. Any work, materials or equipment that may reasonably be inferred from the contract documents as being required to produce the intended results will be supplied whether or not specifically called for. When words which have a well-known technical or trade meaning are used to describe work, materials or equipment, such words shall be interpreted in accordance with that meaning. Reference to standard specifications, manuals or codes of any technical society, organization or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest standard specification, manual, code or laws or regulations in effect at the time of opening of bids, except as may be otherwise specifically stated. However, no provision of any referenced standard specification, manual or code (whether or not specifically incorporated by reference in the contract documents) shall be effective to change the duties and responsibilities of County or Contractor, or any of their consultants, agents or employees from those set forth in the contract documents, nor shall it be effective to assign to County, or any of County's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provisions of this contract. Clarifications and interpretations of the contract documents shall be issued by County.

Conflicts, Errors and Discrepancies
If during the performance of the work, Contractor finds a conflict, error or discrepancy in the contract documents, Contractor shall so report to County in writing at once and before proceeding with the work affected thereby shall obtain a written interpretation or clarification from County.

Amending Contract Documents
The contract documents may be amended to provide for additions, deletions and revisions in the work or to modify the terms and conditions thereof by change order. Contract price and contract time may only be changed by change order.

Supplementary Contract Documents
In addition to the above, the requirements of the contract documents may be supplemented, and minor variations and deviations in the work may be authorized in one or more of the following ways:

1. A field order,
2. County's approval of a shop drawing or sample, or
3. County's written interpretation or clarification.

Reuse of Documents
Neither contractor nor any subcontractor or supplier or other person or organization performing or furnishing any of the work under a direct or indirect contract with County shall 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 County; and they shall not reuse any of them on extensions of the project or any other project without written consent of County and specific written verification or adaptation by County.

Contract Documents
The contract documents comprise the entire agreement between the parties and may be amended only by writing signed by both parties or by written change order. The contract documents shall

include this contract, any general and special conditions, plans and specifications, bidding documents and addenda thereto, and all bids submitted by Contractor.

A component in one Contract part applies as if appearing in each. The parts are complementary and describe and provide for a complete work.

In the case of ambiguity or conflict, the documents shall be given the following priority:

1. Governing ranking of Contract parts in descending order is:
    1.1. Contract
    1.2. Instructions to Bidders, including addendums
    1.3. Project Special Provisions
    1.4. Project plans
    1.5. Revised standard specifications
    1.6. Standard specifications
    1.7. Revised standard plans
    1.8. Standard plans
    1.9. Supplemental project information
    1.10. Nevada County Road Standards and Nevada County Standard Road Drawings
2. Written numbers and notes on a drawing govern over graphics
3. Detail drawing governs over a general drawing
4. Specific specification governs over a general specification
5. Specification in a section governs over a specification referenced by that section

If a discrepancy is found or confusion arises, submit an RFI.

ARTICLE XI: THE PROJECT SITE

Availability of Lands

County shall furnish, as indicated in the contract documents, the lands upon which the work is to be performed, rights-of-way and easements for access thereto, and such other lands which are designated for the use of Contractor. Easements for permanent structures or permanent changes in existing facilities will be obtained and paid for by County, unless otherwise provided in the contract documents. If Contractor believes that any delay in County's furnishing these lands, rights-of-way or easements entitles Contractor to an extension of the contract time, Contractor may make a claim therefor as provided for herein. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

Physical Conditions

If the contract documents identify those reports of explorations and tests of subsurface conditions at the site that have been utilized by County in preparation of the contract documents, Contractor may rely upon the accuracy of the factual data contained in such reports but not upon interpretations or opinions contained therein or for the completeness or representativeness thereof for Contractor's purposes. If construction drawings of physical conditions in or relating to existing surface and subsurface structures (except underground facilities discussed below) at or contiguous to the site have been utilized by County in preparation of the contract documents, Contractor may rely upon the accuracy of the factual data contained in such drawings but not the completeness thereof for Contractor's purposes. If Contractor believes that any factual data on which Contractor is entitled to rely is inaccurate, or any physical condition uncovered or revealed at the site differs materially from that indicated, reflected or referred to in the contract documents, Contractor shall, promptly after becoming aware thereof and before performing any work in connection therewith (except in an emergency as permitted herein), notify County in writing about the inaccuracy or difference. Failure to notify County promptly shall relieve County of any liability for any and all claims resulting from such inaccuracy or difference.

County's Review
County will review the pertinent conditions, determine the necessity of obtaining additional explorations or tests with respect thereto and advise Contractor in writing of County's findings and conclusions.

Possible Document Change
If County concludes that there is a material error in the contract documents or that because of newly discovered conditions a change in the contract documents is required, a change order will be issued in writing as provided to reflect and document the consequences of the inaccuracy or difference.

Possible Price and Time Adjustments
In each case of inaccuracy or difference, an increase or decrease in the contract price or an extension or shortening of the contract time, or any combination thereof, will be allowable to the extent that they are attributable to any such inaccuracy or difference. If County and Contractor are unable to agree as to the amount or length thereof, a claim may be made therefor as provided in the contract documents.

Physical Conditions - Underground Facilities
The information and data shown or indicated in the contract documents with respect to existing underground facilities at or contiguous to the site is based on information and data furnished to County by the owners of such underground facilities or by others. Generally service connections are not indicated on drawings. Unless it is otherwise expressly provided:

1. County shall not be responsible for the accuracy or completeness of any such information or data; and,
2. Contractor shall have full responsibility for reviewing and checking all such information and data, for locating all underground facilities shown or indicated in the contract documents, for coordination of the work with the owners of such underground facilities during construction, for the safety and protection thereof, and repairing any damage thereto resulting from the work, the cost of all of which will be considered as having been included in the contract price.
3. If an underground facility is uncovered or revealed at or contiguous to the site which was not shown or indicated in the contract documents and which Contractor could not reasonably have been expected to be aware of, Contractor shall, promptly after becoming aware thereof and before performing any work affected thereby (except in an emergency as permitted by this contract), identify the owner of such underground facility and give written notice thereof to that owner and to County. County will review the underground facility to determine the extent to which the contract documents should be modified to reflect and document the consequences of the existence of the underground facility, and the contract documents will be amended or supplemented to the extent necessary. During such time, Contractor shall be responsible for the safety and protection of such underground facility as provided herein. Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, to the extent that they are attributable to the existence of any underground facility that was not shown or indicated in the contract documents and which Contractor could not reasonably have been expected to be aware of and will not be assessed liquidated damages pursuant to Government Code Section 4215. If the parties are unable to agree as to the amount or length thereof, Contractor may make a claim therefor as provided in these contract documents.

Preservation of Property
Due care shall be exercised to avoid injury to existing highway improvements or facilities, utility facilities, adjacent property, and roadside trees, shrubs, and other plants that are not to be removed. Roadside trees, shrubs, and other plants that are not to be removed, and pole lines, fences, signs, markers and monuments, buildings and structures, conduits, pipelines under or above ground, sewer and water lines, all highway facilities and any other improvements or facilities within or adjacent to the project shall be protected from injury or damage, and if ordered by County,

the Contractor shall provide and install suitable safeguards, approved by County, to protect such objects from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the specifications accompanying the contract, if any such objects are a part of the work being performed under the contract. County may make or cause to be made such temporary repairs as are necessary to restore to service any damaged facility. The cost of such repairs shall be borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under the contract. Full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in protecting or repairing property, shall be considered as included in the prices paid for the various contract items of work and no additional compensation will be allowed therefor.

Reference Points

County shall establish one or more horizontal and vertical reference points for construction which in County's judgment are necessary to enable Contractor to proceed with the work or as provided in the contract documents. County shall set any other stakes or marks which it deems necessary to establish the lines and grades required for the completion of the work unless the Special Provisions require that the Contractor is responsible for laying out the work. Contractor shall notify the County when Contractor requires staking, in writing a reasonable time in advance of such requirement. In no event shall Contractor give less than two working days notice of such requirement. Contractor shall protect and preserve the established reference points, stakes and marks and shall make no changes or relocations without the prior written approval of County. Contractor shall report to County whenever any reference point, stake or mark is lost or destroyed or requires relocation because of necessary changes in grades or locations. Contractor will be charged for the cost of relocation or replacement if the need therefor arises due to Contractor's acts.

Power

The Contractor shall provide, at no additional cost to the County, all construction power used at the project site and shall make all arrangements with the electrical utility and with the County for power takeoff points, voltage and phasing requirements, transformers, and metering and shall pay all costs and fees arising therefrom. It shall be the Contractor's responsibility to provide all special connections required for the work.

Water

The Contractor shall provide the water needed for the work, including potable water, construction water, and water for testing purposes.

Sanitary Facilities

The Contractor shall make arrangements for use of adequate toilet facilities at or near the site of work. Such facilities shall be subject to the acceptance of the County as to location and type. The Contractor shall maintain the sanitary facilities in acceptable condition from the beginning of the work until completion and shall remove the facilities and disinfect the premises.

ARTICLE XII: PAYMENT AND PERFORMANCE BONDS

Bonds to be Provided

The Contractor shall furnish two bonds each in the amount of one hundred (100%) percent of the contract price, one as security for the faithful performance of the work, and the other as security for the faithful payment and satisfaction of all persons furnishing materials and performing labor for the project. The bonds shall be issued by a corporation duly and legally licensed to transact surety business in the State of California. The payment bond shall remain in force throughout the period required to complete the work and for 35 days after the recording of the Notice of Completion. The performance bond shall remain in force for a period of 365 days after final acceptance of the work to cover any defects in workmanship, materials, or equipment which develop in that time. The bonds must be executed by a duly licensed surety company and accompanied by a certified copy of the authority to act. The scope of the bonds or the forms thereof shall in no way affect or alter the

liabilities of the Contractor to County. Bonds shall be executed on the forms included in the contract documents.

Insolvency or Termination of Right to Do Business
If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in California, Contractor shall within five days thereafter substitute another bond and surety, both of which must be acceptable to County. If an acceptable substitute is not furnished within five days, County may terminate Contractor.

ARTICLE XIII: CONTRACTOR LIABILITY AND INSURANCE

Liability of Contractor
The Contractor shall be liable for all damages and injury which shall be caused to County or any other owners of property on or in the vicinity of the work or which shall occur to any person or persons or property whatsoever arising out of the performance of this contract. Contractor agrees to hold County harmless and indemnify County for any such losses.

Contractor's Liability Insurance
Contractor shall purchase and maintain commercial general liability and other insurance as is appropriate for the work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance and furnishing of the work and Contractor's other obligations under the contract documents, whether it is to be performed or furnished by Contractor, by any subcontractor, by anyone directly or indirectly employed by any of them to perform or furnish any of the work, or by anyone for whose acts any of them may be liable:

1. Claims under workers' disability benefits and other similar employee benefit acts;
2. Claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
3. Claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
4. Claims for damages insured by personal injury liability coverage which are sustained (a) by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or (b) by any other person for any other reason;
5. Claims for damages, other than to the work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom;
6. Claims arising out of operation of laws or regulations for damages because of bodily injury or death of any person or for damage to property; and
7. 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.

To the extent that Contractor's work, or work under Contractor's direction, may require blasting, explosive conditions, or underground operations, the comprehensive general liability coverage shall contain no exclusion relative to blasting, explosion, collapse of buildings, or damage to underground property.

The insurance required by this paragraph shall be "per occurrence" coverage and shall include the specific coverages and be written for not less than the limits of liability and coverages provided herein, or required by law, whichever is greater. The commercial general liability insurance shall include completed operations insurance. All such insurance shall remain in effect until final payment and at all times thereafter when Contractor may be correcting, removing or replacing defective work. In addition, Contractor shall maintain such completed operations insurance for at least one year after final payment and furnish County with evidence of continuation of such insurance at final payment. If Contractor's insurance is canceled prior to completion of the project and the Contractor does not furnish a new Certificate of Insurance prior to cancellation, County may obtain the required insurance and deduct the premium from contract moneys due the Contractor.

At the option of Contractor, evidence of coverage and limits may be furnished by an umbrella liability policy certificate in addition to certificates for worker's compensation and employer's liability, and comprehensive automobile and general liability policies.

Contractual Liability Insurance
The commercial general liability insurance required above will include contractual liability insurance applicable to Contractor's obligations hereunder.

Property Insurance
Unless otherwise specifically provided, Contractor shall purchase and maintain property insurance (builder's risk) upon the work or equipment and supplies stored at the site to the full insurable value thereof (subject to such deductible amounts as may be agreed upon or required by laws and regulations.) This insurance shall include the interests of County and its agents, Contractor and subcontractors in the work. County shall be listed as an additional insured party. Said policy shall insure against the perils of fire, extended coverage, testing and shall include "all risk" insurance for physical loss and damage including theft, vandalism and malicious mischief, collapse and water damage, and such other perils as may be provided herein, and shall include damages, losses and expenses arising out of or resulting from any insured loss or incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers, architects, attorneys and other professionals).

Amount of Property Insurance
Said insurance shall be on a "per occurrence" basis for the full value of the work and supplies and equipment stored or used in connection with the project and shall include vandalism and malicious mischief endorsement. Special consent of County shall be required prior to use of "claims made" coverage.

Schedule of Required Insurance
1. Worker's Compensation Insurance: Statutory amount and employer's liability of **$1,000,000**.
2. Contractor's Commercial General Liability Insurance (bodily injury, property damage and including contractual liability insurance, completed operations and products liability insurance): **$2,000,000**.
3. Comprehensive Business or Commercial Automobile Liability Coverage (bodily injury liability, property damage liability, uninsured motorist protection and including non-owned and hired automobile liability): **$2,000,000**.

Nevada County shall be named as additional insured on all insurance policies. Contractor shall provide proof of insurance required in this contract evidenced by certificates of insurance and endorsements.

Notice Requirement
All the policies of insurance (or the certificates or other evidence thereof) required to be purchased and maintained by the Contractor shall contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least ten (10) days prior written notice has been given to County by registered mail.

Deductibles and Self-Insured Retentions
Any deductibles or self-insured retentions must be fully disclosed by Contractor and approved by County prior to commencement of work. At County's option, the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects County, its officials and employees, or Contractor shall provide a bond guaranteeing payment of losses and related investigations, claims administration and defense expenses.

Risk of Loss
Liability for loss or damage to equipment, materials, workmanship or services occurring on or off the site shall be the responsibility of the Contractor. Liability for completed work shall not be assumed by County until both the work has been completed and County has accepted the work as complete. County will not be responsible for purchasing and maintaining any property insurance to protect the

interests of Contractor, subcontractors or others in the work. The risk of loss will be borne by Contractor, subcontractor or others suffering any such loss and if any of them wishes property insurance coverage in addition to insurance required herein, each may purchase and maintain it at the purchaser's own expense.

Waiver of Rights
Contractor waives all rights against County and its agents for all losses and damages caused by any of the perils covered by the policies of insurance provided for above and any other property insurance applicable to the work, and all other parties named as insureds in such policies for losses and damages so caused. Each subcontract between Contractor and a subcontractor will contain similar waiver provisions by the subcontractor in favor of County and its agents and all other parties named as insureds. None of the above waivers shall extend to the rights that any of the insured parties may have to the proceeds of insurance held by County as trustee or otherwise payable under any policy so issued.

No Right of Recovery
County and Contractor intend that any policies provided as set forth herein shall protect all of the parties insured and provide primary coverage for all losses and damages caused by the perils covered thereby. Any insurance or self-insurance maintained by County shall be in excess of Contractor's insurance and shall not contribute to it.

Receipt and Application of Proceeds
Any insured loss under the policies of insurance required herein will be adjusted with County and made payable to County as trustee for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause. County shall deposit in a separate account any money so received, and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged work shall be repaired or replaced, the moneys so received applied on account thereof and the work and the cost thereof covered by an appropriate change order or written amendment.

County's Duties as Trustee
County as trustee shall have power to adjust and settle any loss with the insurers.

Acceptance of Insurance
If County has any objection to the coverage afforded by or other provisions of the insurance required to be purchased and maintained by Contractor on the basis of its not complying with the contract documents, County shall notify Contractor in writing thereof and Contractor shall immediately provide proof of the proper coverage. Contractor shall provide to County such additional information in respect of insurance provided by it as County may reasonably request. County may at its option waive any type of insurance required herein which County in its discretion deems to be inapplicable to the type of project being constructed. Any such waiver shall be in writing by the County Administrator.

Verification of Coverage
Contractor shall furnish County with certificates of insurance and with original endorsements affecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The certificates and endorsements are to be on forms provided by County and are to be received and approved by County before work commences.

Subcontractors
Contractor shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein.

ARTICLE XIV: MATERIALS AND EQUIPMENT

Material and Equipment

Unless otherwise specified, Contractor shall furnish and assume full responsibility and risk of loss for all 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 furnishing, performance, testing, start-up and completion of the work.

Quality of Materials and Equipment
All materials and equipment shall be of good quality and new, except as otherwise provided in the contract documents. If required by County, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the kind and quality of materials and equipment. Contractor may be required to show that materials and/or equipment will be available in sufficient quantity or time so as to assure top quality performance of the contract. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable supplier except as otherwise provided in the contract documents; but no provision of any such instructions will be effective to assign to County, or any of County's consultants, agents or employees, any duty or authority to supervise or direct the furnishing or performance of the work or any duty or authority to undertake responsibility contrary to the provisions of this contract.

Storage of Materials and Equipment
Materials and equipment shall be stored where specified by County and so as to insure the preservation of their quality and fitness for the work. Stored equipment and materials shall be located so as to facilitate inspection. The Contractor shall be responsible for all damages that occur to materials and equipment until the completion and final acceptance of the work by the County.

Substitute Items
Whenever materials or equipment are specified or described in the contract documents by using the name of a proprietary item or the name of a particular supplier the naming of the item is intended to establish the type, function and quality required. Unless the name is followed by words indicating that no substitution is permitted, materials or equipment of other suppliers may be accepted by County if sufficient information is submitted in advance by Contractor to allow County to determine that the material or equipment proposed is equivalent or equal to that named.

The procedure for review by County will include the following: requirements for review of substitute items of material and equipment or modification or alteration of the design of any material or equipment or portion of the work will not be accepted by County from anyone other than Contractor. If Contractor wishes to furnish or use a substitute item of material or equipment or modification or alteration of the design of any material or equipment or portion of the work, Contractor shall make written application to County for acceptance thereof, certifying that the proposed substitute or modification or alteration will perform adequately the functions and achieve the results called for by the general design, be similar and of equal substance to that specified and be suited to the same use as that specified. The application will state that the evaluation and acceptance of the proposed substitute will not prejudice Contractor's achievement of completion on time, whether or not acceptance of the substitute or design modification or alteration for use in the work will require a change in any of the contract documents (or in the provisions of any other direct contract with County for work on the project) to adapt the design to the proposed substitute or design modification or alteration and whether or not incorporation or use of the substitute in connection with the work is subject to payment of any license fee or royalty. All variations of the proposed substitute or design modification or alteration from that specified will be identified in the application and available maintenance, repair and replacement service will be indicated, where necessary. The application will also contain an itemized estimate of all costs that will result directly or indirectly from acceptance of such substitute or design modification or alteration, including costs of redesign and claims of other contractors affected by the resulting change, all of which shall be considered by County in evaluating the proposed substitute or design modification or alteration. County may require Contractor to furnish at Contractor's expense additional data about the proposed substitute or design modification or alteration. County will be allowed a reasonable time within which to evaluate each proposed substitute or design modification or alteration. County will be the sole judge of acceptability, and no substitute or design modification or alteration will be ordered, installed

or utilized without County's prior written acceptance which will be evidenced by either a change order or an accepted shop drawing. County may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute or design modification or alteration. Contractor shall pay all costs for redesign required by the implementation of the proposed substitute.

Operating and Maintenance Instructions and Manufacturer's Warranties

Before receiving payment for more than 60 percent of the purchase value of any equipment and prior to installation of said equipment, the Contractor shall deliver to County acceptable manufacturer's operating and maintenance instructions covering each item of equipment assembly provided under this contract and each and every warranty provided by the manufacturer. Manufacturers' standard brochures or manuals will be modified to reflect only that model or series of equipment installed on this project. All extraneous material will be crossed out or otherwise altered as acceptable to County.

The operating and maintenance instructions shall include, as a minimum, the following data for each item of mechanical, electrical, and instrumentation equipment:

1. An itemized list of all data provided.
2. Name and location of the manufacturer, the manufacturer's local representative, the nearest supplier and spare parts warehouse.
3. Accepted submittal information applicable to operation and maintenance.
4. Recommended installation, adjustment, start up, calibration, and troubleshooting procedures.
5. Recommended lubrication and an estimate of yearly quantity needed.
6. Recommended step-by-step procedures for all modes of operation.
7. Complete internal and connection wiring diagrams.
8. Recommended preventive maintenance procedures and schedule.
9. Complete parts lists, by generic title and identification number, with exploded view of each assembly.
10. Recommended spare parts.
11. Disassembly, overhaul, and re-assembly instructions.
12. Complete, as applicable, operating and maintenance instructions, transmittal forms and summary sheets.
13. Nameplate data for all equipment supplied, including make, model and serial numbers, type and motor data together with designation and location of equipment.

Before final acceptance of the project, the Contractor shall bind all of the above in an appropriately labeled binder. Each completed binder shall contain only that material which can be held in a non-expanded position. A complete table of contents listing all items and their location in the set shall be included in each binder. For ready reference, the Contractor shall compile a complete list of manufacturer's local representatives for each item provided. In addition to withholding payment where Contractor fails to provide County with manufacturer's warranties, Contractor shall also be deemed to have personally warranted the equipment to the same extent as the manufacturer's warranty on the equipment.

Patent Fees and Royalties

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 County 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 County in the contract documents. Contractor shall indemnify and hold harmless County and anyone directly or indirectly employed by either of them from and against all claims,

damages, losses and expenses (including attorneys' fees and court and arbitration costs) arising out of any infringement of patent rights or copyrights incident to the use in the performance of the work or resulting from the incorporation in the work of any invention, design, process, product or device not specified in the contract documents, and shall defend all such claims in connection with any alleged infringement of such rights.

Contractor's Equipment
The Contractor shall identify each piece of Contractor's equipment, other than hand tools, by means of an identifying number plainly stenciled or stamped on the equipment at a conspicuous location, and shall furnish to County a list giving the description of each piece of equipment and its identifying number. In addition, the make, model number and empty gross weight of each unit of compacting equipment shall be plainly stamped or stenciled in a conspicuous place on the unit. The gross weight shall be either the manufacturer's rated weight or the scale weight.

The make, model, serial number and manufacturer's rated capacity for each scale shall be clearly stamped or stenciled on the load receiving element and its indicator or indicators. All meters shall be similarly identified, rated and marked. Upon request of County, the Contractor shall furnish a statement by the manufacturer, designating sectional and weighbridge capacities of portable vehicle scales.

ARTICLE XV: PLANS AND SPECIFICATIONS

Interpretation of Plans, Specifications and Drawings
The plans, specifications and the drawings are intended to be explanatory of each other. Any work indicated on the drawings and not in the plans or specifications, or vice versa, shall be executed as if indicated in both. Where not specifically stated otherwise, all work and materials necessary for each unit of construction, including special construction for any specific brand or shape of material called for even though only briefly mentioned or indicated, shall be furnished and installed fully and completely as a part of the Contract. As the figured dimensions shown on the drawings and in the specifications of the contract may not in every case agree with scale dimensions, the figured dimensions shall be followed in preference to the scaled dimensions. Should it appear that the work to be done, or any of the matters relative thereto are not sufficiently detailed or explained in the contract documents, the Contractor shall apply to County for such further explanations as may be necessary, and shall conform thereto as part of the contract so far as may be consistent with the terms thereof. In the event of any doubt or question arising respecting the true meanings of the plans, specifications or drawings, the decision of County shall be final and conclusive.

Where for convenience the specifications are arranged by job classification or divided into various sections, it is to be understood this separation is for the convenience of all parties involved and is not to be considered as the limits of the work required of any separate trade. The terms and conditions of such limitations are wholly between Contractor and its subcontractors during both the bidding and construction phase; i.e., all work shown, specified, implied or necessary for the completion of each trade's work, as well as for the proper completion of the project as a whole shall be coordinated by Contractor and the subcontractors during bidding and construction and shall be provided in this contract.

Ownership
All plans and specifications shall remain the property of County and shall be returned to County before the final certificate will be issued.

Handicapped Access
Where applicable, it is the County's intent for all features on the plans and specifications to conform to applicable regulations for the accommodation of physically handicapped persons in buildings and facilities used by the public.

ARTICLE XVI: SHOP DRAWINGS AND SAMPLES

Shop Drawings

After checking and verifying all field measurements and after complying with applicable procedures herein, Contractor shall submit to County for review and acceptance in accordance with the accepted schedule of shop drawing submissions or other appropriate action if so indicated herein, the number of copies specified of all shop drawings, which will bear a stamp or specific written indication that Contractor has satisfied Contractor's responsibilities under the contract documents with respect to the review of the submission. All submissions will be identified as County may require. Such drawings shall be approved by County before any work involving the drawings is performed. The data shown on the shop drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials and similar data to enable County to review the information as required.

Samples
Contractor shall also submit to County for review and acceptance with such promptness as to cause no delay in work, all samples required by the contract documents or as requested by County. All samples will have been checked by and accompanied by a specific written indication that Contractor has satisfied Contractor's responsibilities under the contract documents with respect to the review of the submission and will be identified clearly as to material, supplier, pertinent data such as catalog numbers and the use for which intended.

Contractor's Review
Before submission of each shop drawing or sample, Contractor shall have determined and verified all quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers and similar data with respect thereto and reviewed or coordinated each shop drawing or sample with other shop drawings and samples and with the requirements of the work and the contract documents.

Notice of Variation
At the time of each submission, Contractor shall give County specific written notice of each variation that the shop drawings or samples may have from the requirements of the contract documents, and, in addition, shall cause a specific notation to be made on each shop drawing submitted to Engineer for review and acceptance of each such variation.

County's Review
County will review and accept with reasonable promptness shop drawings and samples, but County's review and acceptance will be only for conformance with the design concept of the project and for compliance with the information given in the contract documents and shall not extend to means, methods, techniques, sequences or procedures of construction (except where a specific means, method, technique, sequence or procedure of construction is indicated in or required by the contract documents) or to safety precautions or programs incident thereto. The review and acceptance of a separate item as such will not indicate acceptance of the assembly in which the item functions. Within a reasonable time after receipt of drawings or samples, County will return marked up copies indicating one of the following four actions:

1. If review and checking indicates no exceptions, copies will be returned marked "NO EXCEPTIONS TAKEN" and work may begin immediately on incorporating the material and equipment covered by the submittal into the work.
2. If review and checking indicates limited corrections are required, copies will be returned marked "MAKE CORRECTIONS NOTED" and work may begin immediately on incorporating the material and equipment covered by the submittal into the work.
3. If review and checking indicates insufficient or incorrect data has been submitted, copies will be returned marked "AMEND AND RESUBMIT". No work may begin on incorporating the material and equipment covered by this submittal into the work until the submittal is revised, resubmitted, and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".
4. If review and checking indicates the material and equipment submittal is unacceptable, copies will be returned marked "REJECTED". No work may begin on incorporating the material and equipment covered by this submittal into the work until a new submittal is made

and returned marked either "NO EXCEPTIONS TAKEN" or "MAKE CORRECTIONS NOTED".

Contractor shall direct specific attention in writing to revisions other than the corrections called for by County on previous submittals. The Contractor may authorize material or equipment supplier to deal directly with County with regard to such submittals; however, ultimate responsibility for the accuracy and completeness of the information contained in the submittal shall remain with the Contractor. Normally, a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required. Submittals on various items using a single transmittal form will be permitted only when the items taken together constitute a manufacturer's "package" or are so functionally related that expediency indicates checking or review of the group or "package" as a whole.

Contractor's Responsibility for Variation
County's review of shop drawings or samples shall not relieve Contractor from responsibility for any variation from the requirements of the contract documents unless Contractor has in writing called County's attention to each such variation at the time of submission and County has given written acceptance of each such variation by a specific written notation thereof incorporated in or accompanying the shop drawing or sample review nor will any review by County relieve Contractor from responsibility for errors or omissions in the shop drawings or from responsibility for having complied with the provisions above.

Work Performed Prior to Shop Drawing or Sample Review
Where a shop drawing or sample is required by the specifications, any related work performed prior to County's review of the pertinent submission will be the sole expense and responsibility of Contractor.

ARTICLE XVII: SUBCONTRACTORS, SUPPLIERS AND OTHERS

Objectionable Parties
Contractor shall not employ any subcontractor, supplier or other person or organization, whether initially or as a substitute, against whom County may have reasonable objection. Contractor shall not be required to employ any subcontractor, supplier or other person or organization to furnish or perform any of the work against whom Contractor has reasonable objection. If the contract documents require the identity of certain subcontractors, suppliers or other persons or organizations (including those who are to furnish the principal items of materials and equipment) to be submitted to County in advance for acceptance by County and if Contractor has submitted a list thereof in accordance with the contract documents, County's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the bidding documents or the contract documents) of any such subcontractor, supplier or other person or organization so identified may be revoked on the basis of reasonable objection after due investigation, in which case Contractor shall submit an acceptable substitute, the contract price will be increased by the difference in the cost occasioned by such substitution and an appropriate change order will be issued. No acceptance by County of any such subcontractor, supplier, or other person or organization shall constitute a waiver of any right of County to reject defective work. The Contractor may not change any subcontractors listed on its bid without written approval from County after a determination that the requirements of Public Contracts Code Section 4107 have been met.

Responsibility for Subcontractors
Contractor shall be fully responsible to County for all acts and omissions of the subcontractors, suppliers and other persons and organizations performing or furnishing any of the work under a direct or indirect contract with Contractor just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the contract documents shall create any contractual relationship between County and any such subcontractor, supplier or other person or organization, nor shall it create any obligation on the part of County to pay or to see to the payment of any moneys due any such subcontractor, supplier or other person or organization except as may otherwise be required

by laws and regulations. County may furnish to any subcontractor or other person or organization, to the extent practical, evidence of amounts paid the Contractor on account of specific work done.

Division of Work
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.

Subcontracts
All work performed for Contractor by a subcontractor will be pursuant to an appropriate agreement between contractor and the subcontractor which specifically binds the subcontractor to the applicable terms and conditions of the contract documents for the benefit of County and contains waiver provisions as required herein. Contractor shall pay each subcontractor a just share of any insurance moneys received by Contractor on account of losses under policies issued pursuant to this Contract.

ARTICLE XVIII: PERFORMANCE OF THE WORK

Supervision
Contractor shall supervise and direct the work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the work in accordance with the contract documents. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall be responsible to see that the finished work complies accurately with the contract documents.

Superintendence
Contractor shall keep on the work at all times during its progress a competent resident superintendent, acceptable to County, who shall not be replaced without written notice to County except under extraordinary circumstances. The superintendent will be Contractor's representative at the site and shall have authority to act on behalf of Contractor. All communications given to the superintendent shall be as binding as if given to Contractor. When work is not in progress and during periods when work is suspended, arrangements acceptable to County shall be made for emergencies. If the superintendent is not present, County shall give direction to the next in command and said direction shall be binding.

Personnel
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. Except in connection with the safety or protection of persons or the work or property at the site or adjacent thereto, and except as otherwise indicated in the contract documents, all work at the site shall be performed during regular working hours, and Contractor will not permit overtime work or the performance of work on Saturday, Sunday or any legal holiday without County's written consent given after prior written notice to County.

Order of Work
If a sequence or procedure is specified in the Special Provisions or plans for the project, Contractor shall be required to follow the sequence or procedure specified. The price for compliance with a specified sequence or procedure will be considered as part of the bid price and no extra amounts will be allowed therefor.

Safety and Protection
Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. Contractor shall take all reasonable precautions for the safety of, and shall provide reasonable protection to prevent damage, injury or loss to:

1. All employees on the work and other persons and organizations who may be affected thereby;
2. All the work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of underground facilities and utility owners when prosecution of the work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to herein caused, directly or indirectly, in whole or in part, by Contractor, any subcontractor, supplier or any other person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, shall be remedied by Contractor. Contractor's duties and responsibilities for the safety and protection of the work shall continue until such time as all the work is completed and County has issued a notice to County and Contractor that the work is acceptable.

The Contractor shall at all times so conduct the work as to insure the least possible obstruction to traffic and inconvenience to the general public and the residents in the vicinity of the work, and to insure the protection of persons and property. No road or street shall be closed to the public except with the permission of County and other governmental authority. Fire hydrants on or adjacent to the work shall be kept accessible to firefighting equipment at all times. Temporary provisions shall be made by the Contractor to insure the use of sidewalks and private and public driveways, and the proper functioning of all gutters, sewer inlets, drainage ditches and culverts, irrigation ditches and natural water courses.

The Contractor shall leave a night emergency telephone number or numbers with the local law enforcement office, so that contact may be made easily at all times in case of trouble or emergencies. The names and telephone numbers of at least two medical doctors practicing in the vicinity and the telephone number of the local ambulance shall be prominently displayed adjacent to all telephones.

Any lighting fixtures shall be installed, mounted and directed in a manner precluding glare to approaching traffic.

Detours

Where detours are necessary, Contractor shall construct and remove detours as provided in the Special Provisions, or as shown on the plans, or as directed by County. The failure or refusal of Contractor to construct and maintain detours at the required time shall be sufficient cause for closing down the work until remedied. The cost of the detours shall be considered a part of the contract price or as included in other items of work as noted in the Special Provisions and no extra amounts shall be paid therefor.

Safety Representative

Contractor shall designate a responsible representative at the site whose duty shall be the prevention of accidents. This person shall be Contractor's superintendent unless otherwise designated in writing by Contractor to County.

Vehicle Code

Pursuant to the authority contained in Vehicle Code Section 591, County has determined that within such areas as are within the limits of the project and are open to public traffic, the following requirements of the Vehicle Code will apply. The lighting requirements in Section 25803; the brake requirements in Chapter 3, Division 12; the splash apron requirements in Section 27600; and, when operated on completed or existing treated base, surfacing, pavement or structures, except as otherwise provided in Section 7-1.02, "Weight Limitations," the weight limitation requirements contained in Division 15.

Attention is directed to the statement in said Section 591 that this section shall not relieve Contractor or any person from the duty of exercising due care. The Contractor shall take all

necessary precautions for safe operation of its equipment and the protection of the public from injury and damage from such equipment.

Any other requirements set forth in Divisions 11, 12, 13, 14 and 15 of the Vehicle Code which County, pursuant to the authority contained in Vehicle Code Section 591, will require compliance with, will be set forth in the Special Provisions.

Trench Safety
Attention is directed to the provisions of Section 6705 of the Labor Code of the State of California.

Excavation for any trench 5 feet or more in depth shall not begin until the Contractor has submitted to County the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of such trench. Such plan shall be submitted at least 5 days before the Contractor intends to begin excavation for the trench and shall show the details of the design of shoring, bracing, sloping, or other provisions to be made for worker protection during such excavation. The plan shall not use shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Industrial Safety and if such plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared and signed by an engineer who is registered as a Civil or Structural Engineer in the State of California.

In addition, the Contractor shall obtain, pay for, and comply with all provisions of the permit required by Section 6500 of the California Occupational Safety and Health Act of 1973.

Notice Prior to Trenching
Where trenching is required, Contractor shall, pursuant to Public Contracts Code Section 7104, promptly, and before the following conditions are disturbed, notify County, in writing of any:

(1) Material that contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

(2) Subsurface or latent physical conditions at the site differing from those indicated.

(3) Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

Upon receipt of such notice, County shall, as required by Public Contracts Code Section 7104, promptly investigate the conditions. If County finds the conditions do materially so differ, or do involve hazardous waste, and would require a decrease or increase in Contractor's cost of, or time required for, performance of any part of the work, County shall issue a change order under the procedures described in this Contract. In the event that a dispute arises between County and Contractor as to whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the cost or time required for performance, Contractor will not be excused from the scheduled completion date but shall proceed with all work to be performed. Contractor shall retain its rights to file a claim as set forth herein.

Alcoholic Beverages
Absolutely no alcoholic beverages shall be permitted on the job site.

Emergencies
In emergencies affecting the safety or protection of persons or the work or property at the site or adjacent thereto, Contractor, without special instruction or authorization from County, is obligated to act to prevent threatened damage, injury or loss. Contractor shall give County prompt written notice as soon as possible thereafter. If County determines that a change in the contract documents is required because of the action taken in response to an emergency, a change order will be issued to document the consequences of the changes or variations.

Warranty and Guarantee

Unless the plans and/or specifications require a longer period for any warranted item, Contractor warrants all of the work completed under this contract by Contractor for a period of one year from the date of final completion. Said warranty includes the guarantee that all work is completed in accordance with the contract documents and that the work is not defective in any way and is fit for its intended use. Work not conforming to the plans and specifications shall be considered defective. If within the warranty period any work is found to be defective, Contractor shall promptly, without cost to County and in accordance with County's written instruction, either correct such defective work or remove it from the site and replace it with non-defective work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, County may have the defective work corrected or removed and replaced, and all direct, indirect and consequential costs of such removal and replacement (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) will be paid by Contractor. Nothing in this paragraph shall serve as a waiver of the statute of limitations for breach of contract or latent defects.

Environmental and Toxics Warranty
Contractor warrants that no asbestos-containing materials, no PCB-containing fixtures or equipment or other toxic or hazardous materials or equipment other than what is contained in standard building materials were installed on this project without County's express written consent. Contractor further warrants that no asbestos-containing materials, PCB-containing fixtures or equipment or other toxic or hazardous materials were discovered during construction of this project which were not disclosed to County in writing.

Contractor also warrants that its operations during the project were not in violation of any applicable federal, state or local environmental law or regulation dealing with hazardous materials or toxic substances, and no notice from any governmental body has been given to Contractor claiming any such violation or calling attention to the need for any work, repairs, construction, or installation or in connection with the project in order to comply with such laws with which Contractor has not complied. If there are any such notices with which Contractor has complied, Contractor shall provide County with copies thereof.

This warranty shall survive completion of the project, and Contractor shall indemnify County for any breach thereof.

Access to Work
County's representatives, testing agencies and governmental agencies with jurisdictional interests will have access to the work at reasonable times for their observation, inspecting and testing. Contractor shall provide proper and safe conditions for such access.

County May Stop the Work
If Contractor fails to conform with the contract documents, if the work is defective, if the work is being carried out in an unsafe manner, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to furnish or perform the work in such a way that the completed work will conform to the contract documents, County may order Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated; however, this right of County to stop the work shall not give rise to any duty on the part of County to exercise this right for the benefit of Contractor or any other party.

Alternative Methods of Construction
Whenever the plans or specifications provide that more than one specified method of construction or more than one specified type of material or construction equipment may be used to perform portions of the work and leave the selection of the method of construction or the type of material or equipment to be used up to the Contractor, it is understood that County does not guarantee that every such method of construction or type of material or equipment can be used successfully throughout all or any part of any project. It shall be the Contractor's responsibility to select and use the alternative or alternatives which will satisfactorily perform the work under the conditions encountered. In the event some of the alternatives are not feasible or it is necessary to use more than one of the alternatives on any project, full compensation for any additional cost involved shall

be considered as included in the contract price paid for the item of work involved and no additional compensation will be allowed therefor.

Correction or Removal of Defective Work
If required by County, Contractor shall promptly, as directed, either correct all defective work, whether or not fabricated, installed or completed, or, if the work has been rejected by County, remove it from the site and replace it with non-defective work. Contractor shall bear all direct, indirect and consequential costs of such correction or removal (including but not limited to fees and charges of engineers, architects, attorneys and other professionals) made thereby.

Acceptance of Defective Work
If, instead of requiring correction or removal and replacement of defective work, County prefers to accept it, County may do so. Contractor shall bear all direct, indirect and consequential costs attributable to County's evaluation of and determination to accept such defective work (such costs to include but not be limited to fees and charges of engineers, architects, attorneys and other professionals). If any such acceptance occurs prior to final payment, a change order will be issued incorporating the necessary revisions in the contract documents with respect to the work; and County shall be entitled to an appropriate decrease in the contract price, and, if the parties are unable to agree as to the amount thereof, County may make a claim therefor as provided in this Contract. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to County. No acceptance of defective work shall occur without an express written acknowledgment by County that work described therein is defective and that County is electing to proceed under this clause. No acceptance of defective work may be inferred from any actions by County staff or its agents.

County May Correct Defective Work
If Contractor fails within a reasonable time after written notice of County to proceed to correct and to correct defective work or to remove and replace rejected work as required by County in accordance with the above, 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, County may, after seven days' written notice to Contractor, correct and remedy any such deficiency. In exercising the rights and remedies under this paragraph County shall proceed expeditiously. To the extent necessary to complete corrective and remedial action, County may exclude Contractor from all or part of the site, take possession of all or part of the work, and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the site and incorporate in the work all materials and equipment stored at the site or for which County has paid Contractor but which are stored elsewhere. Contractor shall allow County, County's representatives, agents and employees such access to the site as may be necessary to enable County to exercise the rights and remedies under this paragraph. All direct, indirect and consequential costs of County in exercising such rights and remedies will be charged against Contractor, and a change order will be issued incorporating the necessary revisions in the contract documents with respect to the work; and County shall be entitled to an appropriate decrease in the contract price, and, if the parties are unable to agree as to the amount thereof, County may make a claim therefor as provided in this Contract. Such direct, indirect and consequential costs will include but not be limited to fees and charges of engineers, architects, attorneys and other professionals, all court costs and all costs of repair and replacement of work of others destroyed or damaged by correction, removal or replacement of Contractor's defective work. Contractor shall not be allowed an extension of the contract time because of any delay in performance of the work attributable to the exercise by County of County's rights and remedies hereunder.

Adjusting Progress Schedule
Contractor shall submit to County for acceptance adjustments in the progress schedule to reflect the impact thereon of new developments; these will conform generally to the progress schedule

then in effect and additionally will comply with any provisions of the general requirements applicable thereto.

Substitute Method of Construction
If a specific means, method, technique, sequence or procedure of construction is indicated in or required by the contract documents, Contractor may furnish or utilize a substitute means, method, sequence, technique or procedure of construction acceptable to County, if Contractor submits sufficient information to allow County to determine that the substitute proposed is equivalent to that indicated or required by the contract documents. The procedure for review by County will be similar to that provided in the paragraph regarding substitution of materials or equipment. No extension of time or extra compensation will be paid to the Contractor by virtue of County's accepting a substitute method of construction.

Suggestions to Contractor
Any plan or method of work suggested by County to the Contractor but not specified or required, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor; and County shall assume no responsibility therefor and in no way be held liable for any defects in the work which may result from or be caused by use of such plan or method of work. Acceptance by the Contractor of any plan or method of work or change suggested by County shall not relieve the Contractor from any other requirements or provisions of the contract.

Permits
Unless otherwise provided for herein, Contractor shall obtain and pay for all construction permits and licenses necessary or incidental to the work. County shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the work, which are applicable at the time of opening of bids. County shall pay all charges of utility connections to the work.

Laws and Regulations
Contractor shall give all notices and comply with all laws and regulations applicable to furnishing and performance of the work. Except where otherwise expressly required by applicable laws and regulations, County shall not be responsible for monitoring Contractor's compliance with any laws or regulations. If Contractor observes that the specifications or drawings are at variance with any laws or regulations, Contractor shall give County prompt written notice thereof, and any necessary changes will be authorized by one of the methods indicated herein. If Contractor performs any work knowing or having reason to know that it is contrary to such laws or regulations, and without such notice to County, Contractor shall bear all costs, damages, fines or penalties, arising therefrom.

Taxes
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.

Use of Premises
Contractor shall confine construction equipment, the storage of materials and equipment and the operations of workers to the project site and land and areas identified in and permitted by the contract documents and other land and areas permitted by laws and regulations, rights-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any land or areas contiguous thereto, resulting from the performance of the work. Should any claim be made against County by any such owner or occupant because of the performance of the work, Contractor shall promptly attempt to settle with such other party by agreement or otherwise resolve the claim by arbitration or at law. Contractor shall, to the fullest extent permitted by laws and regulations, indemnify and hold County harmless from and against all claims, damages, losses and expenses (including, but not limited to, fees of engineers, architects, attorneys and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or

equitable, brought by any such other party against County to the extent based on a claim arising out of Contractor's performance of the work.

Fences which cross, abut, or are on easements shall at all times be maintained by the Contractor in a condition which provides the functional purpose of the fence. Temporary fencing of the construction area will be permitted and temporary fencing shall provide the same functional purpose as existing fencing. Unless otherwise indicated, all improvements within easements shall be restored to conditions that existed prior to the start of work.

Before final acceptance of the work the Contractor shall obtain a written statement of release from each property owner that granted an easement for the work. Release statement shall indicate the property owner's acceptance of the site conditions as restored by the Contractor. The County may waive said written releases where a property owner refuses to sign same but only upon making a determination that there is no work to be completed with respect to said property.

Site Clean-Up

During the progress of the work, Contractor shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the work. At the completion of the work, Contractor shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery, and surplus materials, and shall leave the site clean and ready for occupancy by County. Contractor shall restore to original condition all property not designated for alteration by the contract documents.

The Contractor is advised that the final cleanup of the project shall be done with meticulous care and that the County expects all ductwork, cubicles, cabinets, motor control centers, control panels, rooms, and enclosures to be thoroughly vacuum cleaned and dust-free prior to acceptance of the work.

Protection 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 property to stresses or pressures that will endanger it.

Restoration of Structures

The Contractor shall remove such existing structures or monuments as may be necessary for the performance of the work and, if required, shall rebuild the structures or monuments thus removed in as good a condition as found. Contractor shall also repair all existing structures or monuments which may be damaged as a result of the work under this contract.

All curbs, gutters, driveways, sidewalks, and similar structures that are damaged by the installation of the work shall be reconstructed by the Contractor. Reconstruction shall be of the same kind of material with the same finish and in not less than the same dimensions as the original work. All concrete shall be as set forth in the specifications, or as required by County if not so specified. Repairs shall be made by removing and replacing the entire portions between joints or scores and not merely refinishing any damaged part. All work shall match the appearance of the existing improvements as nearly as possible.

All road and streets where the surface is removed, broken or damaged, or in which the ground has caved or settled due to work under this contract, shall be completely resurfaced and brought to the original grade and crown section unless otherwise indicated. Before resurfacing material is placed, edges of pavements shall be trimmed back far enough to provide clean, solid, vertical faces, and shall be free of any loose material. All cultivated areas, lawns, and other surface improvements which are damaged by actions of the Contractor shall be restored as nearly as possible to their original conditions.

Drainage

Existing drainage facilities shall be maintained throughout the contract time to provide the flow capacities available before commencing work. Drainage conduits shall not be broken, removed, or otherwise interfered with, without permission of the responsible agency.

Where construction requires blocking the flow, flows shall be bypassed as necessary. Stream crossings, blockages, and bypassing shall be accomplished in such a manner as to avoid degradation of downstream water quality. Particular attention shall be given to the avoidance of siltation.

Environmental Control
The Contractor shall not pollute the construction site or any drainage course or its tributary inlets with fuels, oils, bitumens, acids, insecticides, herbicides or other harmful materials. The Contractor shall comply with all applicable Federal, State, County and municipal laws concerning pollution of waterways. Contractor shall submit a plan for preventing such occurrences if required by County. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, waste washings, herbicides and insecticides, from spilling and entering public waters.

Where the Contractor is required to connect or otherwise work around existing lines carrying sewage or process wastes, Contractor shall perform the work to prevent the spill of sewage and insure the delivery of sewage to the treatment plants. Where the Contractor chooses to provide temporary pumping of sewage, Contractor shall first have the pumping facilities approved by County and shall provide 100 percent standby equipment on 24-hour basis.

The Contractor shall provide the means for preventing or lessening all dust nuisances and damages. Such means shall consist of applying water, dust palliative, or both all in accordance with local ordinances and regulations or as directed by County.

Record Documents
Contractor shall maintain in a safe place at the site one record copy of all drawings, plans, specifications, addenda, change orders, field orders and written interpretations and clarifications in good order and annotated to show all changes made during construction. These record documents together with all approved samples and a counterpart of all accepted shop drawings will be available to County for reference. Upon completion of the work, these record documents, samples, and shop drawings will be delivered to County.

As-Built Drawings
The Contractor shall also maintain a neatly marked set of record drawings showing the final locations and layout of all mechanical, electrical, and instrument equipment; piping and conduit, structures, and other facilities. Drawings shall be kept current weekly, with all field instructions and change orders; mechanical, electrical, and instrumentation equipment accommodations; and construction adjustment. Drawings shall be subject to the inspection of the County at all times and progress payments may be withheld if drawings are not current. At the final inspection the Contractor shall submit to County all as-built drawings. Drawings shall be stamped "AS-BUILT", dated and signed by the Contractor. The work will not be formally accepted until as-built drawings are accepted by County.

Continuing the Work
Contractor shall carry on the work and adhere to the progress schedule during all disputes or disagreements with County. No work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted specifically herein or as Contractor and County may otherwise agree in writing.

Indemnification
To the fullest extent permitted by laws and regulations, Contractor shall indemnify, defend and hold harmless County and its consultants, agents and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expenses (a) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (including the work itself) including the loss of use resulting therefrom and (b) is caused in whole or in part by any negligent act or omission of Contractor, any subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of

the work or anyone for whose acts any of them may be liable. The Contractor's indemnification obligation shall apply whether or not the act giving rise to such claims, damages, losses and expenses is caused in part by a party indemnified hereunder or arises by or is imposed by law and regulations regardless of the negligence of any such party.

Statutory Limitations
In any and all claims against County or any of its consultants, agents or employees by any employee of Contractor, any subcontractor, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, the indemnification obligation above 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 or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

Related Work at Site
County may perform other work related to the project at the site by County's own forces, have other work performed by utility companies or let other direct contracts therefor which shall contain conditions similar to these. If the fact that such other work is to be performed was not noted in the contract documents, written notice thereof will be given to Contractor prior to starting any such other work; and, if Contractor believes that such performance will involve additional expense to Contractor or requires additional time and the parties are unable to agree as to the extent thereof, Contractor may make a claim therefor as provided for herein. Any difference or conflict arising between the Contractor and any other Contractor employed by County, or between the Contractor and the workers of County with regard to their work, shall be submitted to County and the Contractor shall abide by County's decision in the matter. If the work of the Contractor is delayed because of any facts or omissions of any other Contractor or of County, the Contractor shall on that account have no claim against County other than for an extension of time.

Access to Site
Contractor shall afford each utility company or district and other contractor who is a party to such a direct contract (or County, if County is performing the additional work with County's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such work, and shall properly connect and coordinate the work with theirs. Contractor shall do all cutting, fitting and patching of the work that may be required to make its several parts come together properly and integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of County and the others whose work will be affected. The duties and responsibilities of Contractor under this paragraph are for the benefit of such utility companies or districts and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between County and such utility companies or districts and other contractors.

Acceptance of Work by Others
If any part of Contractor's work depends for proper execution or results upon the work of any such other contractor or utility company or district (or County), Contractor shall inspect and promptly report to County in writing any delays, defects or deficiencies in such work that render it unavailable or unsafe for such proper execution and results. Contractor's failure so to report will constitute an acceptance of the other work as fit and proper for integration with Contractor's work except for latent or nonapparent defects and deficiencies in the other work.

ARTICLE XIX: TESTS AND INSPECTIONS

Tests and Inspections Required by Laws or Regulations
If laws or regulations of any public body having jurisdiction require any work (or part thereof) to specifically be inspected, tested or approved, Contractor shall assume full responsibility therefor, pay all costs in connection therewith and furnish County the required certificates of inspection, testing, approval or compliance. Contractor shall also be responsible for and shall pay all costs in

connection with any inspection or testing required in connection with County's acceptance of a supplier of materials or equipment proposed to be incorporated in the work, or of materials or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the work. The cost of all inspections, tests and approvals in addition to the above which are required by the contract documents shall be paid by County (unless otherwise specified). Contractor must utilize materials and equipment which are available for inspection at the plant or at the point of distribution in California in the case of foreign materials or equipment.

Other Inspections and Tests
All inspections, tests or acceptances other than those required by laws and regulations of any public body having jurisdiction shall be performed by organizations acceptable to County.

General Requirements
All materials, equipment, installation, and workership included in this contract, if so required by County, shall be tested and inspected to prove compliance with the contract requirements. Installed leakage tests and other piping tests shall be as specified in the technical provisions of these specifications.

No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test. Contractor shall give County timely notice of readiness of the work for all required inspections, tests or approvals.

Tests and inspections shall include:

1. The delivery acceptance test and inspections.
2. The installed tests and inspections of items as installed.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry.

The form of evidence of satisfactory fulfillment of delivery acceptance test and of installed test and inspection requirements shall be, at the discretion of County, either by tests and inspections carried out in County's presence or by certificates or reports of tests and inspections carried out by approved persons or organizations. The Contractor shall provide and use forms which include all test information and are acceptable in content to County.

Certificates of Compliance
A Certificate of Compliance shall be furnished prior to the use of any materials for which the specifications or the Special Provisions require that such a certificate be furnished. In addition, when so authorized in the specifications or in the Special Provisions, the County may permit the use of certain materials or assemblies prior to sampling and testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the specifications. A Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate.

All materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and specifications and any such material not conforming to such requirements will be subject to rejection whether in place or not.

County reserves the right to refuse to permit the use of material on the basis of a Certificate of Compliance.

The form of the Certificate of Compliance and its disposition shall be as directed by County.

Delivery Acceptance Tests and Inspection
The delivery acceptance tests and inspection shall be at the Contractor's expense for any materials or equipment specified herein and shall include the following:

1. Test of items during the process of manufacture and/or on completion of manufacture, comprising material tests, hydraulic pressure tests, electric tests, performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual clauses of these specifications to satisfy County that the items tested and inspected comply with the requirements of this contract. Tests required, other than those specified, will be in accordance with the contract specifications.

2. Inspection of all items delivered at the site in order that County may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery.

Installed Tests and Inspection

All equipment shall be tested by the Contractor to the satisfaction of County before any facility is put into operation. Tests shall be as specified herein and shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work.

At least 30 days before the time allowed in the construction schedule for commencing testing and start up procedures, the Contractor shall submit to County, details of the procedures Contractor proposes to adopt for testing and startup of all mechanical and electrical equipment to be operated singly and together, excepting when such procedures have been covered in the specifications. Such tests shall be conducted using potable water where water is required for such testing. The water required for such tests shall be provided by the Contractor.

During the testing of equipment, the Contractor shall make available experienced factory trained representatives of the manufacturers of all the various pieces of equipment, or other qualified persons who shall instruct County's personnel in the operation and care thereof. Instruction shall include step-by-step troubleshooting procedures with all necessary test equipment. All manufacturer's instructions shall be provided in writing.

If, under test, any portion of the work shall fail to fulfill the contract requirements and is altered, renewed or replaced, tests on that portion when so altered, removed or replace, together with all other portions of the work as are affected thereby, shall, if so required by County, be repeated within reasonable time and in accordance with the specified conditions, and the Contractor shall pay to County all reasonable expenses incurred by County as a result of the carrying out of such tests.

Where, in the case of an otherwise satisfactory installed test, any doubt, dispute or difference should arise between County and the Contractor regarding the test results or methods or equipment using in the carrying out by the Contractor of such test, then County may order the test to be repeated. If the repeat test, using such modified methods or equipment as County may require, substantially confirms the previous test then costs in connection with the repeat test will be paid by County, otherwise the costs shall be borne by the Contractor. Where the results of any installed test fail to comply with the contract requirements for such test then such repeat tests as may be necessary to achieve the contract requirements shall be made by the Contractor at Contractor's own expense.

Quality Control

County will perform testing for the following as the County deems necessary:

1. Soils compaction control
2. Cast-in-place concrete control
3. Aggregate base rock
4. Portland Cement concrete
5. Asphalt concrete
6. Other materials and work incorporated in project

The Contractor shall pay for testing of those samples which fail to meet acceptable standards.

The Contractor shall provide services of a qualified testing laboratory to perform testing for all other work including but not limited to:

1. Concrete mix design
2. Asphalt concrete mix design

The testing laboratory selected by the Contractor is subject to County's approval. The laboratory shall cooperate with Contractor and County and provide qualified personnel promptly on notice, perform specified inspections, sampling and testing of materials as needed to comply with specified standards, and ascertain compliance with requirements of contract documents.

Work Requiring Testing
If any work (including the work of others) that is required by the Contract Documents to be inspected, tested or accepted is covered without written concurrence of County, it must, if requested by County, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given County timely notice of Contractor's intention to cover the same and County has not acted with reasonable promptness in response to such notice.

Contractor's Obligation
Neither observations by County nor inspections, tests or approvals by others shall relieve Contractor from Contractor's obligations to perform the work in accordance with the contract documents.

Uncovering Work Covered Contrary to County's Request
If any work is covered contrary to the written instructions of County or Code or contract requirements, it must, if requested by County, be uncovered for County's observation and replaced at Contractor's expense.

Uncovering Work for Inspection or Testing
In addition to the provisions above regarding work requiring testing, if County considers it necessary or advisable that covered work be observed by County or inspected or tested by others, Contractor, at County's request, shall uncover, expose or otherwise make available for observation, inspection or testing as County may require, that portion of the work in question, furnishing all necessary labor, material and equipment. If it is found that such work is defective, Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including but not limited to fees and charges of engineers, architects, attorneys and other professionals), and County shall be entitled to an appropriate decrease in the contract price, and, if the parties are unable to agree as to the amount thereof, may make a claim therefor as provided in this contract. If, however, such work is not found to be defective, Contractor shall be allowed an increase in the contract price or an extension of the contract time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction; and, if the parties are unable to agree as to the amount or extent thereof, Contractor may make a claim therefor as provided for in this contract.

ARTICLE XX: SUSPENSION OF WORK AND TERMINATION

County May Suspend Work
County may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety days by notice in writing to Contractor. As soon as possible, County will fix the date on which work will be resumed. Contractor shall resume the work on the date so fixed. If Contractor believes that such suspension justifies an increase in the contract price or an extension of the contract time and County and Contractor are unable to agree to the amount or extent thereof, Contractor may make a claim therefor as provided herein.

County May Terminate
Except as limited by law or regulation, County may terminate upon the occurrence of any one or more of the following events:

1. If Contractor commences a voluntary case under any chapter of the Bankruptcy Code (Title 11, United States Code), as now or hereafter in effect, or if Contractor takes any equivalent or similar action by filing a petition or otherwise under any other federal or state law in effect at such time relating to the bankruptcy or insolvency;

2. If petition is filed against Contractor under any chapter of the Bankruptcy Code as now or hereafter in effect at the time of filing, or if a petition is filed seeking any such equivalent or similar relief against Contractor under any other federal or state law in effect at the time relating to bankruptcy or insolvency;

3. If Contractor makes a general assignment for the benefit of creditors;

4. If a trustee, receiver, custodian or agent of Contractor is appointed under applicable law or under contract, whose appointment or authority to take charge of property of Contractor is for the purpose of enforcing a lien against such property or for the purpose of general administration of such property for the benefit of Contractor's creditors;

5. If Contractor admits in writing an inability to pay its debts generally as they become due;

6. If Contractor persistently fails to perform the work in accordance with the contract documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the progress schedule established herein as revised from time to time or fails to make prompt payment to subcontractors or for materials or labor or persistently disregards laws, ordinances or instructions of the County);

7. If Contractor disregards laws or regulations of any public body having jurisdiction;

8. If Contractor disregards the authority of County or its agents; or

9. If Contractor otherwise violates in any substantial way any provisions of the contract documents;

County may, after giving Contractor (and the surety, if there be one) seven days' written notice and to the extent permitted by laws and regulations, terminate the services of Contractor, exclude Contractor from the site and take possession of the work and of all Contractor's tools, appliances, construction equipment and machinery at the site and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion), incorporate in the work all materials and equipment stored at the site or for which County has paid Contractor but which are stored elsewhere, and finish the work as County may deem expedient. In such case Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price exceeds the direct, indirect and consequential costs of completing the work (including but not limited to fees and charges of engineers, architects, attorneys and other professionals and court costs) such excess will be paid to Contractor. If such costs exceed such unpaid balance, Contractor shall pay the difference to County. Such costs incurred by County will be approved as to reasonableness by County and incorporated in a change order, but when exercising any rights or remedies under this paragraph County shall not be required to obtain the lowest price for the work performed. Where Contractor's services have been so terminated by County, the termination will not affect any rights or remedies of County against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by County will not release Contractor from liability.

County May Abandon

Upon written notice to Contractor County may, without cause and without prejudice to any other right or remedy, elect to abandon the work and terminate the agreement. Contractor shall stop work as specified in said notice, terminate all subcontracts, deliver all materials already paid for and secure the site. In such case, Contractor shall be paid for all work executed and any actual expense sustained. No lost profit for work not yet undertaken shall be due to Contractor.

Contractor May Stop Work or Terminate

If, through no act or fault of Contractor, the work is suspended for a period of more than ninety days by County or under an order of court or other public authority, or County fails to act on any application for payment within thirty days after it is submitted, or County fails for thirty days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days' written

notice to County, terminate the agreement and recover from County payment for all work executed and any expense sustained. In addition and in lieu of terminating the agreement, if County has failed to act on an application for payment or County has failed to make any payment as aforesaid, Contractor may upon seven days' written notice to County stop the work until payment of all amounts then due. The provisions of this paragraph shall not relieve Contractor of the obligations to carry on the work in accordance with the progress schedule and without delay during disputes and disagreements with County.

ARTICLE XXI COUNTY'S AGENT'S STATUS DURING CONSTRUCTION

County's Representative
County may appoint representatives during the construction period. The duties and responsibilities and the limitations of authority of such agents during construction are set forth herein and shall not be extended without written consent of County.

Agent's Authority
County may delegate authority to an employee or agent, including an engineer or an architect, to determine the amount, quality, acceptability and fitness of the several kinds of work, material and equipment which are to be paid for under the contract; to decide for the County all questions relative to the true construction, meaning and intent of the contract documents; to decide all questions relative to the classification and measurements of quantities and materials and the fulfillment of this contract, and to reject or condemn all work or material which does not conform to the terms of this contract. The representative's decision in all matters is the decision of County and shall be final and binding on Contractor.

Replacement of Representative
County reserves the right to terminate the employment of the representative at any time.

Visits to Site
Where a representative represents County, said representative will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. However, Contractor must supervise the work and cannot rely on said representative or County as they will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. The representative's efforts will be directed toward providing for County a greater degree of confidence that the completed work will conform to the contract documents. On the basis of such visits and on-site observations, the representative will keep County informed of the progress and adequacy of the work.

Observation of Work
If County and the representative agree, the representative will observe the performance of the work. The duties, responsibilities and limitations of authority of the representative in observing the work will be as provided herein. If County designates another agent to represent County at the site who is not the representative's agent or employee, the duties, responsibilities and limitations of authority of such other person will be as provided in supplementary conditions.

Clarifications and Interpretations
The representative may be appointed to issue (with reasonable promptness) such written clarifications or interpretations of the requirements of the contract documents (in the form of drawings or otherwise) as the representative may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the contract documents. If Contractor believes that a written clarification or interpretation justifies an increase in the contract price or an extension of the contract time and the parties are unable to agree to the amount or extent thereof, Contractor may make a claim therefor as provided in the contract. Said claim shall be made to County unless a representative has been selected to provide such clarifications or interpretations.

Authorized Variations in Work

If a representative is appointed, such representative may authorize minor variations in the work from the requirements of the contract documents which do not involve an adjustment in the contract price or the contract time and are consistent with the overall intent of the contract documents. These may be accomplished by a field order and will be binding on County, and also on Contractor who shall perform the work involved promptly. If Contractor believes that a field order justifies an increase in the contract price or an extension of the contract time and County and Contractor are unable to agree as to the amount or extent thereof, Contractor may make a claim therefor as provided in this Contract.

Rejecting Defective Work

If a representative is appointed, such representative will have authority to disapprove or reject work which the representative believes to be defective, and will also have authority to require special inspection or testing of the work whether or not the work is fabricated, installed or completed. Any decision made by said representative in disapproving or rejecting work shall be binding on Contractor.

Determinations for Unit Prices

If a representative is appointed, such representative will determine the actual quantities and classifications of unit price work performed by Contractor. The representative will review with the Contractor the representative's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an application for payment or otherwise). The representative's written decisions thereon will be final and binding upon Contractor.

Claims and Disputes

For purposes of this paragraph, "claim" shall be defined as set forth in Public Contracts Code Section 20104(b)(2). Claims shall be presented in writing and include the documents necessary to substantiate the claim. Claims must be filed with the designated County representative no later than thirty (30) days after the occurrence of the event giving rise thereto or denial of the change order, whichever occurs last. The form of said claims shall be the same as is required by Government Code Sections 910 and 910.2.

If the claim is under $50,000, County shall respond in writing to Contractor within 45 days of receipt of Contractor's claim or may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the County may have against the Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to Public Contract Code Section 20104.2, upon mutual agreement of the County and Contractor. The County's written response to the claim, as further documented, shall be submitted to Contractor within 15 days after receipt of the further documentation or within a period of time no greater than that taken by Contractor in producing the additional information, whichever is greater.

For claims over $50,000 and less than or equal to $375,000, County shall respond in writing to all written claims within 60 days of receipt of the claim, or may request, in writing within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the County may have against Contractor. If additional information is thereafter required, it shall be requested and provided pursuant to Public Contract Code Section 20104.2, upon mutual agreement of County and Contractor. The County's written response to the claim, as further documented, shall be submitted to Contractor within 30 days after receipt of the further documentation, or within a period of time no greater than that taken by Contractor in producing the additional information or requested documentation, whichever is greater.

If Contractor disputes County's written response, or County fails to respond within the time prescribed above, Contractor may so notify County, in writing, either within 15 days of receipt of County's response or within 15 days of County's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer with such County representatives as the County Administrator or the Board of Supervisors directs for settlement of the issues in dispute. Upon such demand, County shall schedule a meet and confer conference within 30 days for settlement of the dispute.

Following the meet and confer conference, if the claim or any portion remains in dispute, Contractor may file a claim with the Board of Supervisors pursuant to Chapter 1 (commencing with Section 900) and Chapter 2 (commencing with Section 910) of Part 3 of Division 3.6 of Title 1 of the Government Code. Pursuant to authority granted by Government Code Section 930.2, all claims filed with the Board of Supervisors pursuant to the Government Code shall be filed within 90 days of the denial of the original claim by the County representative. The running of the period of time within which a claim under the Government Code must be filed shall be tolled by any period of time utilized by the meet and confer conference. Any lawsuit which Contractor intends to bring with respect to any claim filed pursuant to the Government Code which claim has been denied by County must be commenced not later than six months after the recording of the notice of completion or not later than six months after the date final payment is deposited in the mail or personally delivered, whichever date comes first. If a civil action is filed, the mediation provisions set forth in Public Contract Code Section 20104.4 shall apply unless waived by mutual stipulation of County and Contractor or unless County elects to resolve the dispute pursuant to Public Contract Code Section 10240 et seq.

Effective January 1, 2017 Public Contract Code §9204, as enacted by AB 626, establishes a claim resolution process required for public works projects. In the event of any conflict between the provisions of Article XXI and Public Contract Code §9204, the provisions of the Public Contract Code shall prevail. The entire section can be found at the following link: https://leginfo.legislature.ca.gov/faces/codes_displayText.xhtml?lawCode=PCC&division=2.&title=&part=1.&chapter=9.&article

For every claim that Contractor makes, it shall provide the following documentation upon request of County as a condition precedent to consideration of the claim: Contractor's bidding calculations forms, cost estimates, time sheets, trend reports, job cost analysis records, labor records, as-built documents, any other records used by Contractor in arriving at its bid price, and any other documents or records kept by Contractor during the course of construction. In the event that claims are made, Contractor agrees that County shall have the right to conduct a complete audit of the books and records of Contractor relating to this project and any books and records relating to overhead, profit or general office expenses charged to this project.

Representative's Decision
Where a representative is appointed, the rendering of a decision by the representative with respect to any such claim, dispute or other matter (except any which have been waived by the making or acceptance of final payment) will be a condition precedent to any exercise by County or Contractor of such rights or remedies as either may otherwise have under the contract documents or by laws or regulations in respect of any such claim, dispute or other matter.

Limitations on Representative's Responsibilities
Neither the County's representative's authority to act nor any decision made by the representative in good faith either to exercise or not exercise such authority shall give rise to any duty or responsibility of the representative or County to Contractor, any subcontractor, any supplier, or any other person or organization performing any of the work, or to any surety for any of them.

Construction Methods and Safety
Notwithstanding any references to laws and regulations, rules, codes or standards in the contract documents, the representative and County will not be responsible for Contractor's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto, and the representative and County will not be responsible for Contractor's failure to perform or furnish the work in accordance with the contract documents.

Acts and Omissions of Contractor
Neither the County nor its representatives will be responsible for the acts or omissions of Contractor or of any subcontractor, any supplier, or any other person or organization performing or furnishing any of the work.

ARTICLE XXII: PARTIAL COMPLETION

Partial Completion (Completion of a Portion of the Work)
Use by County of any finished part of the work, which has specifically been identified in the contract documents, or which County and Contractor agree constitutes a separately functioning process or facility that can be used by County without significant interference with Contractor's performance of the remainder of the work, may be accomplished prior to completion of all the work subject to the following:

1. County at any time may request Contractor in writing to permit County to use any such part of the work which County believes to be ready for its intended use and substantially complete. If Contractor agrees, Contractor will certify to County that said part of the work is substantially complete and request County to issue a certificate of substantial completion for that part of the work. Contractor at any time may notify County in writing that Contractor considers any such part of the work ready for its intended use and substantially complete and request County to issue a certificate of substantial completion for that part of the work. Within a reasonable time after either such request, County and Contractor shall make an inspection of that part of the work to determine its status of completion. If County does not consider that part of the work to be substantially complete, County will notify Contractor in writing giving the reasons therefor. If County considers that part of the work to be substantially complete, County will deliver to Contractor a written recommendation as to the division of responsibilities pending final payment between County and Contractor for the entire work with respect to security, operation, safety, maintenance, heat, utilities, insurance and warranties. Unless Contractor disagrees in writing and so informs County promptly, County's aforesaid recommendation will be binding on Contractor until final payment for the entire work.

2. County may at any time request Contractor in writing to permit County to take over operation of any such part of the work although it is not substantially complete. A copy of such request will be sent to Contractor and within a reasonable time thereafter County and Contractor shall make an inspection of that part of the work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to County that such part of the work is not ready for separate operation by County, County will finalize the list of items to be completed or corrected and will deliver such list to Contractor together with a written recommendation as to the division of responsibilities pending final payment between County and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties and guarantees for that part of the work which will become binding upon County and Contractor at the time when County takes over such operation (unless they shall have otherwise agreed in writing). During such operation and prior to substantial completion of such part of the work, County shall allow Contractor reasonable access to complete or correct items on said list and to complete other related work.

3. No occupancy or separate operation of part of the work will be accomplished prior to the insurers who are then providing the property insurance having acknowledged notice thereof and in writing effecting the changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policies, but the property insurance shall not be canceled or lapse on account of any such partial use or occupancy. Each party shall be responsible for notifying its own insurer.

ARTICLE XXIII: ARBITRATION

Arbitration
Where the total of all claims filed by Contractor are under $375,000, County shall have the option of electing arbitration pursuant to Public Contract Code Sections 10240, et seq. If County does so elect, the mediation provisions of Public Contract Code Section 20104.4 shall not apply pursuant to Public Contract Code Section 20104(a)(2). If County does not elect such arbitration pursuant to Public Contract Code Sections 10240 et seq., the provisions of Public Contract Code Section 20104.4 shall apply.

Where the total of all claims filed by Contractor are above $375,000, the arbitration provisions of this contract are voluntary. Neither County nor Contractor shall be required to enter into mediation or arbitration for amounts above $375,000. Written consent of both parties to mediate or arbitrate such claims shall be a prerequisite to such mediation or arbitration. If the parties agree to arbitrate claims above $375,000, the provisions of Public Contract Code Sections 10240, et seq. shall be utilized.

Time to Request Arbitration
No request for arbitration of any claim, dispute or other matter that is required to be referred to County initially for decision will be made until the earlier of (a) the date on which County has rendered a decision or (b) the tenth day after Contractor has presented its evidence to County if a written decision has not been rendered by County before that date. Unless otherwise required by law, no request for arbitration of any such claim, dispute or other matter will be made later than thirty days after the date on which County has rendered a written decision. Notice of the request for arbitration will be in writing to the other party.

ARTICLE XXIV: LABOR AND EMPLOYMENT

Worker's Compensation Certification
By my signature hereunder, as Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Worker's Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of the work of this contract.

Prevailing Wage Rates
In accordance with the provisions of Section 1770 and 1773 of the Labor Code, the County of Nevada has determined that prevailing wage rates are applicable to the work to be done. The Contractor shall post a copy of the wage rates on the job site.

The general prevailing wage rates determined by the Director of Industrial Relations, for the county or counties in which the work is to be done, are available from the California Department of Industrial Relations' Internet website at http://www.dir.ca.gov . These wage rates are not included in the Bid Form and contract for the project. Changes, if any, to the general prevailing wage rates will be available at the same location.

Pursuant to California Labor Code Section 1775, Contractor shall forfeit Fifty Dollars ($50.00) for each calendar day, or portion thereof, for each worker paid less than the prevailing rates for such work or craft, and said amounts shall be distributed pursuant to the requirements of said Section 1775. Any employee whose type of work is not covered by any of the classified wage rates shall be paid not less than the rate of wage listed for the classification which most nearly corresponds to the type of work to be performed.

Collective Bargaining Agreements
Pursuant to California Labor Code Section 1773.8, Contractor shall pay travel and subsistence payments to all workers needed to execute the work as such travel and subsistence payments are defined in the applicable collective bargaining agreements filed in accordance with Section 1773.8 of the Labor Code.

Payroll Records
Contractor shall be responsible for keeping accurate payroll records as required by California Labor Code Section 1776. Contractor is aware that a penalty of twenty-five dollars ($25.00) per day or portion thereof for each worker may be assessed for noncompliance with said section. Contractor shall forward to County a certified copy of each payroll record within ten days after close of each payroll period. Such certification shall include a statement that payroll is correct and complete and complies with prevailing wage requirements.

If by the 15th of the month, the Contractor has not submitted satisfactory payrolls for all work performed during the monthly period ending on or before the 1st of that month, County will retain an amount equal to 10 percent of the estimated value of the work performed during the month from the

next monthly estimate, except that such retention shall not exceed $10,000. Retentions for failure to submit satisfactory payrolls shall be additional to all other retentions provided for in the contract. The retention for failure to submit payrolls for any monthly period will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory payrolls for which the retention was made are submitted.

The Contractor and each subcontractor shall preserve their payroll records for a period of three years from the date of completion of the contract.

Limitations on Hours Worked
Eight hours constitutes a day's work and workers shall be limited to working 8 hours during any one calendar day and 40 hours during any one calendar week. Contractor and all subcontractors shall keep an accurate record of hours worked by each worker for each calendar day and each calendar week which record shall be available for inspection during business hours. Contractor shall, pursuant to California Labor Code Section 1813, forfeit twenty-five dollars ($25) for each day for each worker where such worker is required or permitted to work more than 8 hours in any one day and 40 hours in any one week in violation of the provisions of the Labor Code. No overtime shall be authorized unless prior written approval of County is obtained permitting such overtime. If such overtime work is authorized by County, Contractor shall compensate each worker required to work overtime at the rate of one and one-half (1-1/2) times the basic rate of pay. All costs for overtime inspection, except those occurring as a result of overtime and shift work established as a regular procedure, shall be paid by the Contractor. Overtime inspection shall include inspection required during holidays, Saturdays, Sundays, and any weekday between the hours of 5:00 p.m. and 7:00 a.m. Such costs will include but will not necessarily be limited to engineering, inspection, general supervision and other overhead expenses which are directly chargeable to the overtime work. All such charges shall be deducted by County from payments due the Contractor.

Equal Employment Opportunity and Nondiscrimination
During the performance of this contract, the contractor agrees to abide by all provisions of Section 1735 of the California Labor Code, as amended, regarding nondiscrimination practices.

Employment of Apprentice Labor
Reference is hereby made to Section 1777.5 of the Labor Code of the State of California, which regulations shall govern the employment of apprentices on the work.

Preference for Resident Labor
In the employment of labor for doing the work, the Contractor shall give preference to qualified persons residing within the general area of the work.

Incompetent Workers
If at any time any worker employed by Contractor or any of the subcontractors shall be declared by County to be incompetent or unfaithful in executing the work, the Contractor, on receiving written notice, shall forthwith initiate appropriate action to dismiss such person.

Labor Class Substitutions
If Contractor substitutes a labor classification or provides a new classification which results in a reduction in the contract price, County's execution of a change order evidencing said reduction in price shall in no way be construed, either express or implied, as consent to the use of said labor classification in the performance of any work on the project.

ARTICLE XXV: ASSIGNMENT

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

ARTICLE XXVI: CONFLICT OF INTEREST RESTRICTIONS

No official of County who is authorized in such capacity and on behalf of County to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspecting, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof. No officer, employee, architect, attorney, engineer, or inspector of or for County who is authorized in such capacity and on behalf of County who is in any legislative, executive, supervisory, or other similar function in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

ARTICLE XXVII: WAIVER OF RIGHTS

No action or lack of action on the part of County at any time to exercise any right or remedy conferred upon it under this contract shall be deemed to be a waiver on the part of County of any of County's rights or remedies.

ARTICLE XXVIII: SUCCESSORS IN INTEREST

County and Contractor each bind themselves, their partners, successors, assigns and legal representatives to the other party hereto, their partners, successors, assigns and legal representatives in respect to all covenants, agreements, and obligations contained in the contract documents.

ARTICLE XXIX: NOTICE

Giving Notice

Whenever any provision of the contract documents requires the giving of written notice, it will be deemed to have been validly given if delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or if delivered at or sent registered or certified mail, postage prepaid, to the last business address known to the giver of the notice. The business addresses of Contractor given in the Bid Form and Contractor's office at the site of the work are hereby designated as the places to which all notices, letters, and other communication to Contractor will be delivered. However, County or Contractor may change their addresses at any time by an instrument in writing delivered to the other.

Joint Venture Contractor

In the event the Contractor is a joint venture of two or more Contractors, all grants, covenants, provisos and claims, rights, powers, privileges and liabilities of the contract shall be construed and held to be several as well as joint; any notice, order, direction, request or other communication required to be or that may be given by County to the Contractor under this agreement shall be well and sufficiently given to all persons being the Contractor if given to any one or more of such persons; any notice, request or other communication given by any one of such persons to County under this agreement shall be deemed to have been given by and shall bind all persons being the Contractor.

ARTICLE XXX: VENUE AND JURISDICTION

This contract shall be construed in accordance with the laws of the State of California and the parties agree that venue shall be in Nevada County, California.

IN WITNESS WHEREOF, the parties hereto have signed this Agreement on the date first written, above. One counterpart each has been delivered to County, Contractor, and the Sureties. All portions of the contract documents have been signed or identified by County and Contractor.

COUNTY OF NEVADA

ATTEST:

By:_____

_____
Clerk of the Board

Chair, Board of Supervisors

CONTRACTOR

By:_____

Name: _____

Title: _____

Licensed in accordance with an act providing for the registration of Contractors

License Number:_____

Fed. Tax ID No: _____

Telephone No: _____

ATTACHMENT 1: ELECTRICAL SPECIFICATIONS

SECTION 260010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Table of Contents, Division 26 - Electrical:

SECTION NO.	SECTION TITLE
260010	BASIC ELECTRICAL REQUIREMENTS
260060	POWER SYSTEM STUDY
260519	BUILDING WIRE AND CABLE
260526	GROUNDING AND BONDING
260529	ELECTRICAL HANGERS AND SUPPORTS
260531	CONDUIT
260533	BOXES
260543	UNDERGROUND DUCTS AND STRUCTURES
260553	ELECTRICAL IDENTIFICATION
262413	SWITCHBOARDS
262816	OVERCURRENT PROTECTIVE DEVICES

B. Work included: This Section includes general administrative and procedural requirements for Division 26. The following administrative and procedural requirements are included in this Section to supplement the requirements specified in Division 1, “General Provisions”.

1. Quality assurance.
2. Definition of terms.
3. Submittals.
4. Coordination.
5. Record documents.
6. Operation and maintenance manuals.
7. Rough-in.
8. Electrical installation.
9. Cutting, patching, painting, and sealing.
10. Field quality control.
11. Cleaning.
12. Project closeout.

C. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete and operable installation.

1. General and supplementary conditions: Drawings and general provisions of Contract and Division 1, “General Provisions” of the Specifications, apply to all Division 26 Sections.

2. Earthwork: Include trenching, backfilling, boring and soil compaction as required for the installation of underground conduit, in-grade pull boxes, vaults, lighting pole foundations, etc. Refer to Caltrans Standard Specifications 2018 and County Special Provisions.

3. Concrete work: Include forming, steel bar reinforcing, cast-in- place concrete, finishing and grouting as required for underground conduit encasement, light pole foundations, pull box slabs, vaults, housekeeping pads, etc. Refer to Caltrans Standard Specifications 2018 and County Special Provisions.

1.02 QUALITY ASSURANCE

A. Reference to Codes, Standards, Specifications and recommendations of technical societies, trade organizations and governmental agencies shall mean that latest edition of such publications adopted and published prior to submittal of the bid. Such codes or standards shall be considered a part of this Specification as though fully repeated herein.

B. When codes, standards, regulations, etc. allow Work of lesser quality or extent than is specified under this Division, nothing in said codes shall be construed or inferred authority for reducing the quality, requirements, or extent of the Contract Documents. The Contract Documents address the minimum requirements for construction.

C. Work shall be performed in accordance with all applicable requirements of the latest edition of all governing codes, rules and regulations including but not limited to the following minimum standards, whether statutory or not:

1. California Electrical Code (CEC).

2. California Building Code (CBC).

3. California Fire Code (CFC).

4. California Mechanical Code (CMC).

D. Standards: Equipment and materials specified under this Division shall conform to the following standards where applicable:

ACI	American Concrete Institute
ANSI	American National Standards Institute
ASTM	American Society for Testing Materials
CBM	Certified Ballast Manufacturers
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers, Inc.
IPCEA	Insulated Power Cable Engineer Association
NEMA	National Electrical Manufacturer's Association
UL	Underwriters' Laboratories

E. Independent Testing Agency qualifications:

1. Testing Agency shall be an independent testing organization that will function as an unbiased authority, professionally independent of Manufacturer, Supplier and Contractor, furnishing and installing equipment or system evaluated by Testing Agency.

2. Testing Agency shall be regularly engaged in the testing of electrical equipment, devices, installations, and systems.

3. Testing Agency shall meet Federal Occupational Safety and Health Administration (OSHA) requirements for accreditation of independent testing laboratories, Title 9, Part 1907.
4. On-site technical personnel shall be currently certified by the International Electrical Testing Association in electrical power distribution system testing.
5. Testing Agency shall use technicians who are regularly employed by the firm for testing services.
6. Contractor shall submit proof of above Testing Agency qualifications with bid documentation upon request.

F. All base material shall be ASTM and/or ANSI standards.

G. All electrical apparatus furnished under this Section shall conform to NEMA standards and the CEC and bear the UL label where such label is applicable.

H. Certify that each welder performing Work has satisfactorily passed AWS qualification tests for welding processes involved and, if pertinent, has undergone re-certification.

1.03 DEFINITION OF TERMS

A. The following list of terms as used in the Division 26 documents shall be defined as follows:

1. "Provide": Shall mean furnish, install, and connect unless otherwise indicated.
2. "Furnish": Shall mean purchase and deliver to Project site.
3. "Install": Shall mean to physically install the items in-place.
4. "Connect": Shall mean make final electrical connections for a complete operating piece of equipment.
5. "As directed": Shall be as directed by the Owner or their authorized Representative.
6. "Utility Companies": Shall mean the company providing electrical, telephone or cable television services to the Project.

1.04 SUBMITTALS

A. Format: Furnish submittal data in electronic format for each Specification Section with a table of contents listing materials by Section and paragraph number.

B. Submittals shall consist of detailed Shop Drawings, Specifications, block wiring diagrams, "catalog cuts" and data sheets containing physical and dimensional information, performance data, electrical characteristics, materials used in fabrication and material finish. Clearly indicate by arrows or brackets precisely what is being submitted on and those optional accessories which are included and those which are excluded. Furnish quantities of each submittal as noted in Division 1, “General Provisions”.

C. Each submittal shall be labeled with the Specification Section Number and shall be accompanied by a cover letter or shall bear a stamp stating that the submittal has been thoroughly reviewed by the Contractor and is in full compliance with the requirements of the Contract Documents or provide a Specification Section line-by-line compliance response statement with detailed exception/ deviation response statements for all applicable provisions for the applicable Specification Section. Any Specification Section lines without a detailed exception/ deviation response

statement shall be treated as the Contractor or Vendor is submitting in full compliance with the applicable Specification Section requirements. Cover letters shall list in full the items and data submitted. Failure to comply with this requirement shall constitute grounds for rejection of data.

D. The Contractor shall submit detailed Drawings of all electrical equipment rooms and closets if the proposed installation layout differs from the construction documents. Physical size of electrical equipment indicated on the Drawings shall match those of the electrical equipment that is being submitted for review, i.e.: switchboards, panelboards, transformers, control panels, etc. Minimum scale: 1/4" = 1'- 0". Revised electrical equipment layouts must be approved prior to release of order for equipment and prior to installation.

E. As part of the equipment and fixture submittals, the Contractor shall provide anchorage calculations for floor and wall mounted electrical equipment and fixtures, distribution conduits and raceways, in conformance with the latest edition of the California Building Code (CBC) and ASCE 7. Use the Occupancy Category, Ground Accelerations, Site Class, Seismic Design Category, and Seismic Importance Factor as noted in the structural drawings. For components required for Life Safety or containing hazardous materials use Ip=1.5. Structural Calculations shall be prepared, stamped, and signed by a California Registered Structural Engineer. Specify proof loads for drilled-in anchors, if used.

F. The Manufacturer shall recommend the method of anchoring the equipment to the mounting surface and shall provide the Contractor with the assembly dimensions, weights, and approximate centers of gravity.

G. Review of submittals is for general conformance to design concept and general compliance with the Specification Sections. Submittal Review Comments do not imply waiver of Specifications Section requirements unless specifically noted.

H. All resubmittals shall include a cover letter that lists the action taken and revisions made to each Drawing and equipment data sheet in response to Submittal Review Comments. Resubmittal packages will not be reviewed unless accompanied by this cover letter. Failure to include this cover letter will constitute rejection of the resubmittal package.

I. Independent Testing Agency report:

1. Testing Agency shall provide 3 copies of the complete testing report.
2. Test report shall include the following:
    a. Summary of Project.
    b. Description of equipment.
    c. Equipment used to conduct the test.
        1) Type.
        2) Manufacturer.
        3) Model number.
        4) Serial number.
        5) Date of last calibration.
        6) Documentation of calibration leading to NIST standards.

d. Description of test.

e. Test results, as compared to Manufacturers or industry accepted standards and tolerances.

f. Conclusion and recommendation.

g. Signature of responsible test organization authority.

3. Furnish completed test report to Engineer no later than 30-days after completion of testing, unless otherwise directed.

J. Substitutions:

1. All requests for substitutions shall conform to the general requirements and procedure outlined in Division 1, “General Provisions”.

2. Where items are noted as "or equal," a product of equal design, construction and performance will be considered. Contractor must submit to the Engineer all pertinent test data, catalog cuts and product information required substantiating that the product is in fact equal to that specified. Only one substitution will be considered for each product specified.

3. Manufacturers' names and model numbers used in conjunction with materials, processes or equipment included in the Contract Documents are used to establish standards of quality, utility, and appearance. Materials, processes, or equipment, which in the opinion of the Engineer is equal in quality, utility, and appearance, will be approved as substitutions to that specified.

4. Whenever any material, process or equipment is specified in accordance with a Federal specification, an ASTM standard, an ANSI specification, UL rating or other association standard, the Contractor shall present an affidavit from the Manufacturer certifying that the product complies with the particular standard specification. When requested by the Engineer, support test data to substantiate compliance shall be submitted by the Contractor at no additional cost.

5. Substitutions shall be equal, in the opinion of the Architect/Engineer, to the specified product. The burden of proof of such shall rest with the Contractor. When the Architect/Engineer in writing accepts a substitution, it is with the understanding that the Contractor guaranteed the substituted article or material to be equal to the one specified and dimensioned to fit within the construction. Approved substitutions shall not relieve the Contractor of responsibilities for the proper execution of the Work or from any provisions of the Specifications.

6. The Contractor shall be responsible for all expenses in connection with the substitution materials, processes, and equipment, including the effect of the substitution on the Contractor, Subcontractor’s, or other Contractor's Work. No substitution of material, processes or equipment shall be permitted without written authorization of the Architect/Engineer. Any assumptions on the acceptability of a proposed substitution prior to acceptance by the Engineer are at the sole risk of the Contractor.

1.05 COORDINATION

A. Discrepancies:

1. In the event of discrepancies within the Contract Documents, the Engineer shall be so notified, within sufficient time, as delineated in Division 1, “General Provisions”. prior to the Bid Opening to allow the issuance of an Addendum.

2. If, in the event that time does not permit notification or clarification of discrepancies prior to the Bid Opening, the following shall apply: The Drawings govern in matters of quantity and the Specifications govern in matters of quality. In the event of conflict within the Drawings involving quantities or within the Specifications involving quantities or within the Specifications involving quality, the greater quantity and higher quality shall apply. Such discrepancies shall be noted and clarified in the Contractor's Bid. No additional allowances will be made because of errors, ambiguities or omissions that reasonably should have been discovered during the preparation of the Bid.

B. Project conditions:

1. Examination of Project site: The Contractor shall visit the Project site and thoroughly review the locale, working conditions, conflicting utilities, and the conditions in which the Electrical Work will take place. Verify all existing conditions in the field. No allowances will be made subsequently for any costs that may be incurred because of any error or omission due to failure to examine the Project site and to notify the Engineer of any discrepancies between Contract Documents and actual Project site conditions.

2. Protection: Keep conduits, junction boxes, outlet boxes and other openings closed to prevent entry of foreign matter. Cover fixtures, equipment, devices, and apparatus and protect them against dirt, paint, water, chemical or mechanical damage, before and during construction period. Prior to final acceptance, restore to original condition any fixture, apparatus or equipment damaged including restoration of damaged factory applied painted finishes. Protect bright finished surfaces and similar items until in service. No rust or damage will be permitted.

3. Supervision: Contractor shall personally or through an authorized and competent representative constantly supervise the Work from beginning to completion and, within reason, keep the same foreman and workmen on the Project throughout the Project duration.

C. Preparation:

1. Drawings:

a. Layout: General layout indicated on the Drawings shall be followed except where other Work may conflict with the Drawings.

b. Accuracy: Drawings for the Work under this Section are essentially diagrammatic

1.06 RECORD DOCUMENTS

A. Provide Project Record Drawings as described herein:

1. Drawings shall fully represent installed conditions including actual locations of outlets, true panelboard connections following phase balancing routines, correct conduit, and wire sizing as well as routing, revised luminaire schedule listing Manufacturers and products installed and revised panel schedules. Contractor shall record all changes in the Work during the course of construction on blue or black line prints. These prints shall be made subject of monthly review by the Owner's Representative to ascertain that they are current. If not current, monthly payments may be withheld.

2. Record Drawings shall be the transfer of information on these prints to the construction documents via computer aided drafting (CAD). A set of CAD files of the electrical construction documents will be provided to the Contractor by the Engineer
3. Record drawing submissions shall be provided to the Engineer to review upon the completion of the following phases of Work:
    a. All underground installation.
    b. Building electrical rough-in.
    c. Final electrical installation.
4. A single set of half size prints of the Record Drawings shall be submitted for review. Upon receipt of the Engineer's review comments, corrections shall be made, and the Contractor shall provide the following:
    a. Electronic files of Drawings in PDF and CAD.

B. Panel schedules:
1. Typewritten panel schedules shall be provided for panelboards indicating the loads served and the correct branch circuit number. Schedules shall be prepared on forms provided by the Manufacturer and inserted in the pocket of the inner door of each panelboard. See Section 262413: Switchboards for requirements.

C. Field labels, markings, and warning signs: Provide in accordance and as required by:
1. General: CEC Article 110.21.
2. Arc-Flash Hazard Warning: CEC Article 110.16 (A).
3. Service Equipment: CEC Article 110.16 (B).
4. Identification of Disconnecting Means: CEC Article 110.22 (A).
5. Available Fault Current: CEC Article 110.24.
6. Depth of Working Space in Existing Buildings: CEC Article 110.26 (A)(1)(c).
7. Guarding of Live Parts: CEC Article 110.27 (C).
8. Manholes: CEC Article 110.75 (E).
9. Identification for Branch Circuits: CEC Article 210.5.
10. Identification for Feeders: CEC Article 215.12.
11. Switchboard, Switchgear, and Panelboard Identification: CEC Article 408.3.
12. Field Identification Required: CEC Article 408.4.
13. Short-Circuit Current Rating: CEC Article 408.6.

1.07 OPERATION AND MAINTENANCE MANUALS

A. Prior to Project closeout furnish to the Owner, six (6) hard back 3-ring binders containing all bulletins, operation and maintenance instructions, part lists, service telephone numbers and other pertinent information as noted in each Section all equipment furnished under Division 26. Binders shall be indexed into Division

Sections and labeled for easy reference. Bulletins containing more information than the equipment concerned shall be properly stripped and assembled.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 ROUGH-IN

A. Contractor shall verify lines, levels and dimensions indicated on the Drawings and shall be responsible for the accuracy of the setting out of Work and for its strict conformance with existing conditions at the Project site.

B. Verify final locations for rough ins with field measurements and with the requirements for the actual equipment to be connected.

3.02 ELECTRICAL INSTALLATION

A. Preparation, sequencing, handling, and installation shall be in accordance with Manufacturer's written instructions and technical data particular to the product specified and/or accepted equal except as otherwise specified. Comply with the following requirements:

1. Shop Drawings prepared by Manufacturer.
2. Verify all dimensions by field measurements.
3. Direction prior to proceeding with rough-in.
4. Coordinate connection of electrical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies and controlling agencies. Provide required connection for each service.
5. Install systems, materials, and equipment to conform with approved submittal data, including coordination Drawings, to greatest extent possible. Conform to arrangements indicated by the Contract Documents, recognizing that portions of the Work are indicated only in diagrammatic form. Where coordination requirements conflict with individual system requirements, refer conflict to the Architect.
6. Install systems, materials, and equipment level and plumb, parallel, and perpendicular to other building systems and components, where installed exposed in finished spaces.
7. Install electrical equipment to facilitate servicing, maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
8. Coordinate electrical systems, equipment, and materials installations with other building components.
9. Install systems, materials and equipment giving right-of-way priority to other systems that are required to maintain a specified slope.
10. Conform to the National Electrical Contractors Association "Standard of Installation" for general installation practice.

3.03 CUTTING, PATCHING, PAINTING AND SEALING

A. Structural members shall in no case be drilled, bored, or notched in such a manner that will impair their structural value. Cutting of holes, if required, shall be done with core drill and only with the approval of the Owner.

B. Protection of Installed Work: During cutting and patching operations, protect adjacent installations.

C. Cut, remove, and legally dispose of selected electrical equipment, components and materials as indicated, including but not limited to removal of electrical items indicated to be removed and items made obsolete by the new work.

D. Protect the structure, furnishings, finishes and adjacent materials not indicated or scheduled to be removed.

E. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

F. Patch existing surfaces and building components using experienced installers and new materials matching existing materials and the original installation. For installers' qualifications refer to the materials and methods required for the surface and building components being patched.

G. Application of joint sealers:

1. General: Comply with joint sealer Manufacturers' printed application instructions applicable to products and applications indicated, except where more stringent requirements apply.

2. Installation of fire-stopping sealant: Install sealant, including forming, packing and other accessory materials, to fill openings around electrical services penetrating floors and walls, to provide fire-stops and fire-resistance ratings indicated for floor or wall assembly in which penetration occurs. Comply with installation requirements established by testing and inspecting agency.

3.04 FIELD QUALITY CONTROL

A. General testing requirements:

1. The purpose of testing is to ensure that all tested electrical equipment, both Contractor and Owner supplied, is operational and within industry and Manufacturer’s tolerances and is installed in accordance with design Specifications.

2. Tests and inspections shall determine suitability for energization.

3. Perform tests in presence of the Owner's Representative and furnish test equipment, facilities and technical personnel required to perform tests.

4. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these Specifications.

B. Tests: In addition to specific system test described elsewhere, tests shall include:

1. Equipment operations: Test motors for correct operation and rotation.

2. Alarm and interlock systems: Produce malfunction symptoms in operating systems to test alarm and interlock systems.

3. Circuit numbering verification: Select on a random basis, various circuit breakers within the panelboards and cycle them on and off to verify compliance of the typed panel directories with actual field wiring.

4. Voltage check:
    a. At completion of job, check voltage at several points of utilization on the system that has been installed under this Contract. During test, energize all installed loads.

C. Contractor shall provide test power required when testing equipment before service energization and coordinate availability of test power with General Contractor after service energization. The Contractor shall provide any specialized test power as needed or specified herein.

D. Testing safety and precautions:
    1. Safety practices shall include the following requirements:
        a. Applicable State and Local safety operating procedures.
        b. OSHA.
        c. NSC.
        d. NFPA 70E.
    2. All tests shall be performed with apparatus de-energized and grounded except where otherwise specifically required ungrounded by test procedure.

E. Calibration of test equipment:
    1. Testing Agency shall have calibration program that assures test instruments are maintained within rated accuracy.
    2. Instruments shall be calibrated in accordance with the following frequency schedule:
        a. Field instruments: Analog, 6-months maximum; Digital, 12-months maximum.
        b. Laboratory instruments: 12-months.
        c. Leased specialty equipment: 12-months where accuracy is guaranteed by lessor.
    3. Dated calibration labels shall be visible on test equipment.
    4. Records, which show date and results of instruments calibrated or tested, must be kept up to date.
    5. Up-to-date instrument calibration instructions and procedures shall be maintained for test instrument.
    6. Calibration standards shall be of higher accuracy than instrument tested.
    7. Equipment used for field testing shall be more accurate than instrument being tested.

F. Coordinate with General Contractor regarding testing schedule and availability of equipment ready for testing.

G. Notify Owner and Engineer one week in advance of any testing.

H. Any products which fail during the tests or are ruled unsatisfactory by the Owner's Representative shall be replaced, repaired, or corrected as prescribed by the Owner's Representative at the expense of the Contractor. Tests shall be performed

after repairs, replacements or corrections until satisfactory performance is demonstrated.

I. Testing Agency shall maintain written record of tests and shall assemble and certify final test report.

J. Include all test results in the maintenance manuals.

3.05 CLEANING

A. Prior to energizing of electrical equipment, the Contractor shall thoroughly clean the interior of enclosures from construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

B. Upon completion of Project, prior to final acceptance, the Contractor shall thoroughly clean both the interior and exterior of all electrical equipment per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 PROJECT CLOSEOUT

A. Training: At the time of completion, a period of not less than 4-hours shall be allotted by the Contractor for instruction of building operating and maintenance personnel in the use of all systems. This 4-hour training is in addition to any instruction time called out in the Specifications for specific systems. All personnel shall be instructed at one time, the Contractor making all necessary arrangements with Manufacturer’s Representative. The equipment Manufacturer shall be requested to provide product literature and application guides for the users' reference. Costs, if any, for the above services shall be paid by the Contractor.

B. Special tools: Provide one of each tool type required for proper operation and maintenance of the equipment provided under this Section. All tools shall be delivered to the Owner at the Project completion.

C. Keying: Provide two keys for each lock furnished under this Section and turn over to Owner.

END OF SECTION

SECTION 260060

POWER SYSTEM STUDY

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Services necessary to complete the system analysis studies required for the item specified under this Division, including but not limited to:

1. Short circuit study.
2. Protective device evaluation study.
3. Protective device coordination study.
4. Arc flash and shock risk assessment.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with equipment specified elsewhere to perform a complete analysis study.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. American National Standards Institute, Inc. (ANSI):

   ANSI Z535.4; Product Safety Signs and Labels

2. Institute of Electrical and Electronic Engineers (IEEE):

   IEEE 1584; Guide for Performing Arc-Flash Hazard Calculations

3. National Fire Protection Association (NFPA):

   NFPA 70E; Standard for Electrical Safety in the Workplace

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. The results of the Power System Study shall be summarized in a final report. Three (3) bound copies of the final report shall be submitted.
2. The report shall include the following Sections:
   a. Description, purpose, basis and scope of the study and a single line diagram of that portion of the power system, which is included within the scope of the study.
   b. Tabulations of circuit breaker, fuse and other protective device ratings versus calculated short circuit duties and commentary regarding it.
   c. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection and commentary regarding it.
   d. Fault current calculations including a definition of terms and guide for interpretation of computer printout.

e. Recommended size for power fuses and recommended settings for ground fault relays and for all adjustable trip relays.

f. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.

g. Tabulations of arc flash and shock risk assessment results and commentary regarding results.

h. Sample arc flash and shock hazard warning label.

3. Contractor shall also provide an electronic copy of the report as part of the Record Document process. Electronic copy of the report shall be in PDF format and its native file format (e.g. XXX.PRJ).

B. The study shall be submitted prior to final review of the distribution equipment Shop Drawings, prior to release of equipment for manufacture. If formal completion of the study may cause delay in equipment manufacture, approval from the Engineer may be obtained for a preliminary submittal of sufficient data to ensure that the selection of device ratings and characteristics will be satisfactory. Then the formal study will be provided to verify the preliminary findings.

1.04 QUALITY ASSURANCE

A. The system analysis studies shall be performed by the Switchboard/Switchgear Manufacturer or by an approved Independent Testing Company. The analysis shall be stamped by a professional engineer licensed in the State of California.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 GENERAL

A. The studies shall include all portions of the electrical distribution system from the main normal power services down to and including the 480 volt AC distribution system. Normal system connections and those that result in maximum fault conditions shall be adequately covered in the study.

3.02 SHORT CIRCUIT STUDY AND PROTECTIVE DEVICE EVALUATION STUDY

A. The short circuit study shall be performed with the aid of a computer program and shall be in accordance with the latest applicable IEEE and ANSI standards.

B. The study input data shall include the maximum available short circuit contribution, resistance and reactance components of the branch impedance, the X/R ratios, base quantities selected and other source impedance.

C. Short circuit close and latch duty values and interrupting duty values shall be calculated on the basis of maximum available current at each substation bus, switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel and other significant locations through the system. The short circuit tabulations shall include asymmetrical fault currents, symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio.

D. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, switches, transfer switches and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents.

Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Architect's attention.

3.03 PROTECTIVE DEVICE COORDINATION STUDY

A. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios and characteristics of associated current transformers, ground fault relays and low voltage breaker trip characteristics and settings. The studies shall be in accordance with the latest applicable IEEE and ANSI standards.

B. The coordination study shall include all medium and low-voltage classes of equipment from the building or plant service protective devices down to and including low voltage motor control centers and panelboards. The phase and ground overcurrent protection shall be included as well as settings of all other adjustable protective devices

C. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves and fuses, phase cable damage curves, ground cable damage curves, medium-voltage cable shield damage curves, ground resistor damage curves, etc. as appropriate for the project. The coordination plots shall indicate the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand parameters, cable thermal overcurrent withstand limits and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.

D. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, Manufacturer and type, range of adjustment and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas or inadequacies shall be promptly brought to the Architect's attention.

E. In addition to the protective device coordination study settings, arc energy reduction settings shall also be tabulated. Consider all operating scenarios.

F. The company performing the protective device coordination study shall provide completed and filled out circuit breaker settings labels. Label type (size, colors, text size, etc.) shall be approved by the Owner. Labels shall be similar to the following example with industrial grade self-adhesive backing, weatherproof, and UV proof. Labels shall be provided to the commissioning agent for the commissioning agent to install during commissioning.

CIRCUIT BREAKER SETTINGS			
T/U Mfr:		T/U Model:	
LTPU:		LTD:	
STPU:		STD:	
GFPU:		GFTD:	
INST:		Zone Intlk: (Y/N)	
Name:		Date:	
Verified By:		Date:	
Study Version:			

3.04 ARC FLASH AND SHOCK RISK ASSESSMENT

A. An arc flash and shock risk assessment shall be performed in accordance with NFPA 70E (utilizing IEEE 1584 calculation method for incident energy analysis method) at each switchboard, distribution board, panelboard, etc. in accordance with the referenced standards. NFPA 70E hazard/ risk tables for arc flash PPE category method are not acceptable for compliance with this section.

B. The arc flash and shock risk assessment shall include all voltage classes of equipment from the service entrance down to and including the panelboards, etc. in addition to all possible scenario configurations from alternate power sources (e.g. generators, etc.).

C. The company performing the arc flash and shock risk assessment shall provide arc flash and shock hazard warning labels for all equipment evaluated in accordance with NFPA 70E and ANSI Z535.4. Labeling shall be as follows:

1. Label type:
    a. White vinyl or polyester with the following warning symbol color and black text:
        1) Incident energy below 40 cal/cm² = Orange.
        2) Incident energy for 40 cal/cm² and above = Red with DANGER symbol in lieu of WARNING.
    b. Industrial grade self-adhesive backing.
    c. Suitable for indoor or outdoor environments for a minimum of 3-years without fading or degrading.
2. Label information (minimum):
    a. Nominal system voltage.
    b. Arc flash boundary (inches).
    c. Available incident energy and the corresponding working distance (inches).
    d. Limited approach boundary (inches).
    e. Restricted approach boundary (inches).
    f. Equipment identification.
    g. Date.

3. Labels shall be affixed to all equipment covered under the risk assessment by the company performing the arc flash and shock risk assessment.
4. Prior to printing and affixing labels, coordinate with the Owner and Architect, which scenario will be used for the labels.

3.05 PROTECTIVE DEVICE TESTING, CALIBRATION AND ADJUSTMENT

A. The equipment Manufacturer shall provide the services of a qualified field Engineer and necessary tools and equipment to test and calibrate the protective relays, ground fault relays and circuit breaker trip devices as recommended in the Power System Study.

END OF SECTION

SECTION 260519

BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Building wire.
2. Wiring connections and terminations.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 44;	Thermoset-Insulated Wires and Cables.
UL 83;	Thermoplastic-Insulated Wires and Cables.
UL 310;	Electrical Quick-Connect Terminals.
UL 486A & B;	Wire Connectors.
UL 486C;	Splicing Wire Connectors.
UL 486D;	Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations.
UL 493;	Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
UL 510;	Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
UL 854;	Service-Entrance Cables.
UL 1581;	Reference Standard for Electrical Wires, Cables and Flexible Cords.

2. National Electrical Manufacturer Association (NEMA):

NEMA WC-70;	Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy.

3. Institute of Electrical and Electronic Engineers (IEEE):

IEEE 82;	Test Procedure for Impulse Voltage Tests on Insulated Conductors.

IEEE 576; Recommended Practice for Installation, Termination, and Testing of Insulated Power Cable as Used in Industrial and Commercial Applications.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.
4. Final test results.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Building wire:
   a. Cerrowire
   b. General Cable
   c. Southwire Company
   d. Or equal
2. Wiring connectors and terminations:
   a. 3M Company.
   b. Ideal.
   c. Blackburn-Holub.
   d. Burndy.
   e. Thomas & Betts Corp.
   f. Beau Barrier.
   g. Or equal

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 BUILDING WIRE

A. Conductor material:

1. Provide annealed copper for all wire, conductor, and cable, unless otherwise indicated.
2. Copper wire AWG #8 and larger shall be stranded, unless otherwise indicated.
3. Copper wire AWG #10 and smaller may be solid or stranded as best suited for the installation.

B. Insulation material:

1. All insulated wire, conductor and cable shall be 600 volt rated, unless otherwise noted on the Drawings.
2. Thermoplastic-insulated building wire.
3. Rubber-insulated building wire.
4. Copper feeders and branch circuits larger than #6 AWG: Type dual rated THHN/THWN.
5. Copper feeders and branch circuits #6 AWG and smaller: Type dual rated THHN/THWN.
6. Control Circuits: Type dual rated THHN/THWN.
7. Identify system conductors as to voltage and phase connections by means of color-impregnated insulation.

2.03 WIRING CONNECTIONS AND TERMINATIONS

A. Bolted pressure connectors: Provide wide range-taking connectors with cast bronze compression bolts, designed for parallel taps, tees, crosses or end-to-end connections.

B. Electrical spring wire connectors:

1. Provide multi-part construction incorporating a non-restricted, zinc coated square cross-section steel spring enclosed in a steel sheet with an outer jacket of plastic and insulating skirt.
2. Self-striping pigtail and tap U-contact connectors shall not be used.

C. Push-in wire connectors:

1. Multi-port push-in wire connectors for a maximum of 8-wires, as required for specific application. Connectors are manufactured to accommodate a wide range of sizes with either solid or stranded conductors, up to a maximum wire size of #10 AWG. Low insertion force required for ease of installation.
2. Housing shall be 105-degrees C and transparent for visual connection verification.
3. 600 volt maximum rating with copper contacts.
4. UL Listed to 486C and UL 467 Listed for grounding and bonding applications.

D. Compression type terminating lugs:

1. Provide tin-plated copper high-compression type lugs for installation with hand or hydraulically operated circumference-crimping tools and dies as stipulated by the

lug Manufacturer or as indicated on Drawings. Notch or single point type crimping is NOT acceptable.

2. Two-hole, long barrel lugs shall be provided for size #4/0 and larger wire where terminated to bus bars. Use minimum of three crimps per lug, on sizes where possible.

E. Splicing and insulating tape: Provide black, ultraviolet proof, self-extinguishing, 7-mil thick vinyl general purpose electrical tape with a dielectric strength of 10,000 volts suitable for temperatures from minus 18-degrees C to 105-degrees C.

F. Insulating resin:

1. Provide two-part liquid epoxy resin with resin and catalyst in pre-measured, sealed mixing pouch. Scotchcast 4 or equal for wet or underground vaults, boxes, etc. splices or terminations.

2. Use resin with a set up time of approximately 30-minutes at 21.1-degrees C and with thermal and dielectric properties equal to the insulating properties of the cables immersed in the resin.

G. Terminal strips:

1. Provide box type terminal strips in the required quantity plus 25% spare. Install in continuous rows in terminal cabinets.

2. Use the box type terminal strips with barrier open backs and with ampere ratings as required.

3. Identify all terminals with numbering sequence being used for a system.

H. Crimp type connectors:

1. Provide insulated fork or ring crimp terminals with tinned electrolytic copper-brazed barrel with funnel wire entry and insulation support

2. Fasten crimp type connectors or terminals using a crimping tool recommended by the connector Manufacturer.

3. Provide insulated overlap splices with tinned seamless electrolytic copper barrel with funnel wire entry and insulation support.

4. Provide insulated butt splices with tinned seamless electrolytic copper barrel with center stop, funnel wire entry and insulation support.

I. Cable ties: Provide harnessing and point-to-point wire bundling with nylon cable ties. All cable ties shall be installed using tool supplied by Manufacturer of ties.

J. Wire lubricating compound:

1. UL listed for the wire insulation and conduit type and shall not harden or become adhesive.

2. Shall not be used on wire for isolated type electrical power systems.

K. Bolt termination hardware:

1. Bolts shall be plated, medium carbon steel heat-treated, quenched and tempered equal to ASTM A-325 or SAE grade 5; or silicon bronze alloy ASTM B-9954 Type B.

2. Nuts shall be heavy semi-finished hexagon, conforming to ANSI B18.2.2, threads to be unified coarse series (UNC), class 2B steel or silicon bronze alloy.
3. Flat washers shall be steel or silicon bronze, Type A plain standard wide series, confirming to ANSI B27.2. SAE or narrow series shall not be used.
4. Belleville conical spring washers shall be hardened steel, cadmium plated or silicon bronze.
5. Each bolt connecting lug(s) to a terminal or bus shall not carry current exceeding the following values:
   a. 1/4" bolt: 125 amps
   b. 5/16" bolt: 175 amps
   c. 3/8" bolt: 225 amps
   d. 1/2" bolt: 300 amps
   e. 5/8" bolt: 375 amps
   f. 3/4" bolt: 450 amps

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of wire and cable installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

A. All wire, conductor and cable with their respective connectors, fittings and supports shall be UL listed for the installed application and ambient condition.
B. Feeders and branch circuits in wet locations shall be rated 75-degree C.
C. Feeders and branch circuits in dry locations shall be rated 90-degree C.
D. Minimum conductor size:
   1. Provide minimum AWG #12 for all power and lighting branch circuits.
   2. Provide minimum AWG #14 for all line voltage signal and control wiring unless otherwise indicated.
E. Color coding:
   1. For 277/480 volt, 3-phase, 4-wire systems:
      a. Phase A - Brown
      b. Phase B - Orange
      c. Phase C - Yellow
      d. Neutral - Gray
      e. Ground – Green
   2. Grounded neutral conductors #6 AWG or smaller must be color coded with a white or gray continuous outer finish (no taping). Grounded conductors #4 AWG or larger are allowed to be taped for identification.

3.03 WIRING METHODS

A. Install wires and cables in accordance with Manufacturer's written instructions, CEC Article 310 Part III, as indicated on Drawings and as specified herein.

B. Install all single conductors in raceway system, unless otherwise noted.

C. Parallel circuit conductors and terminations shall be equal in length and identical in all ways.

D. Provide adequate length of conductors within electrical enclosures and train the conductors to terminal points with no excess. Bundle multiple conductors, with conductors larger than #10 AWG cabled in individual circuits. Make terminations so there is no bare conductor at the terminal.

E. Provide #10 AWG pig tails on all 20 amp and 30 amp wiring devices served by #8 AWG conductors and larger.

F. Splice cables and wires only in outlet boxes, junction boxes, pull boxes, manholes or handholes. Group and bundle with tie wrap each neutral with its associated phase conductor where more than one neutral is present in a conduit.

G. Neatly form, train, and tie the cables in individual circuits. For panelboards, cabinets, wireways, switches, and equipment assemblies.

H. Seal cable or wire, entering a building from underground, between the wire or cable and raceway, where it exits the raceway, with a sealant identified for use with the cable insulation, bare conductor, shield, or other component within the raceway.

I. Provide UL-listed factory-fabricated, solderless metal connectors of size, ampacity rating, material, type, and class for applications and for services indicated. Use connectors with temperature ratings equal to or greater than the wires that are being terminated.

J. Stranded wire shall be terminated using fitting, lugs or devices listed for the application. However, in no case shall stranded wire be terminated solely by wrapping it around a screw or bolt.

3.04 WIRING INSTALLATION IN RACEWAYS

A. Install wire in raceway in accordance with IEEE 576, Manufacturer’s written instructions, as indicated on the Drawings and as specified herein after interior of building has been physically protected from the weather and all mechanical Work likely to injure conductors has been completed. Pull all conductors into a raceway at the same time. Exercise care in pulling conductors so that insulation is not damaged. Use UL listed, non-petroleum base and insulating type pulling compound as needed.

B. Completely mandrel all underground conduits prior to installing conductors.

C. Completely and thoroughly swab raceway system before installing conductors.

D. Do not use block and tackle, power driven winch or other mechanical means for pulling conductors of size smaller than #1 AWG.

E. Wire pulling:

1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling of cables.

2. Use rope made of nonmetallic material for pulling feeders.

3. Attach pulling lines for feeders by means of either woven basket grips or pulling eyes attached directly to the conductors.
4. Pull in together multiple conductors or cables in a single conduit.
5. Pulling tensions and sidewall pressures shall not exceed 60% of the manufacturer's recommended maximum values. Pulling tension shall be continuously monitored during the pull by a calibrated dynamometer. If pulling tension is exceeded during the pull, immediately notify the engineer to determine if the cables will be considered damaged and require contractor replacement.

F. Install and test all cables in accordance with Manufacturer's instructions and warranty.

3.05 INSTALLATION IN MANHOLES

A. Install and support cables in manhole on the steel racks with porcelain or equal insulators, unless otherwise noted. Train the cables around the manhole walls, but do not bend to a radius less than six times the overall cable diameter.

3.06 WIRE SPLICES, JOINTS AND TERMINATION

A. Join and terminate wire, conductors, and cables in accordance with UL 486A, C, CEC and Manufacturer's instructions.

B. Thoroughly clean wires before installing lugs and connectors.

C. Make splices, taps and terminations to carry full ampacity of conductors without perceptible temperature rise.

D. Splices and terminations shall be made mechanically and electrically secure.

E. Where it's determined that unsatisfactory splice or terminations have been installed, remove the devices and install approved devices at no addition cost.

F. Terminate wires in Terminal Cabinets, relay, and contactor panels, etc. using terminal strip connectors.

G. Insulate spare conductors with electrical tape and leave sufficient length to terminate anywhere in the panel or cabinet.

H. Install cable ties and maintain harnessing.

I. Encapsulate splices in exterior outlets, pull boxes and junction boxes using specified insulating resin kits. Make all splices watertight for exterior equipment and equipment in pump rooms.

J. Make up all splices and taps in accessible junction or outlet boxes with connectors as specified herein. Pigtails and taps shall be the same color as the feed conductor. Form conductor prior to cutting and provide at least 6-inches of tail and neatly packed in box after splice is made up.

K. Branch circuits (#10 AWG and smaller):

1. Connectors: Solderless, screw-on, reusable spring pressure cable type, 600 volt, 105-degree C. with integral insulation, approved for copper conductors.
2. The integral insulator shall have a skirt to completely cover the stripped wires.
3. The number, size and combination of conductors as listed on the Manufacturers packaging shall be strictly complied with.

L. Feeder circuits: (#6 to 750 kCMIL)

1. Join or tap conductors from #6 AWG to 750 kCMIL using bolted pressure connectors or insulate mechanical compression (hi-press) taps with pre-molded, snap-on insulating boots or specified conformable insulating pad and over wrapped with two half-lapped layers of vinyl insulating tape starting and ending at the middle of the joint.
2. Terminate conductors from size #6 AWG to 750 kCMIL copper using bolted pressure or mechanical compression lugs in accordance with Manufacturer recommendation or as specified elsewhere.
3. Field installed compression connectors for cable sizes 250 kCMIL and larger shall have not less than two clamping elements or compression indents per wire.
4. Insulate splices and joints with materials approved for the particular use, location, voltage, and temperature. Insulate with not less than that of the conductor level that is being joined.

M. Termination hardware assemblies:

1. AL/CU lugs connected to aluminum plated or copper buss, shall be secured using a steel bolt, flat washer (two per bolt), Belleville washer and nut.
2. Copper lugs connected to copper bus, shall be secured using silicon bronze alloy bolt, flat washer (two per bolt), Belleville washer and nut.
3. The crown of Belleville washers shall be under the nut.
4. Bolt assemblies shall be torque to Manufacturer recommendation. Where manufacture recommendations are not obtainable, the following values shall be used:
   a. 1/4" - 20 bolt at 80-inch pounds torque.
   b. 5/16" - 18 bolt at 180-inch pounds torque.
   c. 3/8" - 16 bolt at 20-foot pounds torque.
   d. 1/2" - 13 bolt at 40-foot pounds torque.
   e. 5/8" - 11 bolt at 55-foot pounds torque.
   f. 3/4" - 10 bolt at 158-foot pounds torque.

3.07 IDENTIFICATION

A. Refer to Section 260553: Electrical Identification for additional requirements.

B. Securely tag all branch circuits. Mark conductors with specified vinyl wrap-around markers. Where more than two conductors run through a single outlet, mark each conductor with the corresponding circuit number.

C. Color code conductors' size #8 and larger using specified phase color markers and identification tags.

D. Provide all terminal strips with each individual terminal identified using specified vinyl markers.

E. In manholes, pull boxes and handholes, provide tags of the embossed brass type and show the cable type and voltage rating. Attach the tags to the cables with slip-free plastic cable lacing units.

3.08 FIELD QUALITY CONTROL

A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements.

B. Prefunctional testing:

1. Visual and mechanical inspection:

a. Compare cable data with Contract Documents.

b. Inspect exposed sections of wires and cables for physical damage and proper connections.

c. Verify tightness of accessible bolted connections with calibrated torque wrench in accordance with Manufacturer's published data.

d. Inspect compression applied connectors for correct cable match and indention.

e. Verify visible cable bend meet or exceed ICEA and Manufacturer's minimum allowable bending radius.

f. If cables are terminated through window type current transformers, inspect to verify neutral and ground conductors are correctly placed for operation of protective devices.

g. Ensure wire and cable identification has been installed as specified herein.

2. Electrical testing:

a. Contractor shall perform feeder and branch circuit insulation test after installation and prior to connection to utilization devices such as fixtures, motors, or appliances. Testing shall be as follows:

1) 100% of all feeders 100 amp rated and above.

2) 50% of all feeders smaller than 100 amps.

3) 10% of all branch circuits at each individual panelboard.

b. Perform insulation-resistance test using megohm meter with applied potential of 1000 volt DC for a continuous duration of 60-seconds. Test conductors' phase-to-phase and phase-to-ground. Conductors shall test free from short-circuit and ground faults.

c. Perform continuity test of all feeder and branch circuits to ensure correct cable connections. Test all neutrals for improper grounds.

d. Contractor shall furnish instruments, materials, and labor for these tests.

3. Test values: Investigate resistance values less than 50-megohms.

4. Furnish test results in typewritten report form for review and inclusion in the operation and maintenance manuals.

END OF SECTION

SECTION 260526

GROUNDING AND BONDING

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Power system grounding.
2. Electrical equipment and raceway grounding and bonding.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 467;	Grounding and Bonding Equipment.

2. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

IEEE No. 142;	Recommended Practice for Grounding of industrial and Commercial Power Systems.
IEEE No. 81	Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System.

1.03 SYSTEM DESCRIPTION

A. Ground the electrical service system neutral at service entrance equipment as described herein and indicated on Drawings.

B. Ground each separately derived system neutral as described herein and indicated on Drawings.

C. Except as otherwise indicated, the complete electrical installation including the neutral conductor, metallic conduits and raceways, boxes, cabinets and equipment shall be completely and effectively grounded in accordance with all code requirements, whether or not such connections are specifically indicated or specified.

D. Resistance:

1. Resistance from the main switchboard ground bus through the ground electrode to earth shall not exceed 5-OHMS unless otherwise noted.
2. Resistance from the farthest panelboard, switchboard, etc. ground bus through the ground electrode to earth shall not exceed 20-OHMS

1.04 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.

2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Ground Rods:
   a. Weaver.
   b. Erico "Cadweld" Products, Inc.
2. Ground Wells:
   a. Christy Concrete Products, Inc.
   b. Forni Corp.
3. Ground Bushings, Connectors, Jumpers and Bus:
   a. O-Z/Gedney.
   b. Thomas & Betts Corp.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GROUND CONDUCTORS

A. Refer to Specification Section 260519: Building Wire and Cable for conductor specifications.

B. General purpose insulated:

1. UL approved and code sized copper conductor, with dual rated THHN/THWN insulation, color identified green.
2. Where continuous color-coded conductors are not commercially available, provide a minimum 4" long color band with green, non-aging, plastic tape in accordance with CEC.

C. Bare conductors in direct contact with earth or encased in concrete: #4/0 AWG copper minimum, U.O.N.

D. Bonding pigtails: Insulated copper conductor, identified green, sized per code, and provide with termination screw or lug. Provide solid conductors for #10 AWG or smaller and stranded conductors for #8 AWG or larger.

2.03 DRIVEN (GROUND) RODS

A. Copper clad steel, minimum 3/4-inch diameter by 8 feet long, unless otherwise noted.

2.04 GROUND WELL BOXES FOR GROUND RODS

A. Precast concrete box nominal 9" throat diameter x 14" deep with light duty concrete cover for non-traffic areas or steel plate for traffic areas. Cover shall be embossed or engraved with "GROUND ROD".

2.05 INSULATED GROUNDING BUSHINGS

A. Plated malleable iron or steel body with 150-degree Centigrade molded plastic insulating throat and lay-in grounding lug.

2.06 CONNECTIONS TO PIPE

A. For cable to pipe: UL and CEC approved bolted connection.

2.07 CONNECTIONS TO STRUCTURAL STEEL, GROUND RODS OR SPLICES

A. Where required by the Drawings, grounding conductors shall be spliced together, connected to ground rods or connected to structural steel using exothermic welds or high-pressure compression type connectors.

1. Exothermic welds shall be used for cable-to-cable and cable-to-ground rod and for cable to structural steel surfaces. Exothermic weld kits shall be as manufactured by Cadweld or equal. Each particular type of weld shall use a kit unique to that type of weld.

2. High-pressure compression type connectors shall be used for cable-to-cable and cable-to-ground rod connections.

2.08 BUILDING GROUND BUS REQUIREMENTS

A. Building power system reference ground bus:

1. The reference ground bus is furnished as part of the main electrical switchboard, along with neutral disconnect and bus, and is in addition to the main building power system ground bus outlined above. The building grounding electrode shall make a direct connection to the building referenced ground bus in the main switchboard.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of grounding system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. Grounding electrodes:

1. Concrete encased grounding electrode (UFER ground): Provide a #4/0 AWG minimum bare copper conductor encased along the bottom of concrete foundation or footings which are in direct contact with the earth and where there is no impervious water-proofing membrane between the footing and the soil. The electrode shall extend through a horizontal length of 30 feet minimum and shall be encased in not less than 2 or more than 5 inches of concrete separating it from surrounding soils. The electrode shall emerge from the concrete slab through a protective non-metallic sleeve and shall be extended to the main building reference ground bus.

2. Supplementary grounding electrode (ground ring, grid and driven rods): Provide, as indicated on the Drawings, driven ground rod(s) installed in listed ground well box(s) and filled with gravel after connection is made. Interconnect ground rod with structural steel and adjacent rods with minimum #2 AWG bare copper conductor. Ground rod shall not be less than 8 foot from any other electrode of another electrical system or from adjacent ground rod(s).

B. Grounding electrode conductor: Provide grounding electrode conductor as indicated on the Drawings or sized per CEC Article 250, whichever is greater.

C. Power system grounding:

1. At the building power system reference ground bus in the main service switchboard, connect the grounding electrode conductor from concrete encased UFER ground or other grounding electrode systems as indicated on the Drawing or herein.

D. Separately derived electrical system grounding:

1. Ground each separately derived system per requirements in CEC Article 250 as a minimum, unless greater requirements are required elsewhere in the Contract Documents.

E. Equipment bonding/grounding:

1. Provide a CEC sized insulated copper ground conductor in all 120 volt AC through 600 volt AC feeder and branch circuit distribution conduits and cables.

2. Provide a separate grounding bus at panelboards, switchboards. Connect all metallic enclosed equipment so that with maximum fault current flowing, shall be maintained at not more than 35 volts above ground.

3. Conduit terminating in concentric, eccentric, or oversized knockouts at panelboards, cabinets, gutters, etc. shall have grounding bushings and bonding jumpers installed interconnecting all such conduits.

4. Provide bonding jumpers across expansion and deflection couplings in conduit runs, pipe connections to water meters, dielectric couplings in metallic cold-water piping system.

5. Provide internal ground wire in flexible conduit connected at each end via grounding bushing.

3.03 FIELD QUALITY CONTROL

A. Independent Testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing required herein.

B. Prefunctional testing:

1. Provide Testing Agency with Contract Documents for their review prior to the commencement of ground testing.

2. Visual and mechanical inspection:

a. The Testing Agency shall inspect the grounding electrode and connections prior to concrete encasement, burial, or concealment.

b. Check tightness and welds of all ground conductor terminations.

c. Verify installation complies with the intent of the Contract Documents

3. Obtain and record ground resistance measurements both from electrical equipment ground bus to the ground electrode and from the ground electrode to earth. Furnish and install additional bonding and add grounding electrodes as required complying with resistance limits specified under this Section of the Specification.

4. A typewritten record of measured resistance values shall be submitted for review and included with the operation and maintenance manual furnished to the Owner at the time of Project closeout and before certificate of final payment is issued.

END OF SECTION

SECTION 260529

ELECTRICAL HANGERS AND SUPPORTS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Conduit supports.
2. Equipment supports.
3. Fastening hardware.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 2239; Hardware for the Supports of Conduit, Tubing and Cable.

1.03 SYSTEM DESCRIPTION

A. Provide devices specified in this Section and related Sections for support of electrical equipment furnished and installed under Division 26.

B. Provide support systems that are adequate for the weight of equipment, conduit and wiring to be supported.

1.04 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Concrete fasteners:

a. Phillips "Red-Head".
b. Remington.
c. Ramset.

2. Concrete inserts and construction channel:
   a. Unistrut Corp.
   b. GS Metals "Globe Strut."
   c. Thomas & Betts "Kindorf" Corp.
3. Conduit straps:
   a. O-Z/Gedney.
   b. Erico "Caddy" Fastening Products.
   c. Thomas & Betts "Kindorf" Corp.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 CONCRETE FASTENERS

A. Provide expansion-shield type concrete anchors.

B. Provide powder driven concrete fasteners with washers. Obtain approval by Engineer prior to use.

2.03 CONCRETE INSERTS

A. Provide pressed galvanized steel, concrete spot insert, with oval slot capable of accepting square or rectangular support nuts of ¼ inch to ½ inch diameter thread for rod support.

2.04 THREADED ROD

A. Provide steel threaded rod, sized for the load unless otherwise noted on the Drawings or in the Specifications.

2.05 CONSTRUCTION CHANNEL

A. Provide 1.5-inch by 1.5-inch, 12-gauge galvanized steel channel with 17/32-inch diameter bolt holes and 1-1/2 inch on center in the base of the channel.

2.06 CONDUIT STRAPS

A. One-hole strap, steel, or malleable iron, with malleable iron clamp-back spacer for surface mounted wall and ceiling applications.
   1. Use malleable strap with spacers for exterior and wet locations.
   2. Use steel strap without spacers for interior locations.

B. Steel channel conduit strap for support from construction channel.

C. Steel conduit hanger for pendant support with threaded rod

D. Steel wire conduit support strap for support from independent #12-gauge hanger wires.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of supporting device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

A. Layout support devices to maintain headroom, neat mechanical appearance and to support the equipment loads.

B. Where indicated on the Contract Documents, install freestanding electrical equipment on concrete pads.

3.03 INSTALLATION

A. Furnish and install supporting devices as noted throughout Division 26.

B. Electrical device and conduit supports shall be independent of all other system supports that are not structural elements of the building, unless otherwise noted.

C. Fasten hanger rods, conduit clamps, outlet, and junction boxes to building structure using precast inserts, expansion anchors, preset inserts, or beam clamps.

D. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls.

E. Use expansion anchors or preset inserts in solid masonry walls.

F. Use self-drilling anchors, expansion anchor or preset inserts on concrete surfaces.

G. Use sheet metal screws in sheet metal studs and wood screws in wood construction.

H. Do not fasten supports to piping, ductwork, mechanical equipment, conduit, or acoustical ceiling suspension wires.

I. Do not drill structural steel members unless first approved in writing by the Architect or Structural Engineer.

J. Fabricate supports from structural steel or steel channel, rigidly welded, or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.

K. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide additional support backing in stud walls prior to sheet rocking as required to adequately support cabinets and panels.

L. Bridge studs top and bottom with channels to support flush mounted cabinets and panelboards in stud walls.

3.04 ERECTION OF METAL SUPPORTS

A. Cut, fit and place miscellaneous metal fabrications accurately in location, alignment and elevation to support and anchor electrical materials and equipment.

B. Field Welding: Comply with AWS "Structural Welding Code."

3.05 ANCHORAGE

A. All floor mounted, free standing electrical equipment such as transformers, switchboards, distribution boards, etc. shall be securely fastened to the floor structure.

B. Anchorage of electrical equipment shall comply with the seismic requirements as outlined in Section 260010: Basic Electrical Requirements.

END OF SECTION

SECTION 260531

CONDUIT

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Rigid steel conduit and fittings.
2. PVC insulated rigid steel conduit and fittings.
3. Intermediate metal conduit and fittings.
4. Electrical metallic tubing and fittings.
5. Rigid non-metallic conduit and fittings.
6. Flexible metallic conduit and fittings.
7. Liquidtight flexible metallic conduit and fittings.
8. Miscellaneous conduit fittings and products.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. American National Standards Institute, Inc. (ANSI):

ANSI C80.1;	Rigid Steel Conduit, Zinc-Coated.
ANSI C80.3;	Electrical Metallic Tubing, Zinc Coated.

2. Underwriters Laboratories, Inc. (UL):

UL 1;	Flexible Metal Conduit.
UL 6;	Rigid Metal Conduit.
UL 360;	Liquid-Tight Flexible Steel Conduit.
UL 514B;	Conduit, Tubing and Cable Fittings.
UL 635;	Insulating Bushings.
UL 651;	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
UL 797;	Electrical Metallic Tubing - Steel.
UL 1242;	Intermediate Metal Conduit - Steel.

3. National Electrical Manufacturer Association (NEMA):

NEMA RN1;	PVC Externally coated Galvanized Rigid Steel Conduit.
NEMA TC 2;	Electrical Plastic Tubing and Conduit.
NEMA TC 3;	PVC Fittings for use with Rigid PVC Conduit.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instruction. Provide written instructions for raceway products requiring glues, special tools, or specific installation techniques.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Metal conduit:
   a. Allied Tube and Conduit Co.
   b. Triangle PWC, Inc.
   c. Western Tube and Conduit Corp.
   d. Spring City Electrical Manufacturing Co.
   e. Occidental Coating Co. (OCAL).
   f. Alflex Corp.
   g. American Flexible Metal Conduit Co.
   h. Anaconda.
2. Nonmetallic conduit:
   a. Prime Conduit.
   b. JM Eagle.
   c. Cantex.
3. Fittings:
   a. Appleton Electric Co.
   b. OZ/Gedney.
   c. Thomas & Betts Corp.
   d. Spring City Electrical Manufacturing Co.

e. Occidental Coating Co. (OCAL).

f. Carlon.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GALVANIZED RIGID STEEL CONDUIT (GRS)

A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and UL 6.

B. Standard threaded couplings, locknuts, bushings, and elbows: Only materials of steel or malleable iron are acceptable. Locknuts shall be bonding type with sharp edges for digging into the metal wall of an enclosure.

C. Three-piece couplings: Hot dip galvanized, cast malleable iron.

D. Insulating bushings: Threaded polypropylene or thermosetting phenolic rated 150-degree C minimum.

E. Insulated grounding bushings: Threaded cast malleable iron body with insulated throat and steel "lay-in" ground lug with compression screw.

F. Insulated metallic bushings: Threaded cast malleable iron body with plastic insulated throat rated 150-degrees C.

G. All fittings and connectors shall be threaded.

2.03 PVC INSULATED GALVANIZED RIGID STEEL CONDUIT (PVC GRS)

A. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 20 or 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.

B. Fittings: Conduit couplings and connectors shall be as specified for galvanized rigid steel conduit and shall be factory PVC coated with an insulating jacket equivalent to that of the coated material.

2.04 INTERMEDIATE METAL CONDUIT (IMC)

A. Conduit: Hot dip galvanized steel meeting the requirements of CEC Article 342 and conforming to ANSI C80.6 and UL 1242.

B. Fittings: Conduit couplings, connector and bushing shall be as specified for galvanized rigid steel conduit. Integral retractable type IMC couplings are also acceptable.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Conduit: Shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam and hot dip galvanized after fabrication. Conduit shall conform to ANSI C80.3 Specifications and shall meet UL requirements.

B. Set screw type couplings: Hot dip galvanized, steel or cast malleable iron, UL listed concrete tight. Use set screw type couplings with four setscrews each of conduit sizes over 2 inches. Setscrews shall be of case-hardened steel with hex-head and cup point to firmly seat in wall of conduit for positive grounding.

C. Set screw type connectors: Hot dip galvanized, steel or cast malleable iron UL listed concrete tight with male hub and insulated plastic throat, 150-degree C temperature rated. Setscrew shall be same as for couplings.

D. Raintight couplings: Hot dip galvanized, steel or cast malleable iron; UL listed raintight and concrete tight, using gland and ring compression type construction.

E. Raintight connectors: Hot dip galvanized, steel or cast malleable iron, UL listed raintight and concrete tight, with insulated throat, using gland and ring compression type construction.

2.06 RIGID NON-METALLIC CONDUIT (PVC)

A. Conduit:

1. Rigid polyvinyl chloride, Schedule 40 or 80 conforming to NEMA TC1 and UL 651, latest edition. UL listed for exposed and direct-burial applications and for 90 degrees C conductor insulation. Conduit shall include an integral bell fitting at one end.

B. Fittings: Couplings, adaptors, transition fittings, etc., shall be molded PVC, slip on, solvent weld type conforming to NEMA TC3 for Schedule 40 or 80.

2.07 FLEXIBLE METALLIC CONDUIT (FMC)

A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design and conforming to UL 1.

B. Fittings: Connectors shall be of the single screw clamp variety with steel or cast malleable iron bodies and threaded male hubs with insulated throats. Exception: Pressure cast screw-in connectors shall be acceptable for luminaire connection in suspended ceilings and cut-in outlet boxes within existing furred walls.

2.08 LIQUIDTIGHT FLEXIBLE METALLIC CONDUIT (LFMC)

A. Conduit: Shall be fabricated in continuous lengths from galvanized steel strips, interlocking spirally wound, covered with extruded liquidtight jacket of polyvinyl chloride (PVC) and conforming to UL 360. Provide conduit with a continuous copper-bonding conductor wound spirally between the convolutions.

B. Fittings: Connector body and gland nut shall be of cadmium plated steel or cast malleable iron, with tapered, male, threaded hub; insulated throat and neoprene "O" ring gasket recessed into the face of the stop nut. The clamping gland shall be of molded nylon with an integral brass push-in ferrule.

2.09 MISCELLANEOUS CONDUIT FITTINGS AND PRODUCTS

A. Watertight conduit entrance seals: Steel or cast malleable iron bodies and pressure clamps with PVC sleeve, neoprene sealing grommets and PVC coated steel pressure rings. Fittings shall be supplied with neoprene sealing rings between the body and PVC sleeve.

B. Watertight cable sealing bushings: One piece, compression molded sealing ring with PVC coated steel pressure disks, stainless steel sealing screws and zinc plated cast malleable iron locking collar.

C. Expansion fittings: Multi-piece unit comprised of a hot dip galvanized malleable iron or steel body and outside pressure bussing designed to allow a maximum of 4" conduit movement (2" in either direction). Furnish with external braid tinned copper bonding jumper. Unit shall be UL listed for wet or dry locations.

D. Expansion/deflection couplings: Multi-piece unit comprised of a neoprene sleeve with internal flexible tinned copper braid attached to bronze end couplings with stainless steel bands. Coupling shall accommodate 0.75-inch deflection, expansion

or contraction in any direction and allow 30-degree angular deflections. Flexible, corrosion-resistant, watertight, moisture and heat resistant molded rubber jacket and stainless-steel jacket clamps. Unit shall comply with UL467 and UL514. Manufacturer shall be OZ/Gedney Type DX, Steel City Type EDF or equal.

E. Fire rated penetration seals:

1. UL building materials directory classified.
2. Conduit penetrations in fire rated separation shall be sealed with a UL classified fill, void or cavity material.
3. The fire rated sealant material shall be the product best suited for each type of penetration and may be a caulk, putty, composite sheet, or wrap/strip.

F. Standard products not herein specified:

1. Provide listing of standard electrical conduit hardware and fittings not herein specified for approval prior to use or installation, i.e. locknuts, bushings, etc.
2. Listing shall include Manufacturers name, part numbers and a written description of the item indicating type of material and construction.
3. Miscellaneous components shall be equal in quality, material and construction to similar items herein specified.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of conduit system installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 APPLICATION

A. Galvanized rigid steel conduit (GRS) can be used in the following applications:

1. For feeders and branch circuits located indoors, concealed or exposed above suspended ceilings, in damp/wet locations, in crawl spaces, in attics, chases, furred spaces, equipment rooms, loading docks or in hazardous locations in accordance with CEC and local Codes.
2. For feeders and branch circuits concealed in concrete floors and walls when not in contact with earth.

B. PVC insulated galvanized rigid steel conduit: Refer to 260543.

C. Intermediate metal conduit (IMC): Can be used for the same application as galvanized rigid steel conduit as specified herein.

D. Electrical metallic tubing (EMT): Can be used exposed or concealed for interior electrical feeders 4" and smaller, interior power and lighting branch circuits and low tension distribution system where run above suspended ceilings, in concrete slabs and walls not in contact with earth; in stud walls, furred spaces and crawl spaces. EMT shall not be installed exposed below 6 feet above the finish floor except within electrical, communication or signal rooms or closets.

E. Rigid non-metallic conduit (PVC): Refer to 260543.

F. Flexible metallic conduit (FMC): Can be used only in dry locations for connections from an adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices and to luminaires installed in suspended ceilings, minimum sizes shall be 3/8" for luminaires and control wiring and 1/2" for motor and transformer connections. U.O.N.

G. Liquidtight flexible metallic conduit (LFMC): Can be used in wet or damp locations for connections from adjacent outlet box or conduit to all motors, transformers, vibrating equipment or machinery, controllers, solenoid valves, float and flow switches or similar devices. These areas are typically food preparation and dishwashing areas, sump wells, loading docks, pump rooms, exterior areas, etc. Minimum sizes shall be 1/2".

3.03 PREPARATION

A. Locations of conduit runs shall be planned in advance of the installation and coordinated with ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor prevent removal of ceiling tiles or panels, nor block access to mechanical or electrical equipment.

B. Where practical, install conduits in groups in parallel vertical or horizontal runs and at elevations that avoid unnecessary offsets.

C. All conduits shall be run parallel or at right angles to the centerlines of columns and beams, whether routed exposed, concealed above suspended ceiling or in concrete slabs.

D. Conduits shall not be placed closer than 12-inches to a flue, parallel hot water, steam line or other heat producing source or three inches from such lines when crossing perpendicular to the runs.

E. Exposed conduit installation shall not encroach into the ceiling height headroom of walkways or doorways. Where possible, install horizontal raceway runs above water and below steam piping.

F. The largest trade size conduits in concrete floor and wall slabs shall not exceed 1/3 the floor or wall thickness and conduits shall be spaced a minimum of three conduit diameters apart unless otherwise noted on the Drawings. All conduits shall be installed in the center of concrete slabs or wall and shall not be placed between reinforcing steel and the bottom of floor slabs.

G. In long runs of conduit, provide sufficient pull boxes inside buildings to facilitate pulling wires and cables, with spacing not to exceed 150-feet. Support pull boxes from structure independent of conduit supports. These pull boxes are not indicated on the Drawings.

H. Provide all reasonably inferred standard conduits fitting and products required to complete conduit installation to meet the intended application whether noted, indicated, or specified in the Contract Documents or not.

3.04 INSTALLATION

A. Install conduit in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Minimum Conduit Size: Unless otherwise noted herein or on Drawings, minimum conduit size shall be 1/2" for interior applications and 3/4" for exterior and underground applications.

C. All conduit sizes indicated on the Drawings are sized for copper conductors with THHN/THWN insulation. If conductor type or size is changed the Contractor shall be responsible for resizing conduits upward to meet Code.

D. In general, all conduit work shall be concealed where possible. Exceptions shall be electrical, communication and mechanical rooms, exposed ceiling areas, and parking garages.

E. Conduit connections to motors and surface cabinets shall be concealed, except for electrical, communication and mechanical rooms, or unless exposed Work is clearly called for on the Drawings.

F. Install conduits in complete runs before pulling in cables or wires.

G. Install conduit free from dents, bruises or deformations. Remove and replace any damaged conduits with new undamaged material.

H. Conduits shall be well protected and tightly covered during construction using metallic bushings and bushing "pennies" to seal open ends.

I. In making joints in rigid steel conduit, ream conduit smooth after cutting and threading. Coat all field-threaded joints with UL approved conductive type compound to ensure low resistance ground continuity through conduit and to prevent seizing and corrosion.

J. Clean any conduit in which moisture or any foreign matter has collected before pulling in conductors. Paint all field-threaded joints to prevent corrosion.

K. In all empty conduits or ducts, install a “True Tape” conduit measuring tape line to provide overall conduit length for determining length of cables/conductors for future use.

L. Conduit systems shall be mechanically and electrically continuous throughout. Install code size, insulated, copper, green-grounding conductors in all conduit runs for branch circuits and feeders. This conductor is not indicated on the Drawings. Refer to Section 260526: Grounding and Bonding.

M. Metallic conduit shall not be in contact with other dissimilar metal pipes (i.e. plumbing).

N. Make bends with standard conduit bending hand tool or machines. The use of any item not specifically designed for the bending of electrical conduit is strictly prohibited.

O. A run of conduit between terminations at wire pulling points shall not contain more than the equivalent of four quarter bends (360-degrees, total).

3.05 PENETRATIONS

A. Sealing:

1. Non-rated penetrations: Pack opening around conduits with non-flammable insulating material and seal with gypsum wallboard taping compound.

2. Fire stop: Where conduits, wireways and other electrical raceways pass through fire rated partitions, walls, smoke partitions or floor; install a UL classified fire

stop material to provide an effective barrier against the spread of fire, smoke, and gases. Completely fill and seal clearances between raceways and openings with the fire stop material.

B. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight as specified in Division 07: Sealants and Caulking.

1. Install specified watertight conduit entrance seals at all below grade wall and floor penetrations. Conduits penetrating exterior building walls and building floor slab shall be PVC coated rigid galvanized steel.

2. Conduits that horizontally penetrate a waterproof membrane shall fall away from and below the penetration on the exterior side a minimum of two times the conduit diameters.

3.06 TERMINATIONS AND JOINTS

A. Use raceway fittings that are of types compatible with the associated raceway and suitable for the use and location. For intermediate steel conduit, use threaded rigid steel conduit fittings except as otherwise indicated.

B. Raceways shall be joined using specified couplings or transition couplings where dissimilar raceway systems are joined.

C. Conduits shall be securely fastened to cabinets, boxes and gutters using two locknuts and an insulating bushing or specified insulated connectors. Where joints cannot be made tight, use bonding jumpers to provide electrical continuity of the raceway system. Where terminations are subject to vibration, use bonding bushings or wedges to assure electrical continuity. Where subject to vibration or dampness, use insulating bushings to protect conductors. Install grounding bushings or bonding jumpers on all conduits terminating at concentric or eccentric knockouts.

D. Conduit terminations exposed at weatherproof enclosures and cast outlet boxes shall be made watertight using specified connectors and hubs.

E. Stub-up connections: Extend conduits through concrete floor for connection to freestanding equipment with an adjustable top or coupling threaded inside for plugs and set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; flexible metal conduit may be used 6 inches above the floor. Where equipment connections are not made under this contract, install screwdriver operated threaded flush plugs with floor.

F. Install specified cable sealing bushings on all conduits originating outside the building walls and terminating in switchgear, cabinets, or gutters inside the building. Install cable sealing bushings or raceway seal for conduit terminations in all grade level or below grade exterior pull, junction, or outlet boxes.

G. Raceway seal: Inject into wire filled raceways, a pre-formulated rigid 2 lbs. density polyurethane foam which expands a minimum 35 times its original bulk. Foam shall have the physical properties of water vapor transmission of 1.2 to 3.0 perms: water absorption less than 2% by volume, fungus and bacterial resistant. Foam shall permanent seal against water, moisture, insects, and rodents. Install raceway sealing foam at the following points:

1. Where conduits enter switchboard from below grade.

H. Install expansion couplings where any conduit crosses a building separation.

END OF SECTION

SECTION 260533

BOXES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Wall and ceiling outlet boxes.
2. Pull and junction boxes.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified.

1. American National Standards Institute/National Electrical Manufacturer Association:

ANSI/NEMA OS-1;	Sheet-Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
ANSI/NEMA OS-2;	Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
NEMA 250;	Enclosures for Electrical Equipment (1000 volts maximum).

2. Underwriters Laboratories (UL):

UL 50;	Enclosures for Electrical Equipment, Non-Environmental Considerations.
UL 514A;	Metallic Outlet Boxes.
UL 1773;	Termination Boxes.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Submit Manufacturer's installation instructions.

1.04 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Outlet and junction boxes:

a. Spring City Electrical Manufacturing Co.

b. Thomas & Betts Corp.

c. Raco, Inc.

2. Cast boxes:

a. Appleton Electric Co.

b. Crouse-Hinds.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 OUTLET BOXES

A. Standard outlet box:

1. Provide galvanized, one-piece die formed or drawn steel or welded, knockout type box of size and configuration best suited to the application indicated on the Drawings.

2. 4-inch square by 1.5-inch deep shall be minimum box size.

3. ANSI/NEMA OS 1.

B. Concrete box:

1. Provide galvanized steel, 4-inch octagon rings with mounting lugs, backplate and adapter ring as required.

2. Select height as necessary to position knockouts above concrete reinforcing steel.

3. ANSI/NEMA OS 1.

C. Cast metal outlet body:

1. Provide 4-inch round, galvanized cast iron alloy with threaded hubs and mounting lugs as required.

2. Provide boxes with cast cover plates of the same material as the box and neoprene cover gaskets.

D. Conduit outlet body: Provide Cadmium plated cast iron alloy, oblong conduit outlet bodies with threaded conduit hubs and neoprene gasket, cast iron covers.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of box installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

A. Install all outlet boxes flush with building walls, ceilings, and floors except where boxes are installed in mechanical and electrical rooms, in cabinetry, above accessible ceilings or where exposed Work is called for on the Drawings.

B. Locate pullboxes and junction boxes in concealed locations above removable ceilings or exposed in electrical rooms, utility rooms or storage areas.

C. Install outlet boxes at the locations and elevations indicated on the Drawings or specified herein. Make adjustments to locations as required by structural conditions and to suit coordination requirements of other trades.

D. Locate switch outlet boxes on the latch side of doorways unless otherwise indicated.

E. Locate outlet boxes above hung ceilings having concealed suspension systems, adjacent to openings for removable recessed luminaires.

F. Do not install outlet boxes back-to-back, separate boxes by at least 6". In fire-rated walls separate boxes by at least 24" and wall stud.

G. Adjust position of outlet boxes in finished masonry walls to suit masonry course lines. Coordinate cutting of masonry walls to achieve neat openings for boxes.

3.03 INSTALLATION

A. Install boxes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Locate electrical boxes as indicated on Drawings and as required for splices, taps, wire pulling, equipment connections and Code compliance.

C. Leave no unused openings in any box. Install close-up plugs as required to seal openings.

D. Provide cast metal boxes with gasketed cast metal cover plates where boxes are exposed in damp or wet locations.

E. Welded outlet boxes shall only be used in concealed interior installations.

F. Use conduit outlet bodies to facilitate pulling of conductors or to make changes in conduit direction only. Do not make splices in conduit outlet bodies.

G. Install galvanized steel coverplates on boxes in unfinished areas, above accessible ceilings and on surface mounted outlets.

3.04 SUPPORTS

A. Provide boxes installed in metal stud walls with brackets designed for attaching directly to the studs or mount boxes on specified box supports.

B. Mount boxes, installed in suspended ceilings of gypsum board or lath and plaster construction, to 16-gauge metal channel bars attached to main ceiling runners.

C. Support boxes independently of conduit system.

D. Support boxes, installed in suspended ceilings supporting acoustical tiles or panels, directly from the structure above wherever pendant mounted luminaires are to be installed from the box.

E. Support boxes mounted above suspended acoustical tile ceilings, directly from the structure above.

END OF SECTION

SECTION 260543

UNDERGROUND DUCTS AND STRUCTURES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Underground conduits and ducts.
2. Duct banks.
3. Handholes and pullboxes.
4. Manholes and vaults.
5. Other underground utility structures.
6. Excavation, trenching and backfill.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. American Concrete Institute (ACI):

ACI 318;	Building Code Requirements for Structural Concrete

2. American National Standards Institute, Inc. (ANSI):

ANSI C80.1;	Rigid Steel Conduit, Zinc-Coated.

3. American Society for Testing And Materials (ASTM):

ASTM C31;	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C39;	Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C172;	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C192;	Practice for Making and Curing Concrete Test Specimens in the Laboratory
ASTM C231;	Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C478;	Specification for Precast Reinforced Concrete Manhole Sections
ASTM C805;	Test Method for Rebound Number of Hardened Concrete
ASTM C857;	Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures
ASTM C858;	Specification for Underground Precast Concrete Utility Structures

ASTM C877;	Specification for External Sealing Bands for Concrete Pipe, Manholes and Precast Box Sections
ASTM C891;	Practice for Installation of Underground Precast Concrete Utility Structures
ASTM C990;	Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1037;	Practice for Inspection of Underground Precast Concrete Utility Structures
ASTM C1064;	Standard Test Method for Temperature of Freshly Mixed Concrete
ASTM C1231;	Standard Practice for Use of Unbonded Caps in Determination of Compressive Strength of Hardened Concrete Cylinder
ASTM C1611;	Standard Test Method for Slump Flow of Self-Consolidating Concrete

4. Underwriters Laboratories, Inc. (UL):

UL 6;	Rigid Metal Conduit.
UL 651;	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.

5. National Electrical Manufacturer Association (NEMA):

NEMA RN1;	PVC Externally-coated Galvanized Rigid Steel Conduit.
NEMA TC 2;	Electrical Plastic Tubing and Conduit.
NEMA TC 3;	PVC Fittings for use with Rigid PVC Conduit.
NEMA TC6;	PVC Plastic Utilities Duct (EB and BD Type).

1.03 DEFINITIONS

A. Duct: Electrical conduit and other raceway, either metallic or nonmetallic, used underground embedded in earth.

B. Duct bank: Two or more conduits or another raceway installed underground in same trench.

C. Handhole: An underground junction box in a duct or duct bank.

D. Manhole: An underground utility structure, large enough for a person to enter, connecting with ducts to afford facilities for installing and maintaining cables.

E. Vault: An underground utility structure, large enough for a person to enter, connecting with ducts to afford facilities for installing, operating and maintaining equipment and wiring.

1.04 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
3. Shop Drawings showing details and design calculations for precast vaults and handholes, including reinforced steel.
4. Submit Manufacturer's installation instructions.
5. Complete bill of materials listing all components.
6. Certificate for concrete and steel used in underground precast concrete utility structures, according to ASTM C858.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted and approved.

C. Precast concrete vaults shall be designed and fabricated by an experienced and acceptable precast concrete manufacturer. The manufacturer shall have been regularly and continuously engaged in the manufacture of precast concrete units similar to that indicated in the project specifications or drawings for at least 10 years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Underground precast concrete utility structures:
   a. Oldcastle Enclosure Solutions.
   b. Jensen Precast.
2. Conduits, ducts and fittings:
   a. Prime Conduit.
   b. JM Eagle.
   c. Cantex.
   d. Occidental Coating Company (OCAL).

B. Substitution: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 CONDUIT AND DUCT

A. Refer to Section 260531: Conduit.

B. Galvanized rigid steel conduit (GRS) in underground installations:

1. PVC insulated galvanized rigid steel conduit (PVC GRS):

a. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with nominal 20 or 40 mil thermoplastic vinyl coating, heat fused and bonded to the exterior of the conduit.

b. Fittings: Conduit couplings and connectors shall be steel or malleable iron as required with factory PVC coating and insulated jacket equivalent to that of the coated material.

2. Tape insulated galvanized rigid steel conduit (Tape GRS):

a. Conduit: Full weight, threaded, hot-dip galvanized steel, conforming to ANSI C80.1 and NEMA RN-1 with half lapping of PVC 10 mil tape over the exterior of the conduit. Half lap all raceways a minimum of one time and extend to 12-inches above grade.

b. Fittings: Conduit couplings and connectors shall be steel or malleable iron as required with half lapping of PVC 10 mil tape over the exterior of the fittings. Half lap shall extend to 12-inches above grade.

C. Duct supports: Rigid PVC spacers selected to provide minimum duct spacing and concrete cover depths, while supporting ducts during concrete pour.

D. Duct sealing compound: Non-hardening, safe for human skin contact, not deleterious to cable insulation, workable at temperatures as low as 35 degree F, withstands temperature of 300 degrees F without slump and adheres to clean surfaces of plastic ducts, metallic conduits, conduit coatings, concrete, cable sheaths and jackets, etc.

2.03 PULLBOXES AND HANDHOLES

A. Construction: High densities precast reinforced concrete box, extension, base, and cover. Furnish box with end and side knockouts and non-settling shoulders. Cover shall have hold-down bolts and two lifting eyes.

B. Size: As indicated on the Drawings.

C. Cover markings: Covers shall read "ELECTRICAL", “COMMUNICATIONS”, or "SIGNAL" as appropriate.

D. Rated covers: Use cast iron lid with H20 traffic rating when subject to vehicular traffic.

2.04 MANHOLES AND VAULTS

A. Precast concrete: Concrete mix and reinforcing placement shall be in accordance with ACI 318. Design tops and wall structures for AASHTO H20 highway loading, with 30 percent loading added for impact. Walls shall withstand all soil pressures, taking into consideration the soil encountered and ground water level present at the Project site. Assume ground water level three feet below ground surface unless a higher water table is indicated in soils report.

B. Construction:

1. Monolithic or modular assembled sections.

2. Assembled sections shall have mating edges with tongue and groove joints. Joints shall firmly interlock adjoining components and provide waterproof junctions. Seal joints watertight using preformed plastic strip.

3. Provide lifting devices cast into units for proper handling of units.

4. Identify all structures with Manufacturer's name embedded in or otherwise permanently attached to an interior wall face.
5. Include concrete knockout panels for conduit entrance and sleeve for ground rod.

C. Size and dimensions: As indicated on Drawings.

D. Accessories:

1. Frames and covers: Cast iron with cast-in legend "ELECTRICAL", “COMMUNICATIONS”, or "SIGNAL" as appropriate. Machine cover-to-frame bearing surfaces.
2. Pulling eyes in walls: Eyebolt with reinforcing bar fastening insert. 2-inch diameter eye, 1-inch by 4-inch bolt. Working load embedded in 6-inch, 4000-PSI concrete: 13,000 pounds minimum tension.
3. Pulling and lifting irons in floor: 7/8-inch diameter, hot-dipped galvanized, bent steel rod, stress relieved after forming and fastened to reinforced rod. Exposed triangular opening. Ultimate yield strength: 40,000 pounds shear and 60,000 pounds tension.
4. Bolting inserts for cable stanchions: Flared, threaded inserts of non-corrosive, chemical resistant, nonconductive thermoplastic material; 1/2-inch internal diameter by 2.75-inch deep, flared to 1.24-inch minimum at base. Tested ultimate pull-out strength at 12,000pounds minimum.
5. Expansion anchors for installation after concrete is cast: Zinc-plated carbon steel wedge type with stainless-steel expander cup 1/2-inch bolt size, 5,300 pound rated pull-out strength and 6800pound rated shear strength minimum.
6. Cable stanchions: Hot-rolled, hot-dipped, galvanized "T" section steel, two 1/4-inches size, punched with 14-holes on 1.5-inch centers for cable arm attachment.
7. Cable arms: 3/16-inch thick hot-rolled, hot-dipped galvanized sheet steel pressed to channel shape, approximately two 12-inches wide by 14-inches long and arranged for secure mounting in horizontal position at any position on cable stanchions.
8. Cable support insulators: High glaze, wet-process porcelain arranged for mounting on cable arms.
9. Ground rods: Solid copper, 3/4-inch diameter by 10-feet length (minimum).
10. Ground wire: Stranded bare copper conductor, #6 AWG (minimum). Size in accordance with CEC Article 250.
11. Steps: Cast iron, suitable for shape and construction.

2.05 CONSTRUCTION MATERIALS

A. Mortar: Conform to ASTM C270, Type M, except for quantities less than 2.0 Cu. Ft., where packaged mix complying with ASTM C387, Type M may be used.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of duct and manhole installation to verify conformance with Manufacturer and Specification

tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 EARTHWORK

A. Excavation for underground electrical structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus, a sufficient distance to permit placing and removal of concrete formwork, installation or services, other construction and for inspection.

1. Excavate, by hand, areas within dripline of large trees. Protect the root system for damage and dry-out. Maintain moist conditions for root system and over exposed roots with burlap. Paint root cuts of 1 inch in diameter and larger with emulsified asphalt tree paint.

2. Take care not to disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed.

B. Trenching: Excavate trenches for electrical installation as follows:

1. Excavate trenches to the uniform width, sufficiently wide to provide ample working room and a minimum of 6 to 9 inches clearances on both sides of raceways and equipment.

2. Excavate trenches to depth indicated or required.

3. Limit the length of open trench to that in which installations can be made and the trench backfilled within the same day.

4. Where rock is encountered, carry excavation below required elevation and backfill with a layer of crushed stone or gravel prior to installation of raceways and equipment. Provide a minimum of 6 inches of stone or gravel cushion between rock bearing surface and electrical installations.

C. Backfilling and filling: Place soil materials in layers to required sub-grade elevations for each area classification, using materials and methods specified in the Caltrans Standard Specifications 2018 and County Special Provisions.

1. Under building slabs, use drainage fill materials.

3.03 CONDUIT AND DUCT INSTALLATION

A. Install duct lines in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Application:

1. Direct burial ducts: Schedule 40, minimum 24-inches below finished grade.

2. Below building slab-on-grade: Schedule 40, minimum 4-inches below bottom of slab except that bends and penetrates through floor slab shall be insulated galvanized rigid steel conduit.

3. Below roads and paved surfaces:

a. Schedule 40, minimum 36-inches below finished grade.

4. Penetrations of building and equipment slabs: Insulated galvanized rigid steel conduit.

C. Slope duct to drain towards vaults and handholes and away from building and equipment entrances. Pitch not less than 4-inches per 100-feet.

D. Curved sections in duct lines shall consist of long sweep bends with a minimum radius of 25-feet in the horizontal and vertical directions. The use of manufactured bends is limited to building entrances and equipment stub-ups.

E. For communications and signal conduits, do not exceed a combined bend radius of greater than 180 degrees between pull points.

F. Underground conduit stub-ups to inside of building and exterior equipment shall be insulated galvanized rigid steel conduit.

G. Make joints in ducts and fittings watertight according to Manufacturer's instructions. Stagger couplings so those of adjacent ducts do not lie in the same plane.

H. Terminate duct lines at vaults and handholes with end bells spaced 10-inches on center for 5-inch ducts and varied proportionately for other duct sizes. Change from regular spacing to end-bell spacing 10-feet from the end bell without reducing duct line slope and without forming trap in the line. Grout end bells into manhole walls from both sides to provide watertight entrance.

I. Separation between direct buried duct lines shall be 3-inches minimum for like systems and 12-inches minimum between power and signal ducts.

J. For direct burial installations install continuous warning strip of heavy gage plastic imprinted "electrical ducts below", approximately 12-inch wide at 12-inches above ducts.

K. Mandrel all ducts upon completion of installation and prior to pulling cables.

3.04 HANDHOLE AND PULL BOX INSTALLATION

A. Install handholes in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Handholes shall be installed flush with finished grade or surface. Install on a level 6-inch bed of well-tamped gravel or crushed stone.

C. Orientation of handholes shall be coordinated in advance with Landscape Architect and arranged to minimize connecting duct bends and deflections.

3.05 MANHOLE AND VAULT INSTALLATION

A. Install precast assembly in accordance with Manufacturer's written instructions, as indicated on Drawings and as specified herein.

B. Install manhole with rooftop at least 15-inches below finished grade. Access shall be via 30-inch diameter precast chimney from roof opening to finished grade.

C. Install cast iron frame and cover. Set frames in paved areas and traffic ways flush with finished grade. Set other frames 1-inch above finished grade.

D. Units shall be installed on a level 12-inch bed of well-tamped gravel or crushed stone.

E. Install drains in bottom of units where indicated.

F. Install removable hardware, including pulling eyes, cable stanchions, cable arms and insulators, as required for installation and support of cable and conductors and as indicated.

G. Provide cable rack support as indicated and required. Support intervals shall not exceed 36-inches. Each rack shall include cable support insulators.

H. Drive ground rod into earth, through the floor sleeve, after manhole is set in place. Fill the sleeve with a sealant to make a watertight seal.

I. Install ground wire around the inside perimeter of manhole and anchor to wall. Connect the wire to the ground rod by exothermic welding process to form solid metal joint. Bond the ground wire to the exposed non-current carrying metal parts of racks and like items in the manhole.

J. Do not drill deeper than 3-7/8” for anchor bolts installed in the field. Use a minimum of 2 anchors for each cable stanchion.

3.06 FIELD QUALITY CONTROL

A. Testing: Demonstrate capability and compliance with requirements upon completion of installation of underground duct and structures.

1. Grounding: Test vault grounding to ensure electrical continuity of bonding and grounding connections. Measure ground resistance at each ground rod and report results.

2. Duct integrity: Rod ducts with a mandrel 1/4-inch smaller in diameter than internal diameter of ducts. Where rodding indicates obstructions in ducts, remove the obstructions and retest.

3.07 CLEANING

A. Pull brush through full length of ducts. Use round bristle brush with a diameter 1/2-inch greater than internal diameter of duct.

B. Clean internal surfaces of handholes and vaults including sump. Remove foreign material.

END OF SECTION

SECTION 260553

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Electrical equipment nameplates.
2. Panelboard directories.
3. Wire and cable identification.
4. Buried electrical line warnings.
5. Junction box identification.
6. Warning and caution signs.
7. Inscribed device coverplates.

1.02 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein.
2. Schedules for nameplates to be furnished.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Conduit and wire markers:
   a. Thomas & Betts Corp.
   b. Brady.
   c. Griffolyn.
2. Inscription Tape:
   a. Kroy.
   b. Merlin.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 NAMEPLATES

A. Type NP: Engraved, plastic laminated labels, signs, and instruction plates. Engrave stock melamine plastic laminate 1/16-inch minimum thickness for signs up to 20-square inches or 8-inches in length; 1/8-inch thick for larger sizes. Engraved nameplates shall have white letters and be punched for mechanical fasteners.

B. Color and letter height as specified in Part 3: Execution.

2.03 LEGEND PLATES

A. Type LP: Die-stamped metal legend plate with mounting hole and positioning key for panel mounted operator devices, i.e. motor control pilot devices, hand-off-auto switches, reset buttons, etc.

B. Stamped characters to be paint filled.

2.04 BRASS TAGS

A. Type BT: Metal tags with die-stamped legend, punched for fastener.

B. Dimensions: 2" diameter 19 gauge.

2.05 PANELBOARD DIRECTORIES (400 AMP OR LESS)

A. Directories: A 6" x 8" minimum size circuit directory frame and card with clear plastic covering shall be provided inside the inner panel door.

B. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side. Multi-section panelboards shall have continuous consecutive circuit numbers, i.e. Section 1 (circuit numbers 1-42), Section 2 (circuit numbers 43-84), Section 3 (circuit numbers 85-126) for all 42-pole panelboards. For 84-pole panelboards the numbering is Section 1 (circuit numbers 1-84), Section 2 (circuit numbers (85-168), etc.

2.06 WIRE AND TERMINAL MARKERS

A. Provide self-adhering, pre-printed, machine printable or write-on, self-laminating vinyl wrap around strips.

B. Blank markers shall be inscribed using the printer or pen recommended by Manufacturer for this purpose.

2.07 CONDUCTOR PHASE MARKERS

A. Colored vinyl plastic electrical tape, 3/4" wide, for identification of phase conductors. Scotch 35 Brand Tape or equal.

2.08 UNDERGROUND CONDUIT MARKER

A. 6-inch wide, yellow polyethylene tape, with continuous black imprinting reading "Caution - Buried Electric Line Below".

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of identification device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 NAMEPLATES

A. Installation:

1. Degrease and clean surfaces to receive nameplates.

2. Install nameplates parallel to equipment lines.

3. Secure nameplates to equipment fronts using machine screws.

B. Provide type 'NP' color coded nameplates that present, as applicable, the following information:

1. Equipment or device designation:
2. Amperage, KVA or horsepower rating, where applicable.
3. Voltage or signal system name.
4. Source of power or control.

C. Nameplates for power system distribution equipment and devices are to be black.

D. Minimum letter height shall be as follows:

1. For panelboards, switchboards, etc.: ½ inch letters to identify equipment designation. Use ¼ inch letters to identify voltage, phase, wires, etc.
2. For individual circuit breakers, switches and motor starters in panelboards, distribution boards, and switchboards use 3/8-inch letters to identify equipment designation. Use 1/8-inch letters to identify all other.
3. For individual mounted circuit breakers and disconnect switches use 3/8-inch letters to identify equipment designation. Use 1/8" letters to identify all other.

3.03 BRASS TAGS

A. Provide type BT tags for individual ground conductors to exposed ground bus indicating connection i.e. "UFER", "Cold water bond", etc.

B. Provide tags for all feeder cables in underground vaults and pull boxes.

C. Provide tags for empty conduits in underground vault, pull boxes and stubs.

3.04 PANELBOARD DIRECTORIES (400 AMP OR LESS)

A. Provide typewritten directories arranged in numerical order denoting loads served by room number or area for each circuit.

B. Verify room numbers or area designation with Project Manager.

C. Mount panelboard directories in a minimum 6" x 8" metal frame under clear plastic cover inside every panelboard.

3.05 WIRE AND CABLE IDENTIFICATION

A. Provide wire markers on each conductor in panelboards, pull boxes, outlet, and junction boxes and at load connection. Identify with branch circuit or feeder number for power and lighting circuits and with control wire number as indicated on equipment Manufacturer's Shop Drawings for control wiring.

B. Provide colored phase markers for conductors as noted in Section 260519: Building Wire and Cable. Apply colored, pressure sensitive plastic tape in half-lapped turns for a distance of 3-inches from terminal points and in boxes where splices or taps are made. Apply the last two laps of tape with no tension to prevent possible unwinding. Do not cover cable identification markings by taping.

3.06 UNDERGROUND CONDUIT MARKERS

A. During trench backfilling, for exterior underground power, signal, and communications lines, install continuous underground plastic line marker, located directly above line at 6 to 8 inches below finished grade. Where multiple lines

installed in a common trench or concrete envelope, do not exceed an overall width of 16 inches; install a single line marker.

END OF SECTION

SECTION 262413

SWITCHBOARDS

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Main service switchboard.
2. Outdoor enclosure and accessories.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. American National Standards Institute, Inc. (ANSI):

ANSI C12;	Code for Electricity Metering.
ANSI C37.5;	Current and Potential Transformers.
ANSI C39.1;	Electrical Analog Indicating Instruments.
ANSI C57.13;	Requirements for Instrument Transformers.

2. Underwriters Laboratories, Inc. (UL):

UL 486E;	Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors.
UL 489;	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
UL 869A;	Service Equipment.
UL 891;	Dead-Front Switchboards.
UL 943;	Ground-Fault Circuit Interrupters.
UL 1053;	Ground-Fault Sensing and Relaying Equipment.

3. National Electrical Manufacturer Association (NEMA):

NEMA AB1;	Molded Case Circuit Breakers.
NEMA PB 2;	Deadfront Distribution Switchboards.
NEMA PB 2.1;	General Instruction for Proper Handling, Installation, Operation and Maintenance of Deadfront Distribution Switchboards Rated 600 Volts or less.
NEMA PB 2.2;	Application Guide Ground Fault Protective Devices for Equipment.
NEMA SG5;	Power Switchgear Assemblies.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Shop Drawings to include:
    a. Front, plan, and side view elevations with overall dimensions.
    b. Conduit entrance locations and requirements.
    c. Nameplate legends; size and number of bus bars per phase, neutral and ground.
    d. Switchboard instrument details and accessories.
    e. Electrical characteristics including voltage, frame size and trip rating and withstand ratings.
3. Outdoor weatherproof equipment enclosure and accessories.
4. Furnish structural calculations for equipment anchorage as described in Section 260010: Basic Electrical Requirements.
5. Submit Manufacturer's installation instructions.
6. Complete Bill of Materials listing all components.
7. Final test results.
8. Warranty.

B. Dimensions and configurations of switchboards shall conform to the space allocated on the Drawings. The Contractor shall submit a revised layout if equipment furnished varies in size from that indicated on Drawings for the Engineer's approval.

C. Service entrance switchboard utility metering sections shall be submitted to the local electrical utility company for approval prior to submission to the Engineer. A letter of acceptance from utility company shall be included in submittal package.

1.04 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. A detailed explanation of the operation of the system.
2. Instructions for routine maintenance.
3. Pictorial parts list and part numbers.
4. Pictorial and schematic Electrical Drawings of wiring systems, including operating and safety devices, control panels, instrumentation, and annunciators.
5. Telephone numbers for the authorized parts and service distributors.
6. Include all service bulletins and torque Specifications for all terminations.
7. Final testing report.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused, and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

C. Independent Testing Agency qualifications: Refer to Section 260010: Basic Electrical Requirements.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Switchboard components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner. Components shall be properly packaged in factory-fabricated containers and mounted on shipping skids.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with NEMA PB2.1 and Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

A. Units and components offered under this Section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.08 EXTRA MATERIAL

A. Provide one spray can of matching finish paint for touching up damaged surfaces after installation.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. ABB/ General Electric.
2. Eaton.
3. Industrial Electric Mfg.
4. Siemens.
5. Square D.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 SWITCHBOARDS - GENERAL

A. Enclosure:

1. Each switchboard shall consist of a dead front, completely metal enclosed self-supporting structure. Construction shall consist of vertical sections of the

universal frame type bolted together and braced with self-tapping bolts. Sides, top and rear shall be covered with captive-bolt fastened steel plates having formed edges all around. Front plates shall be sectionalized and removable. All plates shall be fabricated from 12-gage steel and shall have die-formed edges all around. The switchboard frame shall be suitable for use as floor sills in indoor installations. Corners shall be reinforced with rigged gussets internal and external to the structural members.

2. Switchboards shall have depth as required to house all equipment contained within it. Switchboard shall be constructed so that the back and front of all sections align. Construction of the board shall allow maintenance of incoming line terminations, device connections and all bus bolted connections.
3. All devices shall be accessible and removable from the front unless rear access is indicated on the Drawings.
4. Provide necessary hardware to permit locking every overcurrent protective device handle in the "OFF" position.
5. Provide hinged access doors to all termination, meter, and relay compartments with knurled and slotted large head captive-bolts. The design shall allow access to compartments without tools and without removing any panels.
6. Furnish cable pull sections or top cable pull boxes where indicated on the Drawings complete with cable tie down supports. Where cable pull section or pull boxes contain utility service cables, provide utility acceptable sealing means.
7. Switchboard shall be suitable for use as service entrance equipment and be labeled in accordance with UL requirements.
8. Utility metering compartment section shall be fabricated to meet all utility company requirements. Where separate vertical section is required for utility metering, match and align with switchboard enclosure.
9. Clearances: Comply with CEC Article 408.18 for clearances and connections. Equipment requiring rear or side access to make field connections shall be so marked by the manufacturer on the front of the equipment in accordance with CEC Article 408.18 (C).

B. Bus assembly and terminations:

1. The switchboard bussing shall be highly conductive tin-plated aluminum with sufficient cross-sectional area to meet UL Standard 891 temperature rise requirements.
2. Switchboard bus bars and connections shall consist of high conductivity tin-plated aluminum (750 amps per square inch maximum) mounted on heavy duty glass polyester supports. Bolted connections using Belleville washers are required for all internal connections, including those between protective devices and bus.
3. Bus arrangement shall be Phase A-B-C-N left-to-right, top-to-bottom and front-to-rear as viewed from the front. Horizontal and vertical bus ampere rating shall be uniform from end-to-end.
4. All bussing to and from an overcurrent protective device shall be rated to the frame sizing, not the trip rating.

5. Where "SPACE" is indicated in the switchboards, cross connectors and mounting hardware shall be installed to match the frame size ampere rating noted on the Electrical Drawings. All "SPACES" shall be ready for installation of overcurrent protective devices at a future time.
6. Shipping splits and provisions for future bus extension shall be provided with necessary bus splices.
7. Each switchboard shall contain a full length, bottom/front located copper ground bus that is securely connected to each vertical section. Ground bus shall be sized in accordance with UL 891, Table 25.1.
8. Termination lugs: High compression circumference crimped type rated for use with aluminum/copper conductors.
9. Switchboards shall be fully rated for a minimum of AIC Rating as indicated on the Drawings.
10. Neutral bus shall be 100 percent rated unless otherwise indicated on the Drawings.
11. Main service switchboards:
    a. Removable neutral link: Provide removable bolted bus section for the purpose of disconnecting the ground circuit conductor from the premises wiring at the supply side of the service in accordance with CEC Article 230-75.
    b. Main bonding jumper: Connection between the grounded circuit conductor and the equipment ground conductor at the supply side of the service. Size in accordance with CEC Table 250-102(C)(1).

C. Switching and overcurrent protective devices:
1. Refer to Section 262816: Overcurrent Protective Devices.
2. Main and overcurrent protective devices(s) shall be fixed mounted molded case circuit breaker with interrupting rating and frame and trip ratings as indicated on Drawings.
3. Feeder overcurrent protective device(s) shall be fixed mounted molded case circuit breaker with frame and trip rating as indicated on Drawings.
4. Devices interrupting rating shall match that of switchboard for which the device is installed.
5. Devices shall be manually operated unless shunt trip and/or electrically operated devices are indicated on Drawings.

D. Ground fault protection:
1. General: A solid-state, zone-interlocked, ground fault protection system shall be provided integral on the main, and the feeder device(s) as indicated on Drawings. It shall consist of integral phase current sensors, appropriate solid-state relaying equipment to provide the desired ground fault current sensitivity and time-current response characteristics. Provide neutral ground fault current transformer for four wire systems. Provisions shall be made for wiring devices for coordination between the main and the feeder devices.

2. Device settings: Adjustable pickup current sensitivity for ground fault currents from 200 amperes to 1200 amperes shall be provided. A calibrated dial shall be provided for setting the current pickup point in the field. Time delay shall be adjustable from 0 to 60 cycles. Settings for individual relays shall be as directed by the short circuit/coordination study specified in Section 260060: Power System Study. A locking screw shall be provided to retain both adjustments at desired setting.
3. All overcurrent devices shall be independently time coordinated irrespective of zone interlocking to allow the last downstream level of ground fault devices to be time coordinated, i.e. it shall NOT revert to the lowest time setting.

E. Instrumentation and controls:

1. Switchboards shall have a digital meter unit (DMU) as indicated on the Drawings. DMU shall be Electro Industries Shark 200 (CAT# SHARK200-60-10-V6-D2-RO1S-1NP100S) with communications software or equal. Control power shall be derived internally.
2. Meter potential circuits shall be fused. Potential transformers if required for the monitoring devices shall be provided with fuses in the primary.
3. Meter current circuits shall have shorting terminal blocks between the meter and the current transformers. Current transformers shall be ring type (one per phase) with ratio, thermal, and mechanical ratings coordinated with the application and protection.
4. Instrument transformer accuracy per IEEE C57.13.6:
   a. Current transformers must maintain 0.3% accuracy from 5% rated current through rating factor at rated burden.
   b. Voltage transformers must maintain 0.15% accuracy from 90% to 110% of rated voltage.
5. All internal devices (relays, transformers, etc.) shall be tagged as to rating and function with permanently fastened engraved nameplates.
6. Control and signal circuits: Control devices, i.e.: contactors, relays, time clocks, etc. shall be mounted in a separate compartment that is fully barrier from the overcurrent protective device compartments. Control devices shall be accessible through a separate hinged cover panel.
7. Relays: All relays shall be industrial control grade with a "ON" indicating neon light, hold down springs, minimum of 10 amp rated contacts and a minimum of four form C contacts. Relays used for control power transfer shall have 20 amp rated contacts. Do NOT use paralleled relays for relays with greater than 4-poles, use relays with the required number of poles. This is to prevent the situation where one relay fails, and half of the intended function is lost, which could be dangerous.

F. Refer to Electrical Drawings for the following:

1. Mounting style; voltage; terminal lug size, location, and quantity; bus ampacity; interrupting capacity of bus and overcurrent protective devices, quantity, poles, and rating of overcurrent protective devices. Note that the AIC value noted on the Drawings for distribution equipment is the minimum rating of all components; values are in RMS symmetrical amps.

2. If indicated on the Electrical Drawings, provide contactors, relays, time clocks, etc. mounted within switchboard.

G. Miscellaneous requirements:

1. Circuit numbering: Starting at the top, odd numbered circuits in sequence down the left-hand side and even numbered circuits down the right-hand side.

2. Nameplates: Engraved nameplates shall be provided for each device and all "SPACES" located in the switchboard. An engraved nameplate shall also be provided indicating the switchboard designation. See Section 260553: Electrical Identification for requirements.

3. All control wires shall be labeled with wire markers and referenced to the control wiring diagrams. Provide colored wires with colored stripes to facilitate troubleshooting and locating both ends of wires. Do not use wires with all the same wire color. Use fork, crimp type terminations on all control wires.

4. Provide a test block and plugs for voltage and current monitoring at each main switch. Provide engraved legend plates to indicate function of each test point.

5. Vertically mounted mains shall have the operating handle in the up position when energized.

H. Weatherproof outdoor enclosure and accessories:

1. Provide a NEMA 3R non-walk-in type weatherproof housing with hinged lockable access doors. Each section shall have a minimum of 13-inch deep vestibule. Provide a latch for each door to ensure adequate closing pressure to seal against harmful weather.

2. Provide each section of the switchboard with the following items with power obtained from a control power transformer and circuit breaker within the switchboard.

a. Thermostatically controlled space heater.

b. 120 volt AC industrial grade fluorescent lights inside each section vestibule.

c. One 120 volt AC GFCI type duplex outlet with weatherproof cover. Connect to 120 volt AC light circuit.

3. The weatherproof housings shall be provided with lifting eyes.

I. Finish:

1. Five step zinc phosphate pre-treatment, one coat of rust inhibiting dichromate primer and one coat of baked-on enamel finish, ANSI 61 (light gray).

2. A seven-step spray wash electroplate primer with final baked-on enamel finish; ANSI 61 (light gray) is an acceptable finish alternative.

2.03 SOURCE QUALITY CONTROL

A. Factory testing:

1. The switchboard shall be completely assembled, wired, adjusted, and tested at the factory. After assembly, the complete switchboard shall be tested for operation under simulated conditions to assure the accuracy of the wiring and the functioning of all equipment.

2. The main circuits shall be given a dielectric test of 2200 volts for one minute between current carrying components and ground and between opposite polarities. The wiring and control circuits shall be given a dielectric test of 1500 volts for one minute between current carrying components and ground.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of switchboard installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 PREPARATION

A. Ensure all conduit stub-ups for bottom entry into switchboard are in place and located as required per Shop Drawings.

B. As shown on the Drawings, provide a concrete pad beneath equipment.

3.03 INSTALLATION

A. Install switchboards in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Handling, storage, installation and energize of switchboards shall be carried out in accordance with latest edition of NEMA Publications PB 2.1.

C. Freestanding switchboards shall be accurately aligned, leveled, and bolted in place on full-length channels securely fastened to concrete floor.

D. Switchboards shall be anchored and braced to withstand seismic forces as calculated per Section 260010: Basic Electrical Requirements.

E. Provide mounting hardware brackets, bus bar drilling and filler pieces for all unused spaces.

F. "Train" interior wiring; bundle and clamp, using specified plastic wire wraps specified under Section 260519: Building Wire and Cable.

G. Replace any panel pieces, doors or trims having dents, bends, warps, or poor fit that may impede ready access, security, or integrity.

H. Conduits terminating in concentric, eccentric, or oversized knockouts at switchboards shall have ground bushings and bonding jumpers installed interconnecting all such conduits and the switchboards.

I. Check and tighten all bolts and connections with a torque wrench using Manufacturer's recommended values.

J. Visually inspect switchboards for rust and corrosion if signs of rust and corrosion are present, board shall be restored to new condition or replaced.

3.04 FIELD QUALITY CONTROL

A. Manufacturer's field service: Contractor shall arrange and pay for the services of a factory-authorized service representative to supervise the initial start-up, testing, and adjustment of the switchboard.

B. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing,

calibration and inspection required herein. Independent Testing Agency shall meet the requirements as outlined in Section 260010: Basic Electrical Requirements. Testing Agencies objectives shall be to:

1. Assure switchboard installation conforms to specified requirements and operates within specified tolerances.
2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
3. Prepare final test report including results, observations, failures, adjustments, and remedies.
4. Apply label on switchboard upon satisfactory completion of tests and results.
5. Verify ratings and settings and make final adjustments.

C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.

D. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.

E. Prefunctional testing:

1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
2. Visual and mechanical inspection:
    a. Compare nameplate information and connections to Contract Documents.
    b. Inspect for physical damage, defects alignment and fit.
    c. Verify appropriate anchorage, required clearances and correct alignment.
    d. Inspect doors, panels and sections for paint, dents, scratches, fit and missing hardware
    e. Check tightness of all control and power connections.
    f. Check that all covers, barriers, and doors are secure.
    g. Verify correct barrier installation.
    h. Verify that relays and overcurrent protective devices meet Drawing, power system study and specified requirements.
    i. Perform mechanical operational tests in accordance with Manufacturer's instructions.
    j. Exercise active components.
    k. Inspect control power and instrument transformers.
    l. Inspect insulators for evidence of physical damage or contaminated surfaces.
    m. Ground-fault protection:
        1) Verify ground connection is made ahead of neutral disconnect link and on line side of any ground fault sensor.
        2) Verify neutral sensors are connected with correct polarity on both primary and secondary.

3) Verify all phase conductors and neutral pass through sensor in same direction for zero sequence systems.

4) Verify grounding conductors do not pass through zero sequence sensors.

5) Verify grounded conductor is solidly grounded.

6) Verify correct operation of self-test panel.

7) Set pickup and time-delay settings in accordance with Specifications. Record operation and test sequences as required by code.

3. Electrical tests:

a. Perform resistance tests through bus joints with low-resistance ohmmeter. Joints that cannot be directly measured due to permanently installed insulation wrap shall be indirectly measured from closest accessible connection.

b. Perform insulation-resistance tests on each bus section, phase-to-phase, and phase-to-ground, at 1000 volt DC for 60-seconds. Investigate resistance values less than 50-megohms.

c. Perform over-potential test on each bus section, each phase-to-ground with phases not under test grounded, in accordance with Manufacturer's published data. Test voltage shall be applied for 60-seconds.

d. Perform insulation-resistance tests at 1000 volt DC for 60-seconds on control wiring. Do not perform this test on wiring connected to solid-state components.

e. Perform current injection tests on the entire current circuit in each section of switchgear.

1) Perform current tests by primary injection, where possible, with magnitudes such that minimum of 1 amp flows in secondary circuit.

2) Where primary injection is impractical, utilize secondary injection with minimum current of 1 amp.

3) Test current at each device.

f. Perform tests on all instrument transformers in accordance with Manufacturer's written instructions.

g. Determine accuracy of meters and instruments per Manufacturer's instructions.

h. Perform the following tests on control power transformers:

1) Perform insulation-resistance test. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.

2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage. Confirm potential at all devices.

3) Verify correct secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.

i. Potential transformer circuits:

1) Perform insulation-resistance tests. Perform measurements from winding-to-winding and each winding-to-ground. Test voltages shall be determined in accordance with Manufacturer's instructions.

2) Perform secondary wiring integrity test. Disconnect transformer at secondary terminals and connect secondary wiring to correct secondary voltage.

3) Verify secondary voltage by energizing primary winding with system voltage. Measure secondary voltage with secondary wiring disconnected.

j. Ground resistance:

1) Measure system neutral-to-ground insulation-resistance with neutral disconnect link temporarily removed. Replace neutral disconnect link after test.

2) Measure insulation-resistance of control wiring at 1000 volt DC for 60-seconds. Refer to Manufacturer's instruction for devices with solid-state components

k. Ground fault protection system:

1) Perform the following pickup tests using primary injection:

a) Verify relay does not operate at 90% of pickup setting.

b) Verify pickup is less than 125% of setting or 1200amps, whichever is smaller.

2) For summation type systems using phase-neutral current transformers, verify correct polarities by applying current to each phase-neutral current transformer pair. This test also applies to molded-case breakers using external neutral current transformer.

a) Relay should operate when current direction is the same relative to polarity marks in the two current transformers.

b) Relay should not operate when current direction is opposite relative to polarity marks in the two current transformers.

3) Measure time delay of the relay at 150% or greater of pickup.

4) Verify reduced control voltage tripping capacity at 55% for AC systems and 80% for DC systems.

l. Calibrate digital meters to 0.5-percent and verify meter multipliers.

m. Check phasing of alternate supply sources.

n. Verify operation of switchboard heaters.

o. Test overcurrent protection devices per Section 262816: Overcurrent Protective Devices.

4. Test values:

a. Bolt torque levels shall be in accordance with Manufacturer's requirements.

b. Compare bus connection resistances to values of similar connections.

c. Insulation-resistance values for bus, control wiring and control power transformers shall be in accordance with Manufacturer's published data. Values of insulation resistance less than Manufacturer's minimum levels should be investigated. Over-potential tests should not proceed until insulation-resistance levels are raised above minimum values.

d. Insulation shall withstand the over-potential test voltage applied.

e. Determine contact resistance in microhms. Resistance values shall not exceed high limit of normal range as indicated in Manufacturer's published data.

f. System neutral-to-ground insulation shall be a minimum of one megohm.

g. Ground fault protection systems relay timing shall be in accordance with Manufacturer's Specifications but must also be no longer than one second at 3000 amps.

F. In the event that the system fails to function properly during the testing as a result of inadequate pretesting or preparation, the Contractor shall bear all costs incurred by the necessity for retesting including test equipment, transportation, subsistence and the Engineer's hourly rate.

G. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

H. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.05 CLEANING

A. Prior to energizing of switchboard, the Contractor shall thoroughly clean the interior of enclosure of all construction debris, scrap wire, etc. using Manufacturer's approved methods and materials.

B. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of switchboard per Manufacturers approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

C. Touch-up paint any marks, blemishes or other finish damage suffered during installation.

3.06 TRAINING

A. Factory authorized service representative shall conduct a 4-hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance, and testing of equipment with both classroom training and hands-on instruction.

B. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION

SECTION 262816

OVERCURRENT PROTECTIVE DEVICES

PART 1 - GENERAL

1.01 SUMMARY

A. Work included: Labor, materials, and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:

1. Molded case circuit breakers.

B. Related Work: Consult all other Sections, determine the extent and character of related Work, and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.02 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:

1. Underwriters Laboratories, Inc. (UL):

UL 489;	Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.

2. National Electrical Manufacturer Association (NEMA):

NEMA AB 1;	Molded Case Circuit Breakers.

1.03 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:

1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
2. Describe product operation, equipment and dimensions and indicate features of each component.
3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
4. Provide factory certification of trip characteristics for each type and rating of circuit breaker.
5. Provide current let-through and melting time information for each type and rating of fuses.
6. Confirmation in writing of compliance with Arc Energy Reduction per CEC Articles 240.67 and 240.87.
7. Submit Manufacturer's installation instructions.
8. Complete bill of materials listing all components.
9. Warranty.

1.04 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. A detailed explanation of the operation of the system.
2. Instructions for routine maintenance.
3. Parts list and part numbers.
4. Telephone numbers for authorized parts and service distributors.
5. Final testing reports.

1.05 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.07 WARRANTY

A. Units and components offered under this Section shall be covered by a 1-year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products furnished by the following Manufacturers (or equal) shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.

1. Circuit breakers:
   a. ABB/ General Electric.
   b. Eaton.
   c. Siemens.
   d. Square D.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.02 GENERAL

A. Overcurrent protective devices shall satisfy all CEC mandated selective coordination requirements.

B. Circuit breakers rated (or can be adjusted) 1200 amps or higher shall satisfy CEC Article 240.87 requirements.

2.03 MOLDED CASE CIRCUIT BREAKERS

A. Branch and feeder circuit breakers shall be molded case, bolt on and trip indicating.

B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.

C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings.

D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.

E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.

F. Provide identified handle ties for single pole circuit breakers that share a neutral conductor.

G. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.

H. All terminals shall be dual rated for aluminum or copper wire.

I. Circuit breakers with frame ratings 100 amps and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100 amps shall be installed in distribution type panels.

J. Circuit breakers with frame ratings above 100 amps through 400amps shall have solid state electronic trips with true RMS reading through the 13th harmonic with 1% accuracy, interchangeable trip via front accessible current plug, adjustable instantaneous and short time be rated as indicated on Drawings at the voltage indicated.

K. Circuit breakers with frame ratings above 401 amps through 2500 amps shall have microprocessor-based RMS sensing trip units with the following characteristics:

1. Interchangeable current rating plug or an adjustable trip setting to match the trip rating as indicated on Drawings.

2. Adjustable long-time pick-up setting. Minimum of five settings from 50% to 100%.

3. Adjustable long-time delay setting. Minimum of three delay bands.

4. Adjustable short time pick-up setting. Minimum of five settings from 200% to 800%.
5. Adjustable short-time delay setting. Minimum of three delay bands with I2t IN and OUT curves.
6. Adjustable instantaneous pick-up setting. Minimum of five settings from 200% to 1000%. Where the instantaneous feature is omitted on the Drawings, the trip unit shall have an instantaneous override feature.
7. Zone selective interlocking (ZSI) for short-time delay and ground-fault delay trip functions, if indicated on the drawings.
8. LED status indication to show “health” of trip unit.
9. Three-phase ammeter, if indicated on the drawings.
10. Trip indication targets on overload, ground fault and short circuit, if indicated on the drawings.

L. Accessories: Provide accessories as noted on the Drawings, i.e. shunt-trip, auxiliary contacts, undervoltage trip, alarm switch, etc.

M. Spaces in the boards shall be able to accept any combination of 1, 2 or 3-pole circuit breakers as indicated. Provide all necessary bus, device supports, and mounting hardware sized for frame, not trip rating.

N. Series rated breakers are not acceptable unless specifically noted on the Drawings.

O. Breaker shall be rated to operate in an ambient temperature of 40-degrees C and at 100% of their frame ampere rating on a continuous basis.

P. For circuit breakers rated or can be adjusted to 1200 amps (or higher), provide zone selective interlocking (ZSI) with downstream protective devices, if indicated on the drawings. If ZSI is not indicated on the drawings, provide a key interlock maintenance mode switch and blue LED indicating lamp in the same section, which shall allow an operator to manually enable arc energy reduction protective device maintenance settings to reduce the arc flash energy level in accordance with CEC Article 240.87 requirements. Key shall be held captive when maintenance mode signal is disabled and removable when maintenance mode signal is enabled. Maintenance mode switch positions shall be labeled “Enabled” and “Disabled”. Blue indicating lamp shall be push-to-test type.

Q. Refer to the Drawings for breakers requiring ground fault protection. See Section 262413: Switchboards for requirements of ground fault protection system.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of overcurrent protective device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.02 INSTALLATION

A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.

C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable CEC and NEMA standards for installation.

3.03 FIELD QUALITY CONTROL

A. Independent testing: Contractor shall arrange and pay for the services of an independent Testing Agency to perform all quality control electrical testing, calibration and inspection required herein. Testing Agencies objectives shall be to:

1. Assure overcurrent protective device installation conforms to specified requirements and operates within specified tolerances.
2. Field test and inspect to ensure operation in accordance with Manufacturer's recommendations and Specifications.
3. Prepare final test report including results, observations, failures, adjustments, and remedies.
4. Verify ratings and settings and make final adjustments.

B. At least three weeks prior to any testing, notify the Engineer so that arrangement can be made for witnessing test, if deemed necessary. All pretesting shall have been tested satisfactorily prior to the Engineer's witnessed test.

C. The Contractor shall supply a suitable and stable source of electrical power to each test site. The Testing Agency shall specify the specific power requirements.

D. Testing of overcurrent protective devices shall be done only after all devices are installed and prior to system being energized.

E. Prefunctional testing:

1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
2. Visual and mechanical inspection:
   a. Inspect for physical damage, defects alignment and fit.
   b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
   c. Compare nameplate information and connections to Contract Documents.
   d. Check tightness of all control and power connections.
   e. Check that all covers, barriers, and doors are secure.
3. Electrical tests:
   a. Circuit continuity: All feeders shall be tested for continuity. All neutrals shall be tested for improper grounds.

b. Test all circuit breakers with frame size 225 amps and larger in each panelboard, distribution board, switchboard, etc. unless otherwise noted via primary current injection testing. Testing shall verify the following:

1) Determine that circuit breaker will trip under overcurrent conditions, with tripping time in conformance with NEMA AB 1 requirements.

2) Circuit breaker pickup and delay measurements are within the manufacturers published tolerances for long time, short time, instantaneous, and ground fault.

3) For circuit breakers rated or can be adjusted to 1200 amps (or higher), confirm ZSI protection is acceptable or the maintenance mode switch is operational (enabled and disabled) with reduced pickup and delay measurements when enabled.

F. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

G. Contractor shall submit the Testing Agency's final report for review prior to Project closeout and final acceptance by the Owner. Test report shall indicate test dates, devices tested, results, observation, deficiencies, and remedies. Test report shall be included in the operation and maintenance manuals.

3.04 ADJUSTING

A. Adjust circuit breaker trip settings based on recommendations of Section 260060: Power System Study.

B. Adjust circuit breaker trip settings for coordination with other overcurrent protective devices in system.

C. Adjust circuit breaker trip settings for adequate protection from overcurrent and fault currents.

3.05 CLEANING

A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt, and debris.

3.06 TRAINING

A. Factory authorized service representative shall conduct a 4-hour training seminar for Owner's Representatives upon completion and acceptance of system. Instructions shall include safe operation, maintenance, and testing of equipment with both classroom training and hands-on instruction.

B. Contractor shall schedule training with a minimum of 7-days advance notice.

END OF SECTION

ATTACHMENT 2: 300kW FLUSH MOUNT GA DRAWING PACKAGE

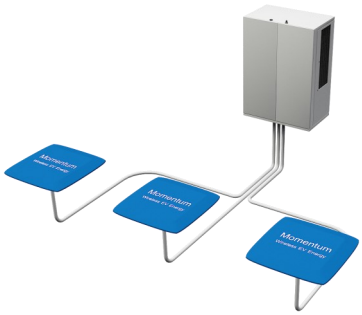
INDUCTEV

300kW Flush Mount GA Drawing Package

Table of Contents

INDUCTEV

AUTOMATIC WIRELESS EV CHARGING

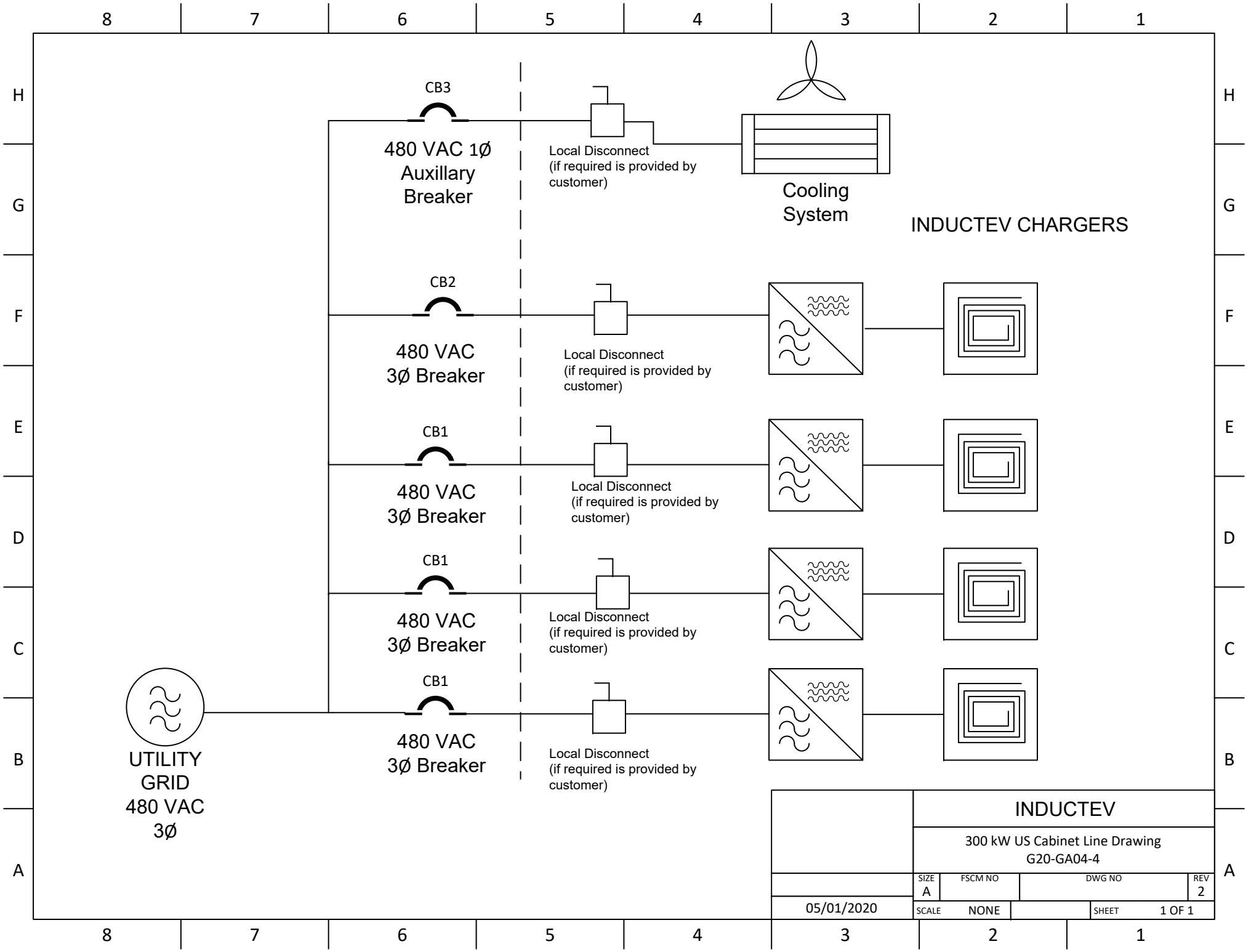


ELECTRICAL SPECIFICATIONS (US)

SPECIFICATIONS	G20-GA01-2	G20-GA01-4
	US 150kW	US 300kW
Total Charging Pads Available	2	4
Input Ratings:		
Voltage	480VAC ± 10%	
Frequency	60Hz	
SCCR	10kA	
Per Charging Pad Specifics:		
Current	103A/Pad	
Phase Configuration	3 Phase, 3 Wire, Solidly Grounded Wye	
Max Overcurrent Protection Device	125A (80% rated)	
Acceptable Wire Term (Cu Only)	4AWG (16mm^2) - 1/0AWG (50mm^2)	
Cabinet System Cooling:		
Voltage	480VAC	
Phase Configuration	1 Phase 2 Wire, Solidly Grounded	
Acceptable Wire Term (Cu Only)	14 AWG (2.5mm^2) - 6 AWG (10mm^2)	
Current.	18A	16A
Minimum Circuit Ampacity	20A	
Max Overcurrent Protection Device	25A	30A

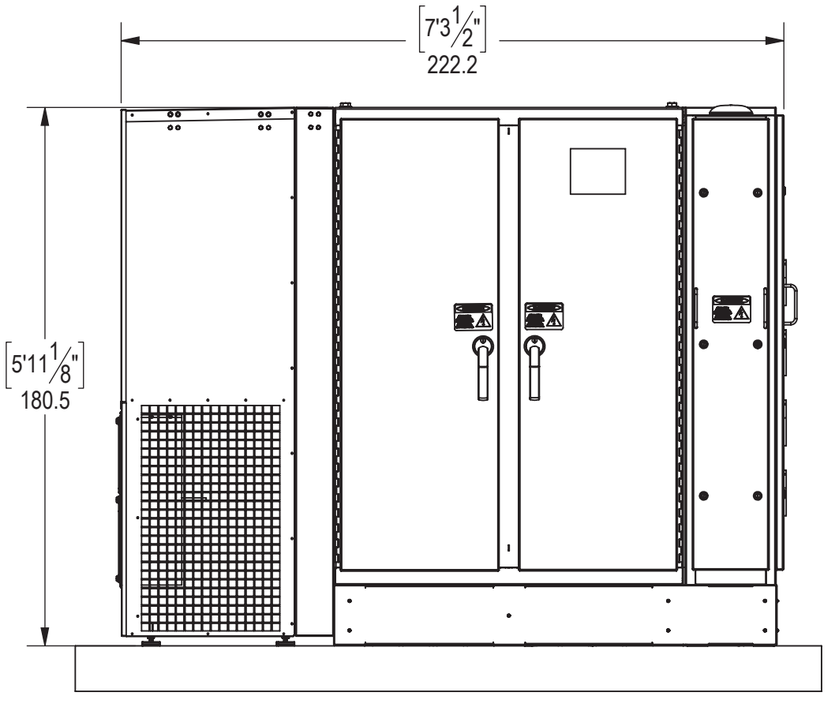
The INDUCTEV Power electronics cabinet converts 480V AC (or 400V) to High Frequency AC for wireless transmission. The Cabinet also manages the charg-ing system power control, metering and grid communications for vehicle authoriza-tion, smart charging, and system management.

www.InductEV.com
CustomerSupport@InductEV.com
660 Avondale Road, King of Prussia, PA 19406


CB3
480 VAC 1Ø
Auxillary
Breaker
Local Disconnect
(if required is provided by
customer)
Cooling
System
INDUCTEV CHARGERS
CB2
480 VAC
3Ø Breaker
Local Disconnect
(if required is provided by
customer)
CB1
480 VAC
3Ø Breaker
Local Disconnect
(if required is provided by
customer)
CB1
480 VAC
3Ø Breaker
Local Disconnect
(if required is provided by
customer)
CB1
480 VAC
3Ø Breaker
Local Disconnect
(if required is provided by
customer)
UTILITY
GRID
480 VAC
3Ø
INDUCTEV
300 kW US Cabinet Line Drawing
G20-GA04-4
SIZE
A
FSCM NO
DWG NO
REV
2
05/01/2020
SCALE
NONE
SHEET
1 OF 1

NOTES:
1. CONTRACTOR TO PROVIDE THE FOLLOWING TOOLS FOR CONTRACT WORK
    1. CRIBBING
        1. REFERENCE PAGE 9 FOR CRIBBING INSTRUCTIONS
        2. 4X OF 6X6 OR 8X8 DEPENDING ON THE AVAILABILITY
    2. LIFTING EQUIPMENT
        1. REFERENCE PAGE 5 FOR LIFTING INSTRUCTIONS
2. MOMENTUM DYNAMICS TO PROVIDE THE FOLLOWING TOOLS AND PARTS IN ADDITION TO BOM TABLE BELOW
    3. 4X 3/4"-10 THREADED EYEBOLTS
    4. AIR CONDITIONER (A/C) HARDWARE: 11X HEX HEAD 1/4"-20 X 1" SCREWS AND 11X 1/4" WASHERS
    5. SKIRTS: 4X SIDE SKIRTS AND 16X #10-32 SCREWS AND PLASTIC #10 WASHERS
    6. 1X DOOR KEY

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	PREPRODUCTION RELEASE	10/29/2021	J. Wendschuh



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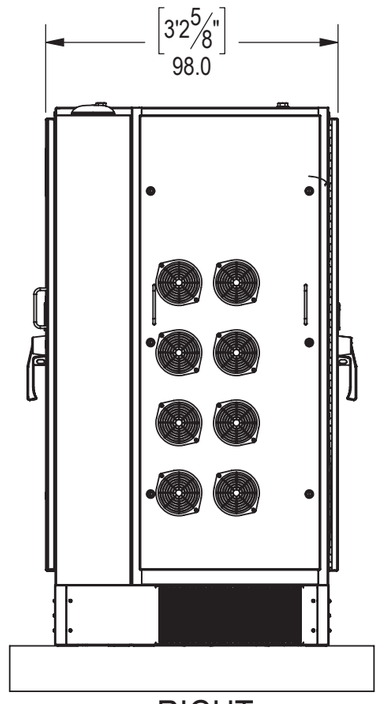
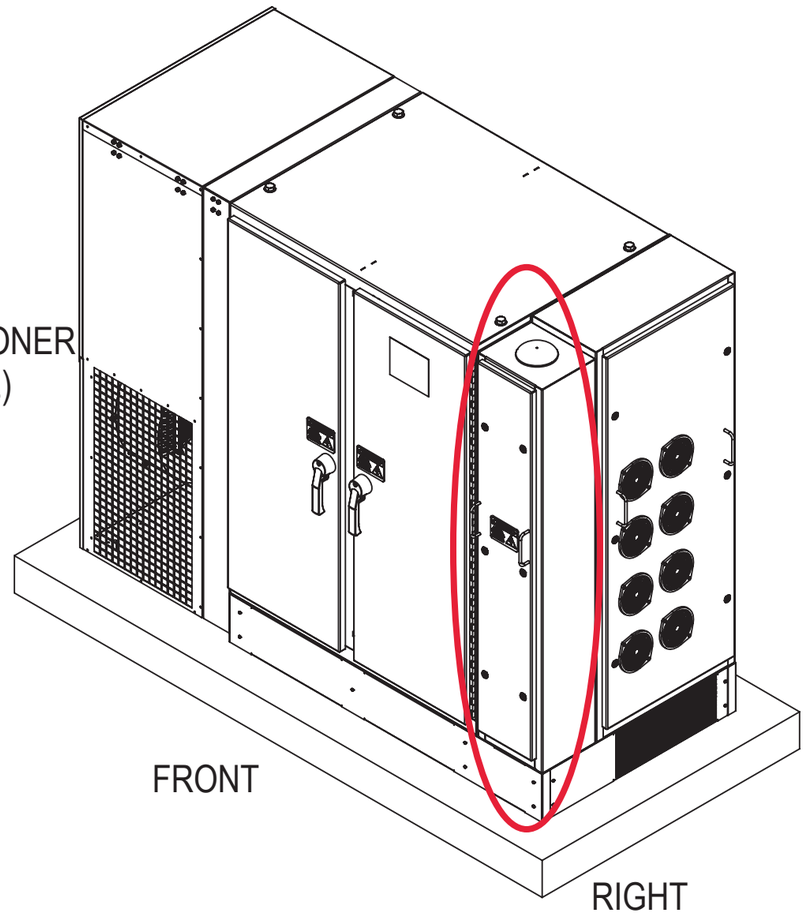


RIGHT
(COIL COOLING CABINET SIDE)

LEFT
(AIR CONDITIONER [A/C] SIDE)

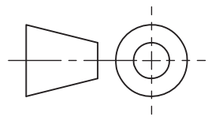


FRONT

RIGHT
(COIL COOLING CABINET SIDE)

ITEM No	PART No	DESCRIPTION	QUANTITY
1	A-01384	Enclosure Assy - GenII, GA, 300kW, 480V, 60Hz, A/C	1
2	0100001759	A/C and Plenum - 5 Ton, w. controller	1
3	0100004590	Threaded Anchor - Concrete, 3/8"-16 F, 1-9/16" L, 316 SS	8
4	0100008352	Screw - Hex Head, 3/8"-16 x 3/4", 18-8 SS	8
5	0100009209	Washer - Flat, 3/8" Screw, 18-8 SS	8
6	1000000094	Tool - 3/8" Concrete Anchor Installation Tool	1

THIRD ANGLE PROJECTION



UNLESS OTHERWISE SPECIFIED, UNITS: [FT-IN] CM

TOLERANCES	FAB	MACH
X	±0.5 mm	±0.2 mm
X.X	±0.25 mm	±0.1 mm
X.XX	±0.125 mm	±0.025 mm
X°	1°	0.5°
SURFACE FINISH		1.6

	NAME	DATE
DRAWN	M. Tabbut	10/1/2021
CHECKED	B. Van De Wiele	10/29/2021

DWG TYPE: Assembly

MATERIAL: N/A

FINISH: N/A

DO NOT SCALE DRAWING

INDUCTEV

TITLE: Enclosure Field Assy - GenII, GA, 300kW, 480V, 60Hz, A/C

PART NO: A-01503

DWG NO: 0100004069

SIZE: B

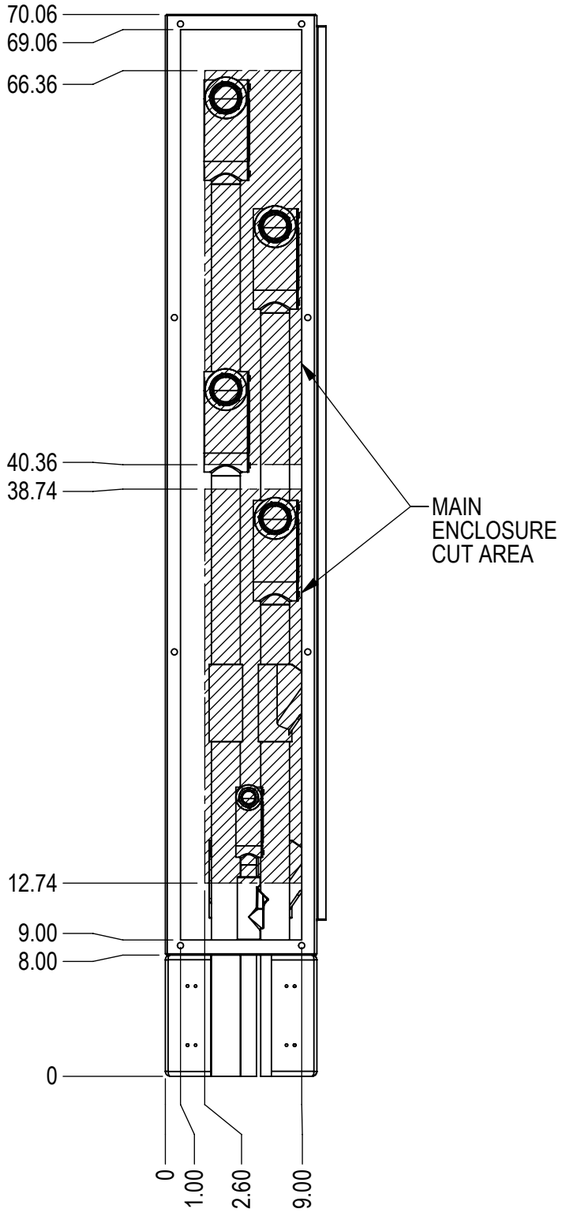
LIFECYCLE STATE: Preproduction

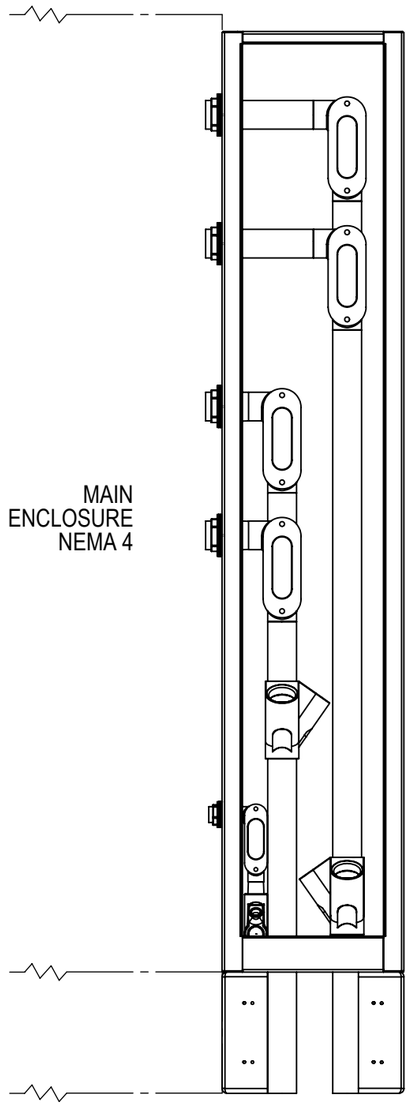
REV: A

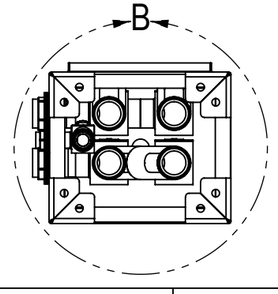
SCALE: NONE

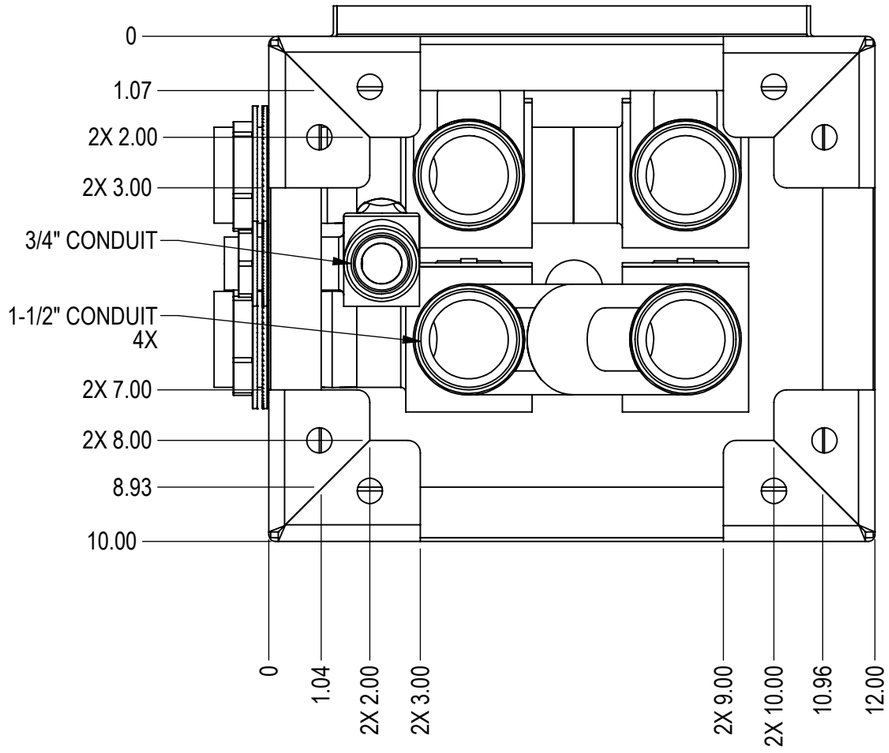
WEIGHT: 1270.06 kg (2800 lbs)

SHEET 1 OF 14









DETAIL B

CONFIGURATION 2

ALL UNITS ARE IN INCHES

INDUCTEV

SIZE	DWG NO	REV
B	A-01747	P1

SCALE: NONE	WEIGHT: 0.03 kg (0.08 lbs)	SHEET 2 OF 2

CONDUIT HUBS IN STAINLESS STEEL

WH-3SSG with Ground

- Suitable for use in hazardous location applications when installed according to NEC Articles 501.10(B), Class I, Div. 2, (Suitable for use in Class I Zone 2 applications) 502.10, 503.10 and 505- 15.
- Suitable for use with NEMA type enclosures 2, 3, 3R, 4, 4x 12 and 13.

c UL us LISTED

cULus Certified to CSA Standards by UL

FEATURES-SPECIFICATIONS

Applications

Conduit hubs provide a liquid tight, oil tight and dust tight termination of electrical conduit through the walls of sheet metal enclosures. The hubs fit into standard knockout dimensions.

Features

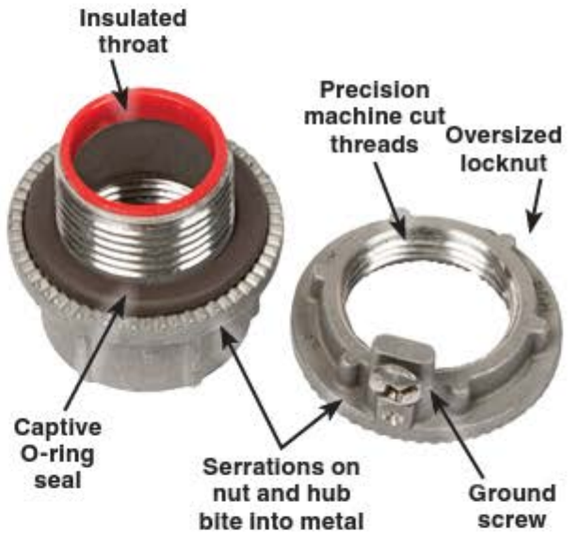
- Oversized locknut provides for a strong vibration-proof termination
- Captive sealing ring
- Serrations on hub body and locknut provide effective positive ground path
- Rugged 316 Stainless Steel
- Insulated throat protects conductors
- Suitable for use with NEMA type enclosures 2, 3, 3R, 4, 4x, 12 and 13
- Grounding provision for added safety

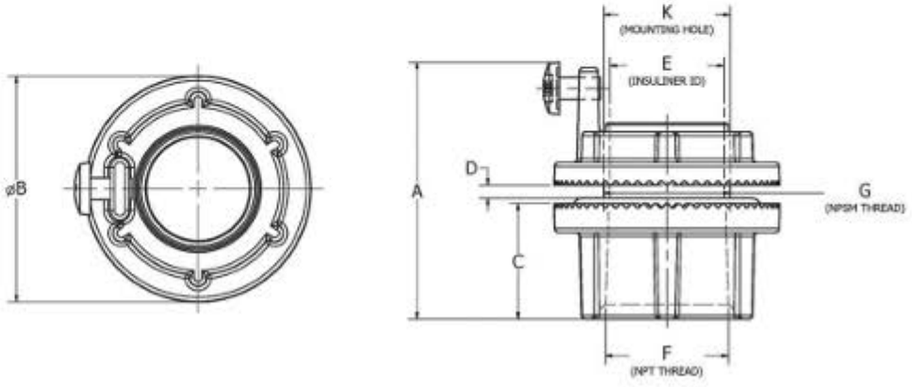
Material/Finish

- Nut and body 316 Stainless Steel
- Natural finish
- Sealing ring gasket - Viton
- Insuliner - Lexan
- Ground screw - Stainless steel

WH WEATHERPROOF CONDUIT HUBS			
CATALOG NUMBER	FEMALE NPT HUB SIZE	MAX. COPPER① GROUND WIRE SIZE	
WH-1SSG	1/2"	#8	#8
WH-2SSG	3/4"	#8	#8
WH-3SSG	1'	#8	#8
WH-4SSG	1-1/4"	#8	#8
WH-5SSG	1-1/2"	#8	#6
WH-6SSG	2"	#8	#4
WH-7SSG	2-1/2"	#6	#2
WH-8SSG	3"	#6	1/0
WH-9SSG	3-1/2"	#6	2/0
WH-0SSG	4"	#4	2/0

① Use of wire terminal is recommended by UL and required by CSA for wire gauges over 10 AWG





"D" Dimension indicates maximumn panel thickness hub will accomodate.


H2 PRECAST

NOTES:
1. CONTRACTOR TO PROVIDE THE FOLLOWING TOOLS FOR CONTRACT WORK
    1. CRIBBING
        1. REFERENCE PAGE 9 FOR CRIBBING INSTRUCTIONS
        2. 4X OF 6X6 OR 8X8 DEPENDING ON THE AVAILABILITY
    2. LIFTING EQUIPMENT
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REVISIONS			
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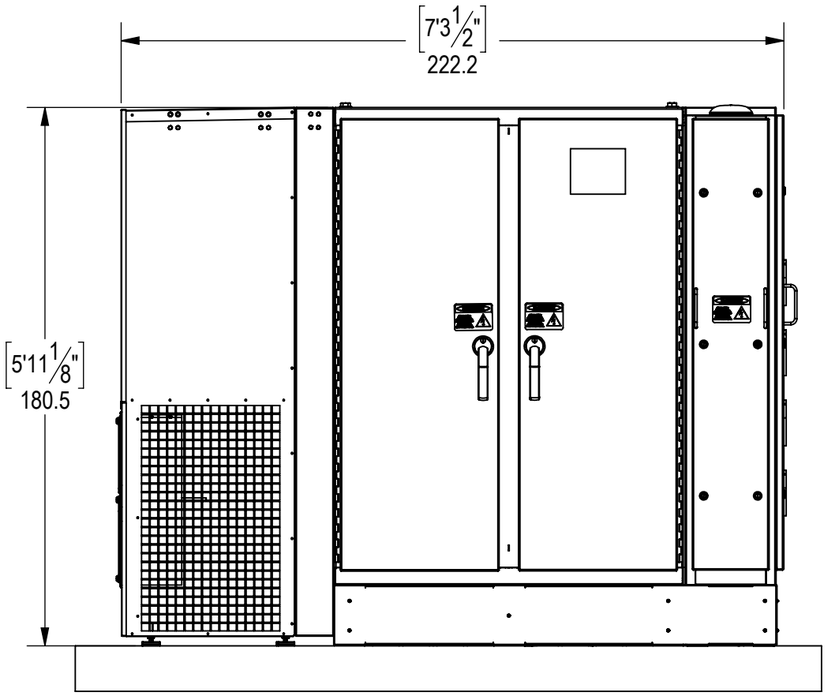

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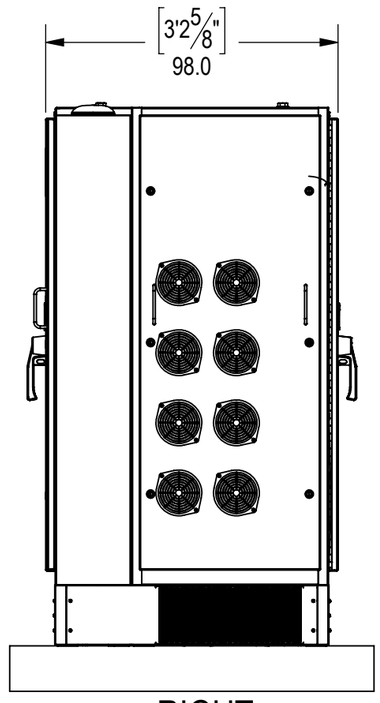
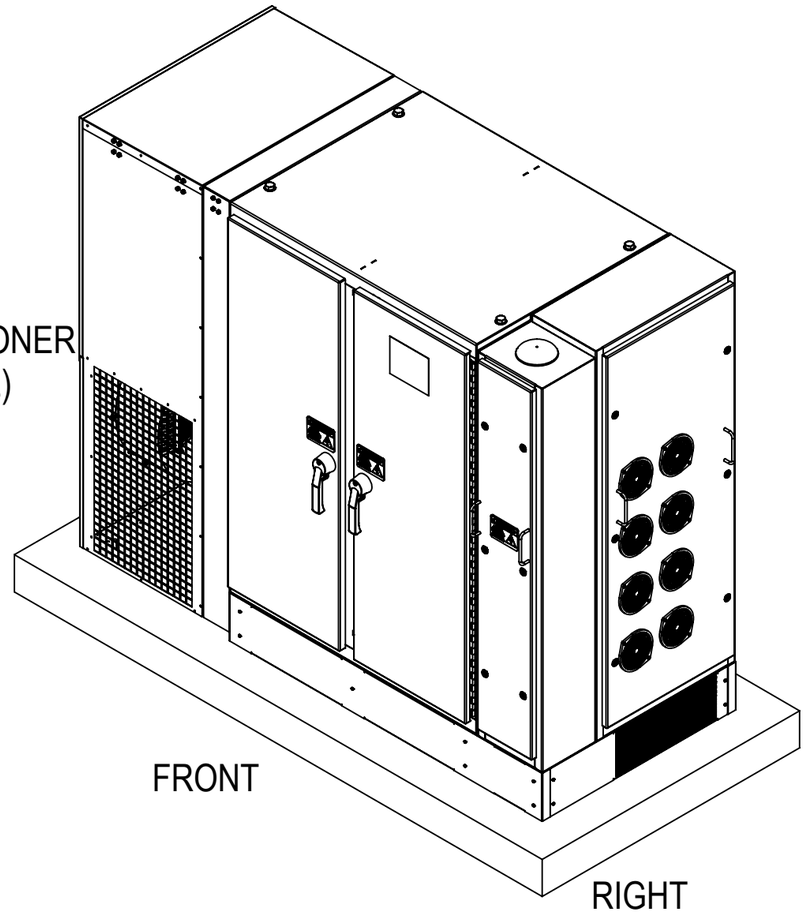


RIGHT
(COIL COOLING CABINET SIDE)

LEFT
(AIR CONDITIONER [A/C] SIDE)



FRONT

RIGHT
(COIL COOLING CABINET SIDE)

ITEM No	PART No	DESCRIPTION	QUANTITY
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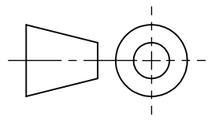
3	0100004590	Threaded Anchor - Concrete, 3/8"-16 F, 1-9/16" L, 316 SS	8
4	0100008352	Screw - Hex Head, 3/8"-16 x 3/4", 18-8 SS	8
5	0100009209	Washer - Flat, 3/8" Screw, 18-8 SS	8
6	1000000094	Tool - 3/8" Concrete Anchor Installation Tool	1

THIRD ANGLE PROJECTION



UNLESS OTHERWISE SPECIFIED, UNITS: [FT-IN] CM

TOLERANCES

	FAB	MACH
X	±0.5 mm	±0.2 mm
X.X	±0.25 mm	±0.1 mm
X.XX	±0.125 mm	±0.025 mm
X°	1°	0.5°
SURFACE FINISH		1.6

	NAME	DATE
DRAWN	M. Tabbut	10/1/2021
CHECKED	B. Van De Wiele	10/29/2021

DWG TYPE: Assembly

MATERIAL: N/A

FINISH: N/A

DO NOT SCALE DRAWING

INDUCTEV

TITLE: Enclosure Field Assy - GenII, GA, 300kW, 480V, 60Hz, A/C

PART NO: A-01503

DWG NO: 0100004069

SIZE: B

LIFECYCLE STATE: Preproduction

REV: A

SCALE: NONE

WEIGHT: 1270.06 kg (2800 lbs)

SHEET 1 OF 14

TABLE OF CONTENTS

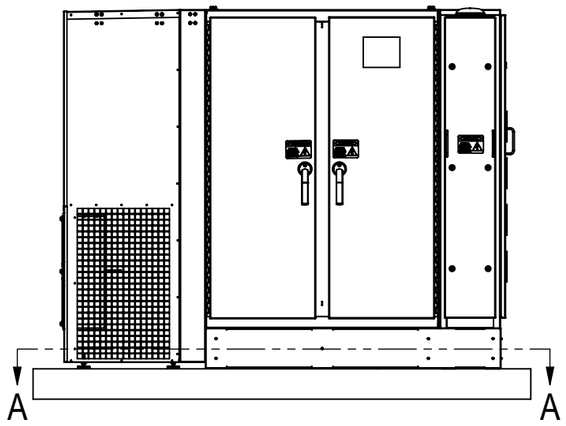
INDUCTEV

PART NO	DWG NO
A-01503	0100004069

SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 2 OF 14

REFERENCE PAGE
CONDUIT LAYOUT RELATIVE TO ENCLOSURE



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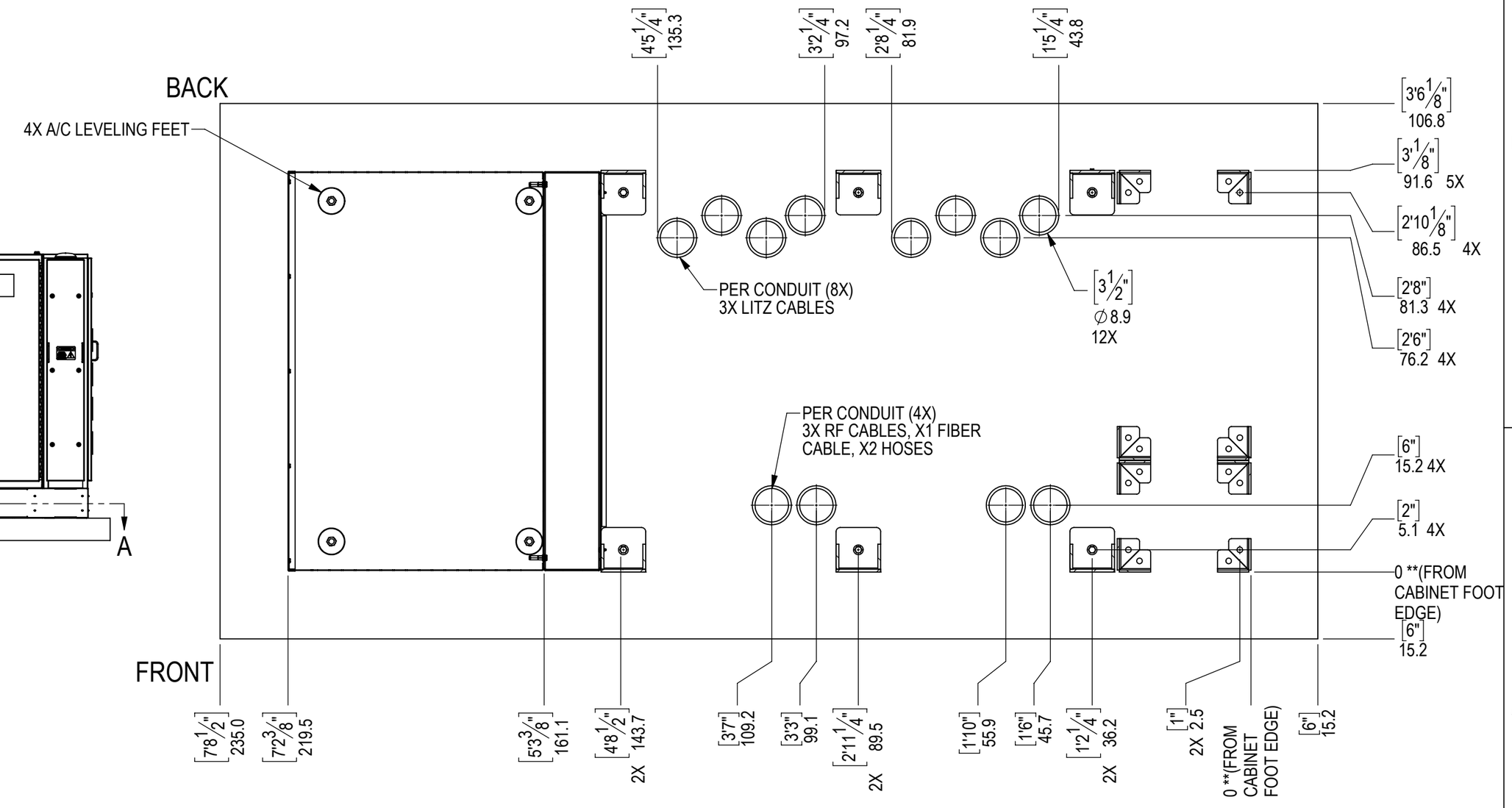
BACK



FRONT

SECTION A-A
TOP DOWN VIEW

** FOOT SKIRTS, DOORS, PANELS, AND HANDLES MAY STICK OUT PAST THE DATUM DIMENSIONS

INDUCTEV

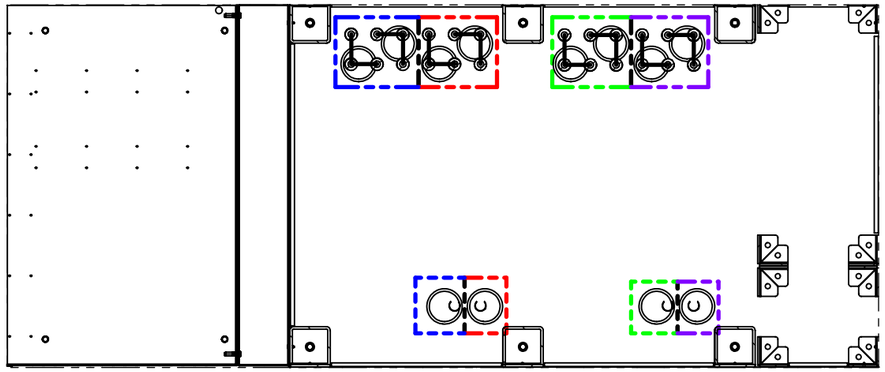
PART NO	DWG NO
A-01503	0100004069

SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 3 OF 14

REFERENCE PAGE:
GEM MAPPING

BACK



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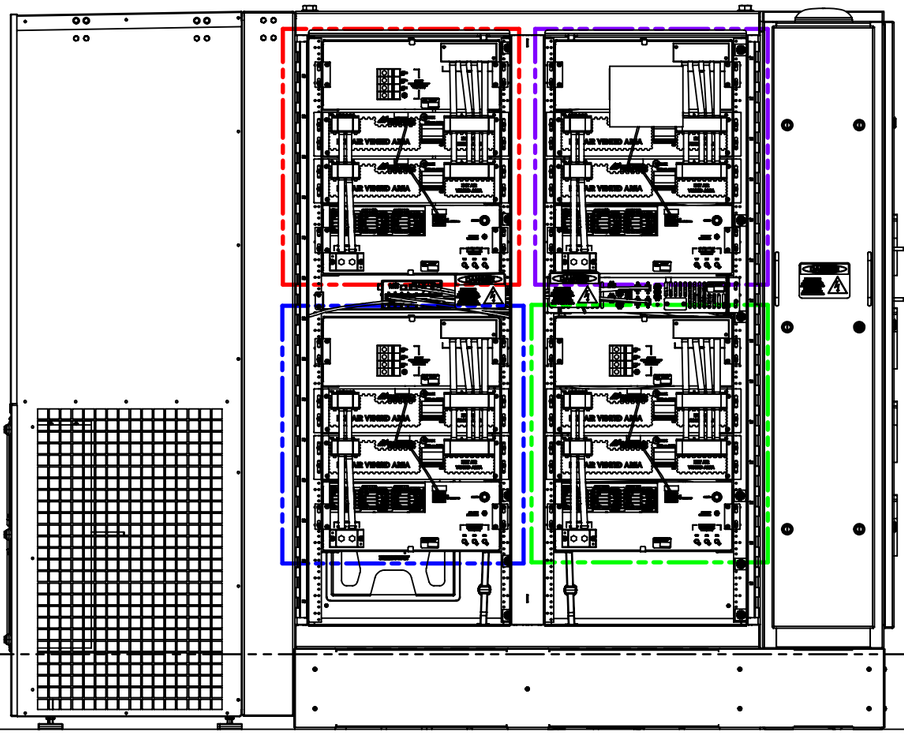
SECTION B-B



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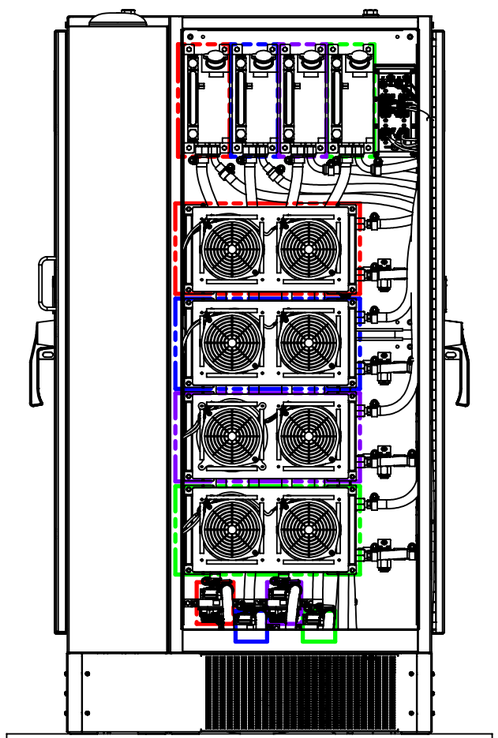


RIGHT SIDE
COIL COOLING CABINET

LEGEND
GEM 1 - RED
GEM 2 - BLUE
GEM 3 - PURPLE
GEM 4 - GREEN

INDUCTEV

PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 4 OF 14

EQUIPMENT LIFTING INSTRUCTIONS

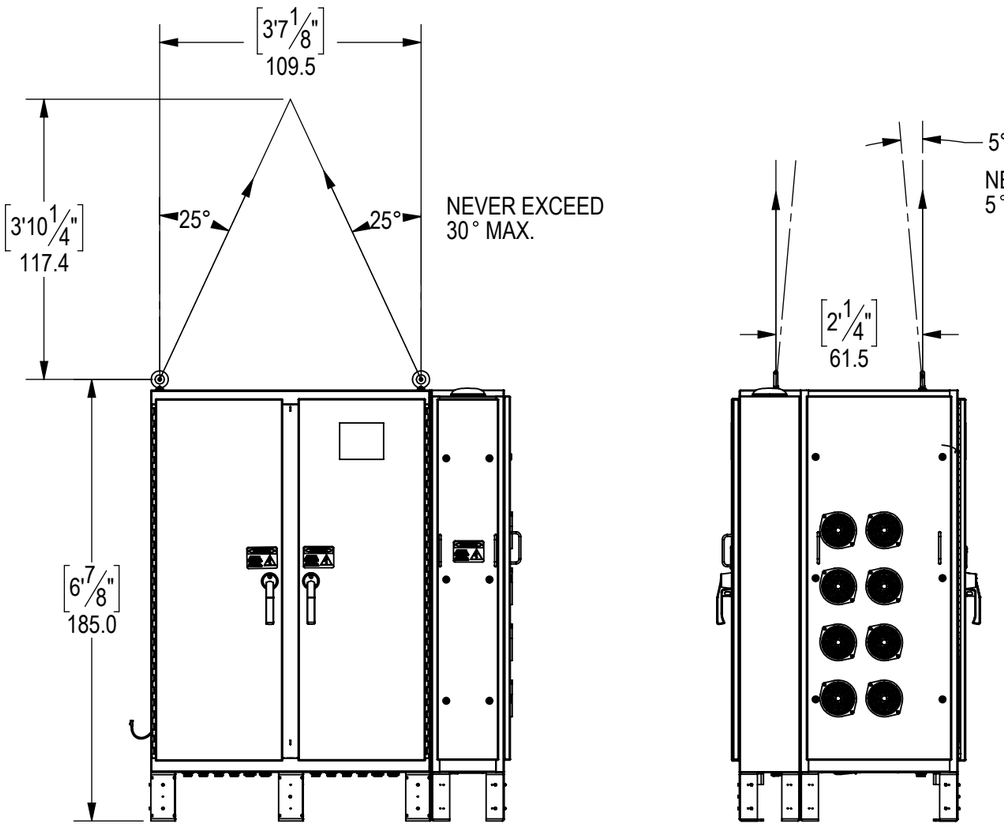
THE CABINET AND AIR CONDITIONER SHOULD NEVER BE LIFTED WHILE CONNECTED TOGETHER. THE EYEBOLTS ON THE EQUIPMENT ARE ONLY RATED FOR THEIR SPECIFIC EQUIPMENT

FOR CABINET

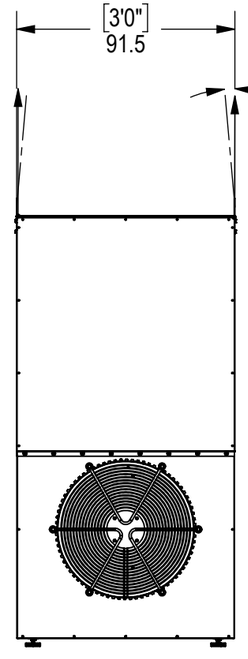
- UTILIZE 4X 3/4"-10 THREADED EYEBOLTS FOR LIFTING. SEE EYEBOLT INSTALLATION ON SHEET 6 IF EYEBOLTS AREN'T INSTALLED YET.
- ANGLE OF SUSPENSION SHOULD NEVER BE MORE THAN 30° OFF VERTICAL FOR LIFTING. THE CLOSER TO VERTICAL PREFERRED.
- LOAD APLIED AT AN ANGLE TO THE PLANE OF THE EYE NOT RECOMMENDED.
- DANGER: NEVER EXCEED THE 5° ANGLE FOR A LOAD APPLIED TO THE PLANE OF THE EYE
- CABINET APPROX. WEIGHT = 2100 LBS [953 KG]

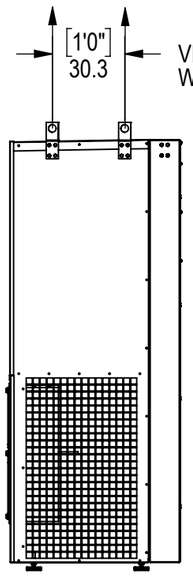
FOR A/C WITH PLENUM

- UTILIZE 4X LIFTING EYES FOR LIFTING. 4X LIFTING EYES SHOULD BE PULLED STRAIGHT UP USING A VERTICAL LIFTING BAR. 5° PAST 90° ALLOWABLE FOR LIFTING. HINGING TOWARDS THE MIDDLE MAY CAUSE DAMAGE TO THE TOP OF THE UNIT.
- NOTE THE CENTER OF GRAVITY IS OFFSET FROM THE LIFTING EYES. USE CAUTION WHEN LIFITING
- A/C WITH PLENUM APPROX. WEIGHT = 700 LBS [318 KG]



CABINET





AIR CONDITIONER WITH PLENUM

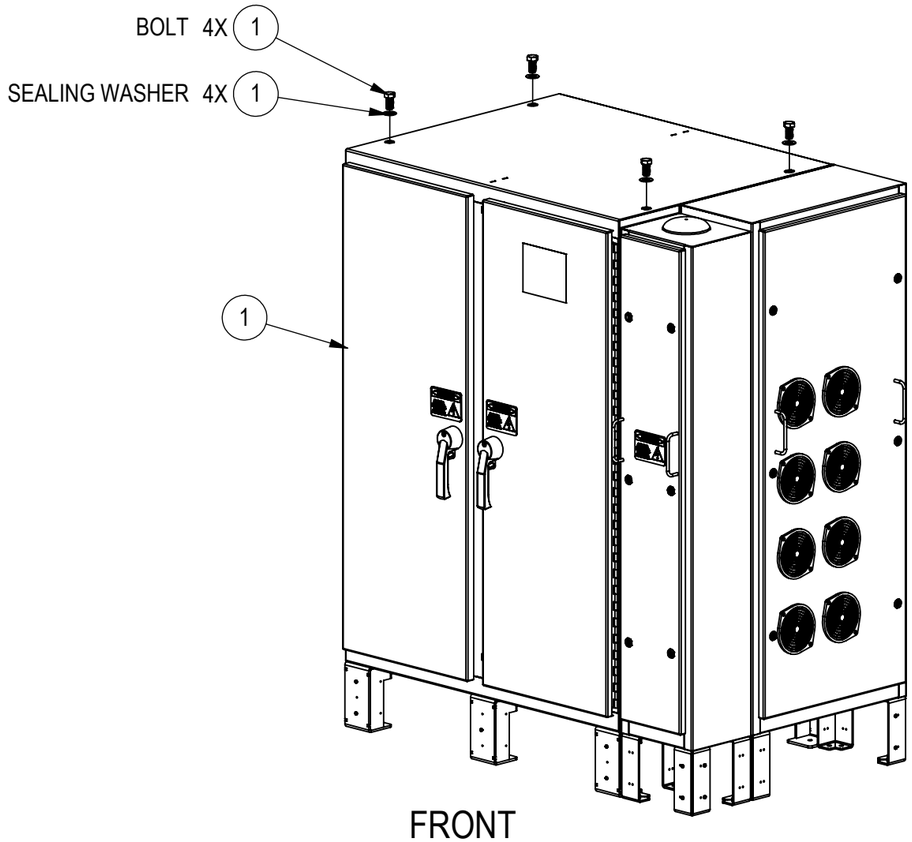
INDUCTEV

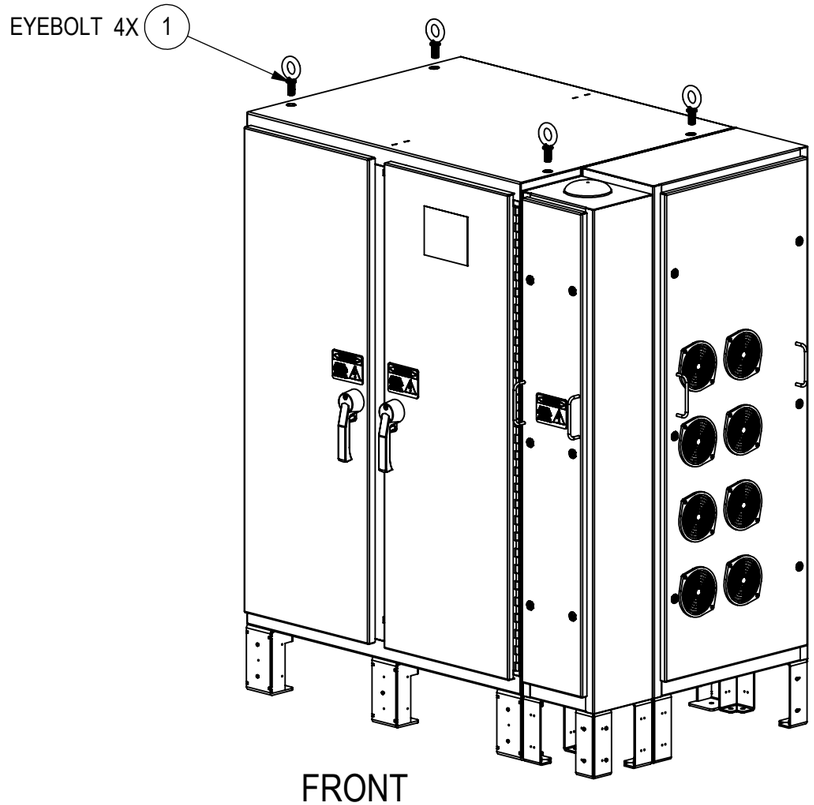
PART NO	DWG NO
A-01503	0100004069

SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 5 OF 14

1. REMOVE 4X (1) SEALING WASHERS AND 4X (1) 3/4"-10 X 1-1/2" BOLTS FROM THE TOP OF THE CABINET. SET ASIDE FOR RE-USE UPON COMPLETION. DO NOT THROW AWAY
2. INSTALL 4X (1) SUPPLIED 3/4"-10 THREADED EYEBOLTS AND EYEBOLT SEALING WASHERS TO THE TOP OF THE CABINET. EYEBOLTS SHOULD BE ORIENTED IN THE SAME DIRECTION TO KEEP OFF AXIS LOADING TO A MINIMUM
   1. TOOL: HAND
   2. LOCITITE: NONE
   3. TORQUE: HAND-TIGHT TO SNUG





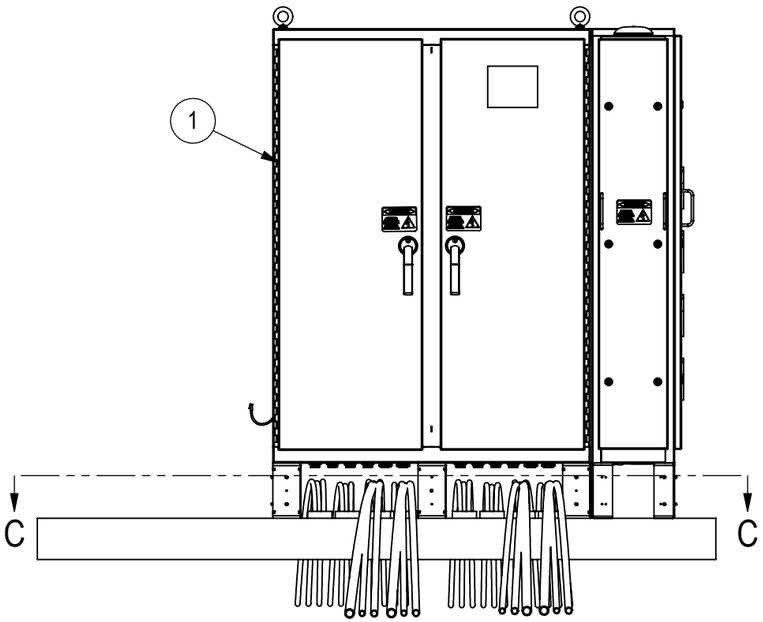
INDUCTEV

PART NO	DWG NO
A-01503	0100004069

SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 6 OF 14

1. MOVE CABLING AND HOSES COMING FROM CONDUIT OUT OF THE WAY OF FUTURE CABINET FOOT LOCATIONS
   - ANCHOR LOCATION SETTING AND INSTALLATION CAN BE DONE PRIOR TO CABLE PULL AND MAY BE RECOMMENDED
2. TEMPORARILY SET (1) IN PLACE TO LOCATE ANCHOR BOLT LOCATIONS. FOR CABINET POSITIONING RELATIVE TO CONDUIT, SEE SECTION C-C
   - REFERENCE PAGE 5 FOR LIFTING INSTRUCTIONS
3. FOR MARKING ANCHOR LOCATIONS, SEE NEXT PAGE



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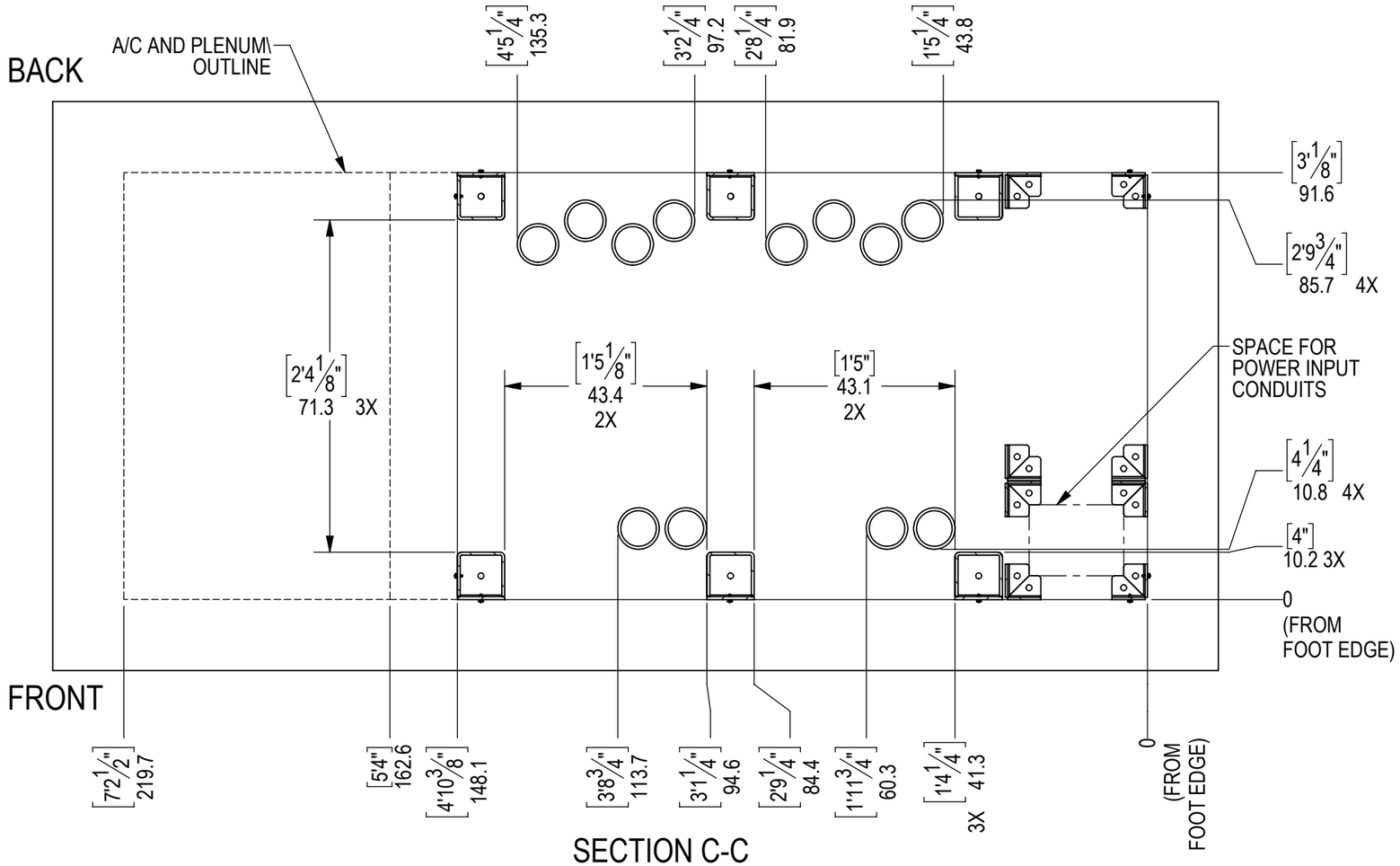
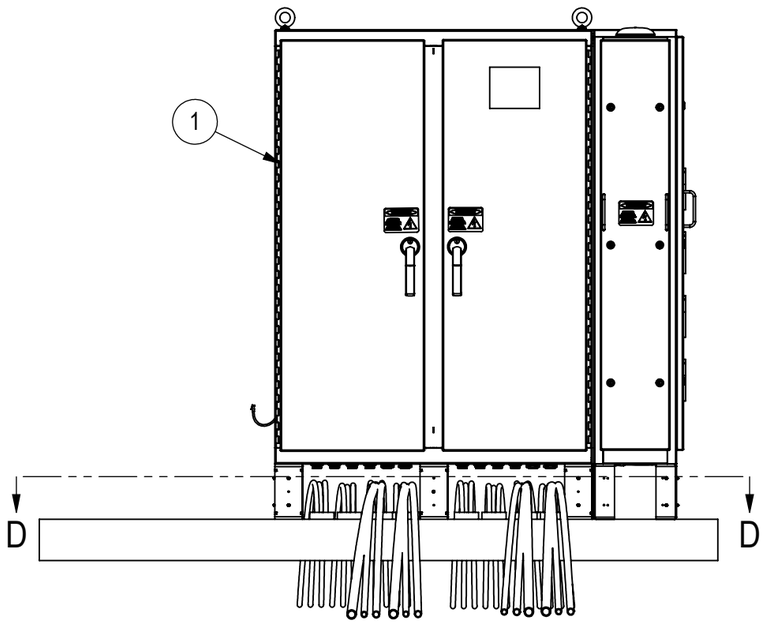


SECTION C-C
TOP DOWN VIEW
DIMENSIONS ARE APPROX. ONLY AND ARE SITE AND CABINET SPECIFIC

INDUCTEV

PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 7 OF 14

1. WITH (1) TEMPORARILY SET ON CONCRETE, 8X MARK ANCHOR BOLT LOCATIONS ON THE 6X MAIN ENCLOSURE FEET AND 2X OUTER COIL COOLING CABINET FEET. SEE SECTION D-D
2. ONCE LOCATIONS ARE MARKED, LIFT (1) OFF OF CONCRETE PAD AND SET ASIDE
3. ANCHORING IS SUBJECT TO CIVIL AND STRUCTURAL ENGINEERING APPROVALS AS REQUIRED. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR ANCHOR INSTALLATION
4. IF THE SUPPLIED HARDWARE SYSTEM IS APPROVED BY THE CIVIL & STRUCTURAL ENGINEERS AND IS USED: USE A 1/2" MASONRY DRILL BIT, DRILL 8X HOLES FOR ANCHORING CABINET 1-9/16" DEEP
5. INSERT (3) 8X FLUSH TO SURFACE
6. USING (8), DRIVE THE ANCHOR PIN TO SET THE ANCHORS



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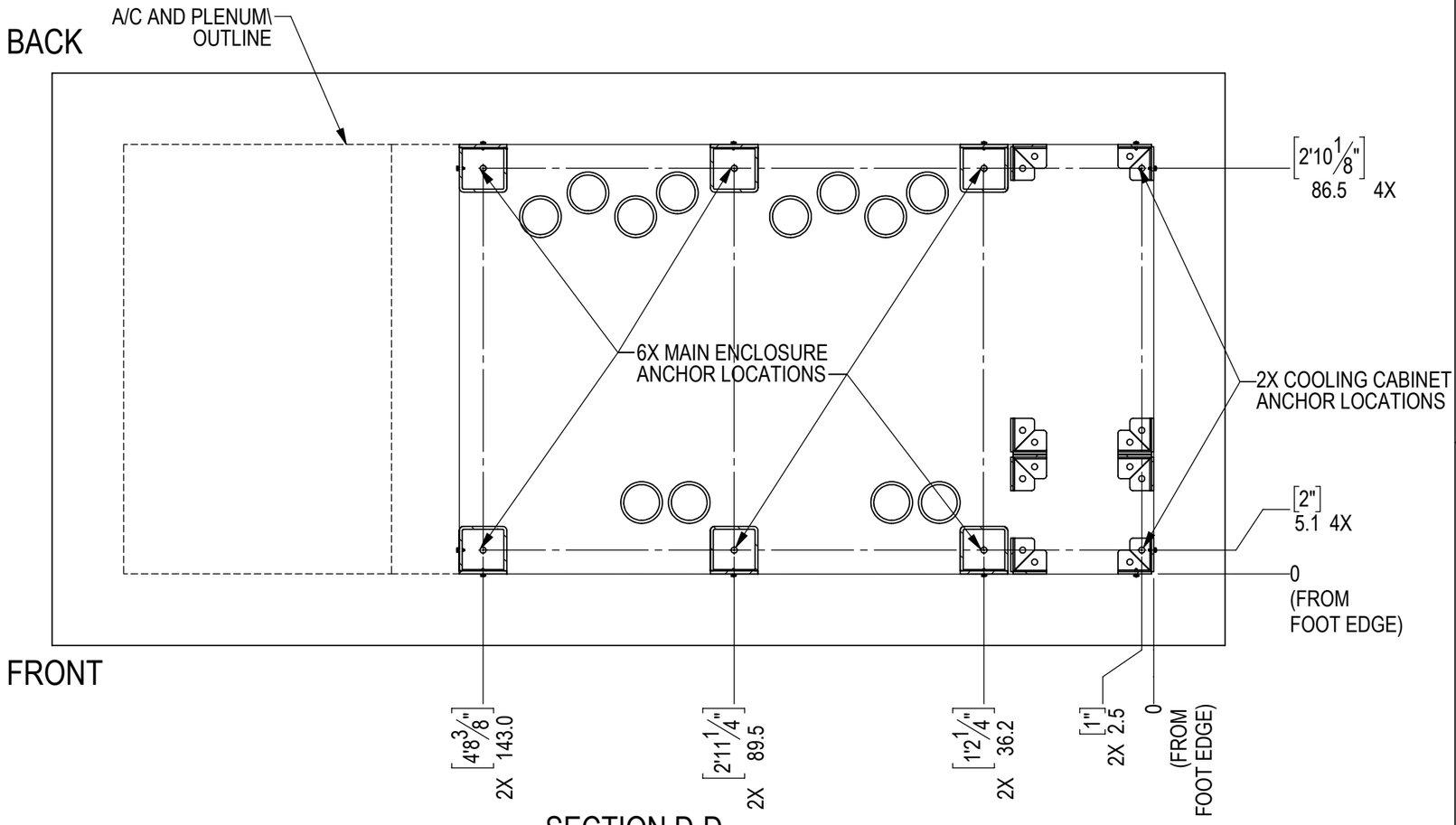
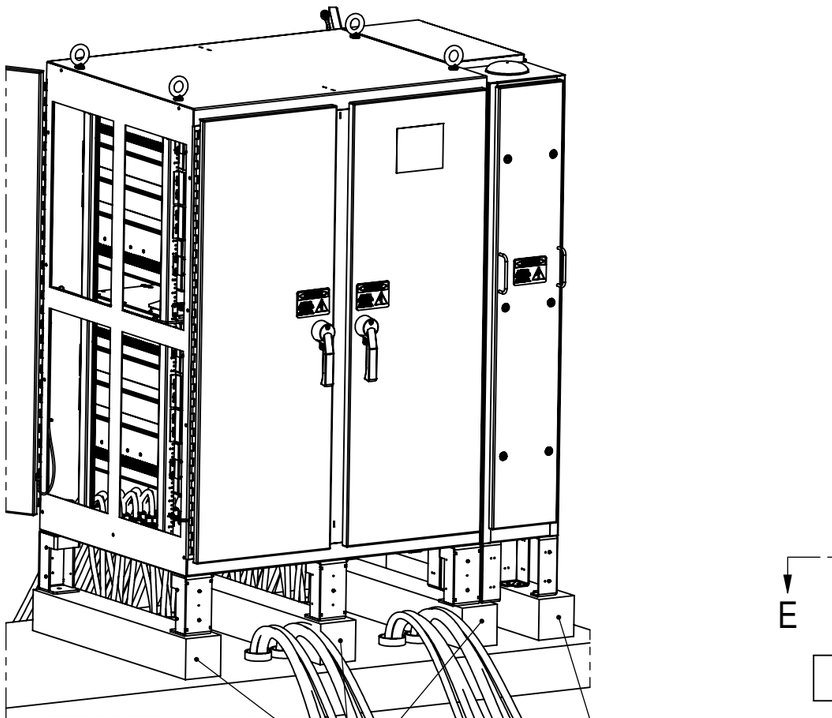


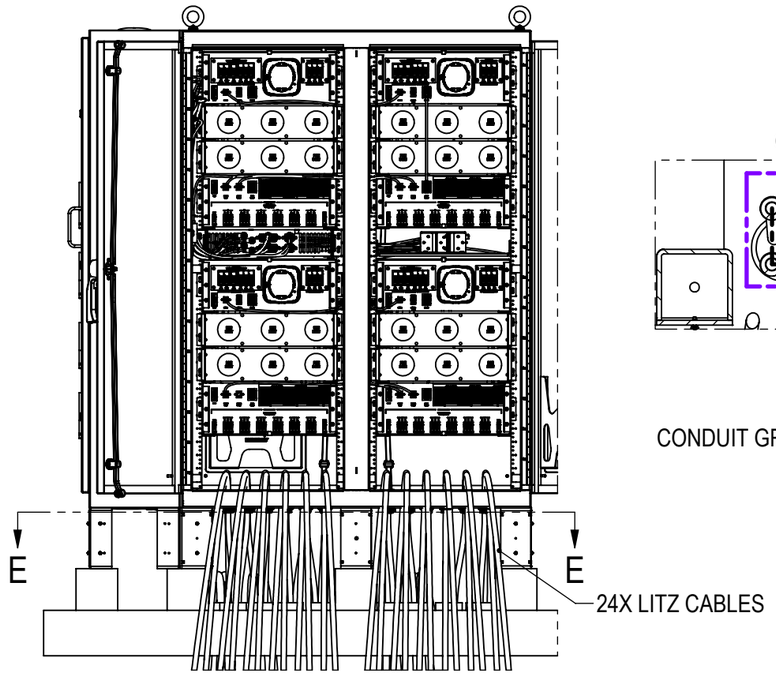
SECTION D-D
TOP DOWN VIEW
DIMENSIONS ARE APPROX. ONLY AND
ARE SITE AND CABINET SPECIFIC

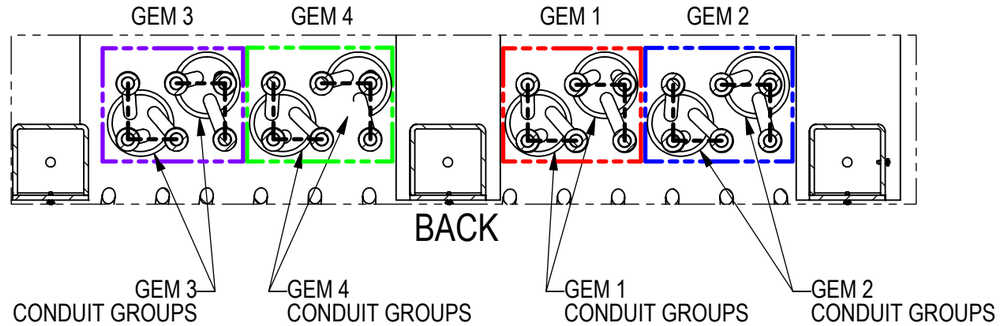
INDUCTEV

PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 8 OF 14

1. SET CRIBBING ON CONCRETE OVER ANCHOR BOLT LOCATIONS. NEED SUPPORT UNDER 6X MAIN CABINET FEET AND AT LEAST 2X SIDE CABINET FEET
   - BE SURE HOSES AND CABLES ARE OUT OF THE WAY AND ARE NOT BEING CRUSHED OR PINCHED
2. CAREFULLY SET CABINET ON CRIBBING AND ENSURE EQUIPMENT IS STABLE AND SECURE BEFORE PROCEEDING
3. AT THE BACK OF THE CABINET, LOOSEN 24X CORD GRIP TOPS SO THAT IT'S EASIER TO PULL 24X LITZ CABLES THROUGH
   - TOOL: 1.65" [42MM] SOCKET OR 6-PT CROWS FOOT
4. AT THE BACK OF THE CABINET PULL 24X LITZ CABLES FROM CONDUIT THROUGH CORD GRIPS AS DESIGNATED IN SECTION E-E
   1. 3X CABLES FROM EACH CONDUIT SHOULD ROUTE TO THE NEAREST 3X CORD GRIPS ABOVE EACH CONDUIT OUTPUT
5. KEEP CORD GRIP TOPS LOOSE UNITL LITZ CABLE FINAL ASSEMBLY TO ALLOW FOR INSTALLER ASSISTANCE TO EASE ALL CABLES THROUGH WHEN LOWERING OFF CRIBBING
   - NOTE: IF CABLE SLACK IS NOT MANAGED WELL AND CABLE IS PULLED OR BENT PAST 4.5" [11.4 CM] MINIMUM BEND RADIUS, PERMANENT CABLE DAMAGE CAN OCCUR







SECTION E-E
TOP DOWN VIEW

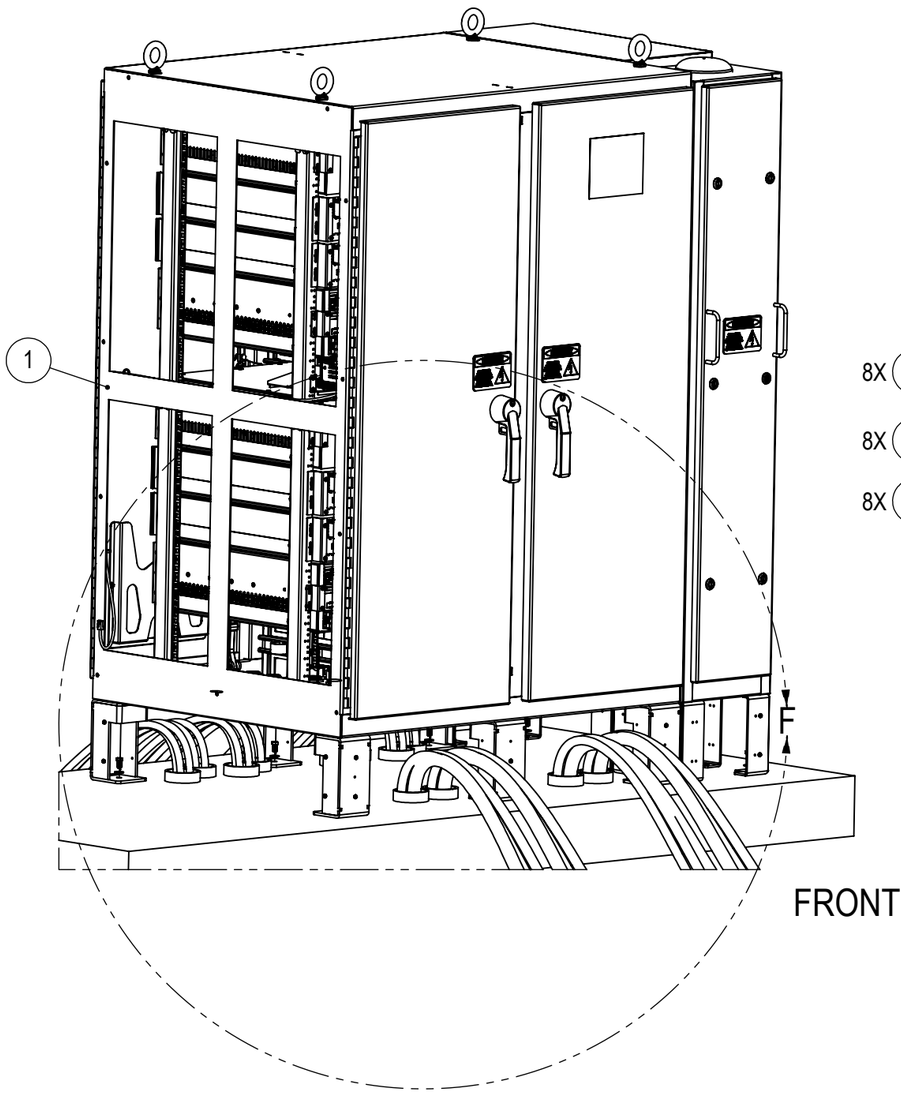
INDUCTEV

PART NO	DWG NO
A-01503	0100004069

SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE | WEIGHT: 1270.06 kg (2800 lbs) | SHEET 9 OF 14

1. LIFT CABINET WEIGHT OFF OF CRIBBING JUST ENOUGH THAT THE CRIBBING CAN JUST SLIDE OUT
2. SLOWLY LOWER THE CABINET OVER 8X ANCHOR BOLT LOCATIONS. BE SURE TO PULL 24X LITZ CABLES UP AS CABINET GETS LOWERED INTO PLACE
   - NOTE: IF CABLE SLACK IS NOT MANAGED WELL AND CABLE IS PULLED OR BENT PAST 4.5" [11.4 CM] MINIMUM BEND RADIUS, PERMANENT CABLE DAMAGE CAN OCCUR
3. IF USING SUPPLIED ANCHORING SYSTEM, SECURE 8X (1) FEET TO 8X (3) USING 8X (4) AND 8X (5)
   1. TOOL: 9/16" SOCKET
   2. LOCTITE: NONE
   3. TORQUE: 8 FT-LBS. [11 N-M]



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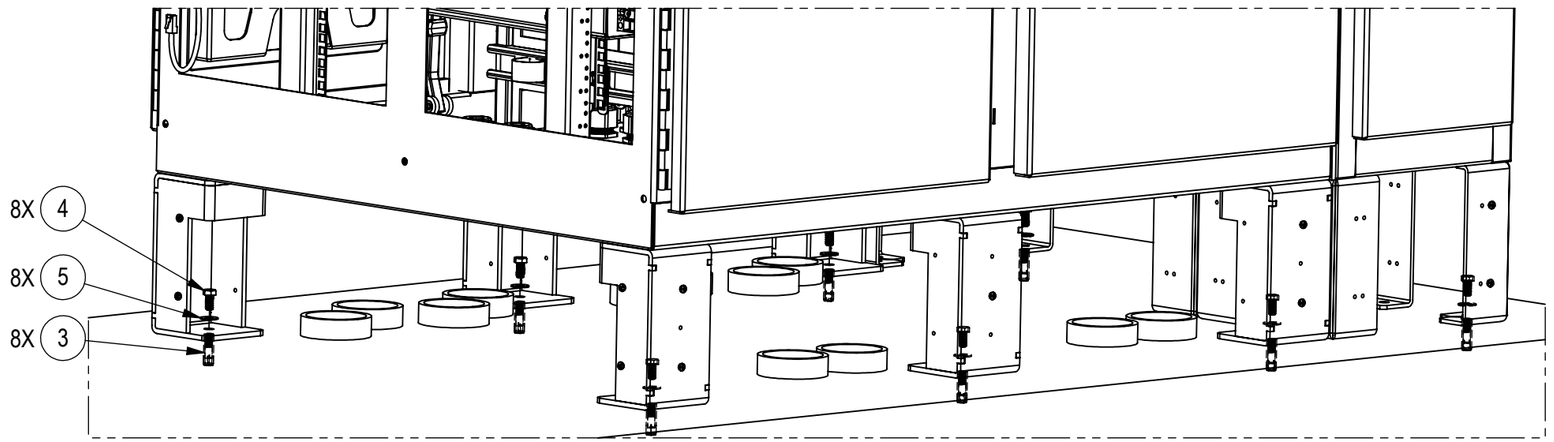
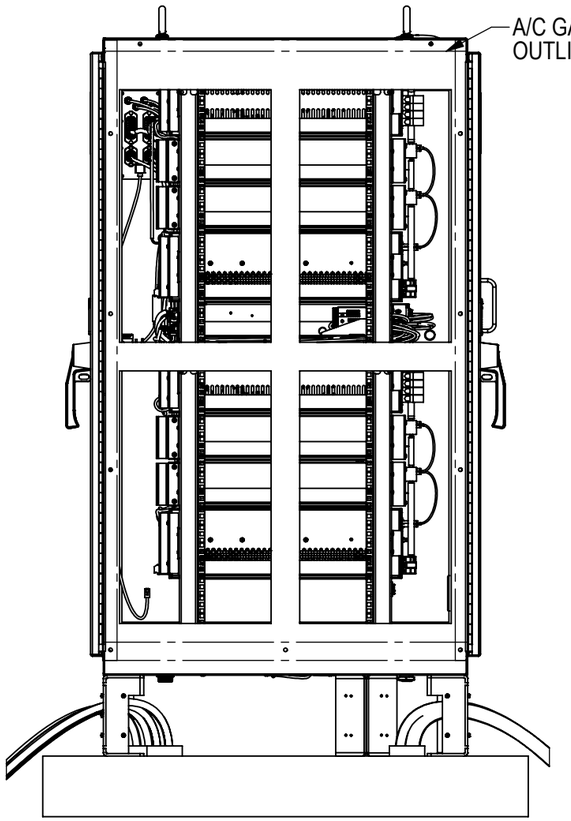


DETAIL F

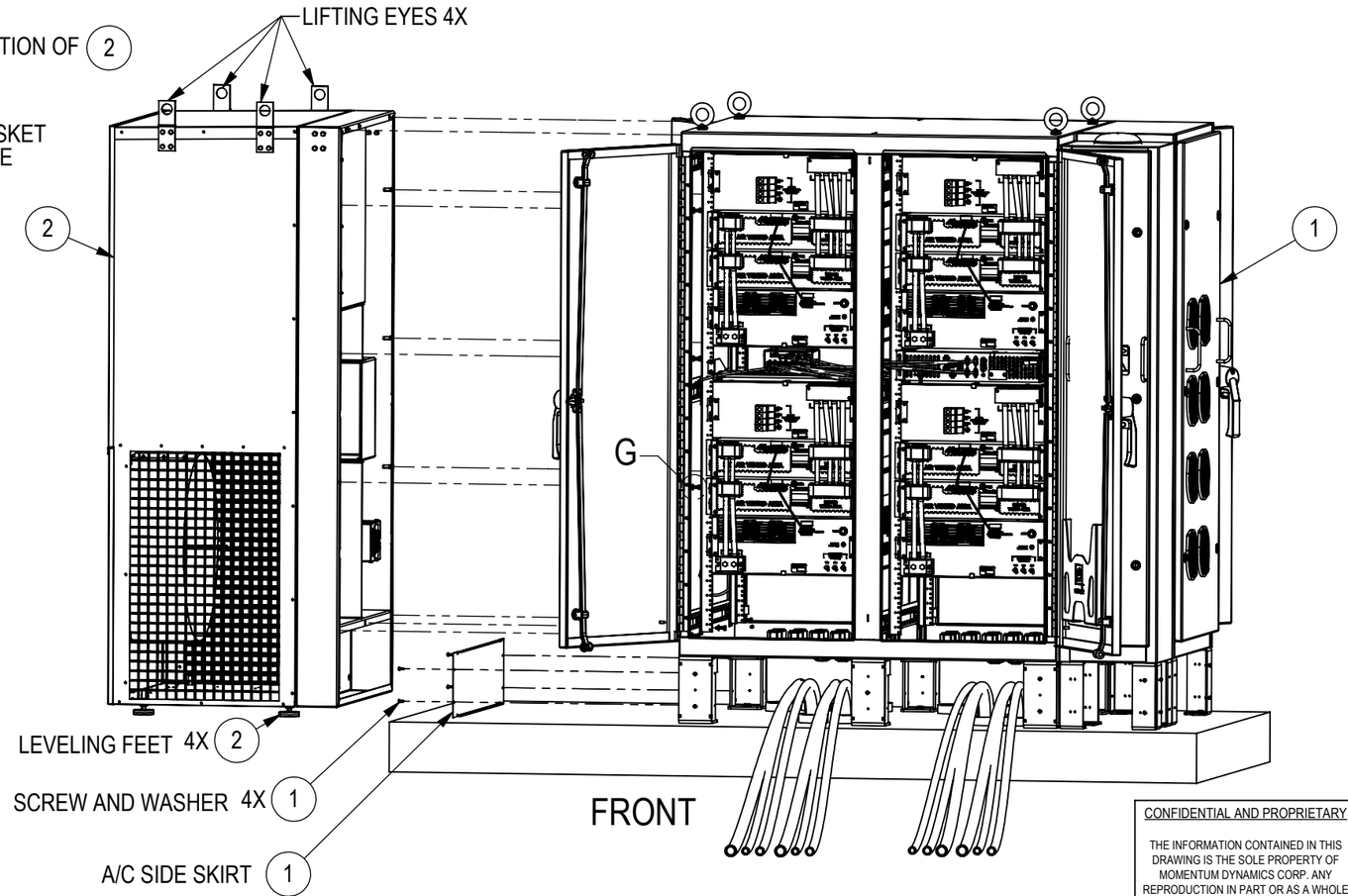
INDUCTEV

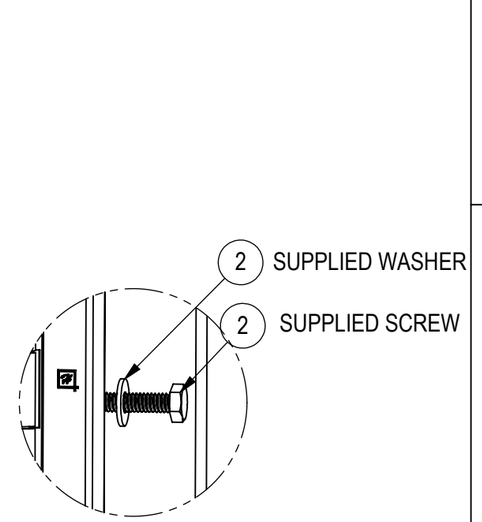
PART NO	DWG NO	
A-01503	0100004069	
SIZE: B	LIFECYCLE STATE: Preproduction	REV: A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 10 OF 14

1. INSTALL (1) INSIDE SKIRT (WITHOUT PERFORATIONS) WITH 4X SUPPLIED #10-32 SCREWS AND 4X PLASTIC WASHERS TO A/C SIDE OF THE CABINET
   1. TOOL: PH 2 DRIVE
   2. LOCTITE: NONE
   3. TORQUE: 22 IN-LBS. [2.5 N-M]
2. ENSURE PRE-INSTALLED (2) GASKETS ON THE SIDE OF THE CABINET ARE INTACT AND NOT DAMAGED. CONTACT MANUFACTURER FOR REPLACEMENT GASKETS IF DAMAGED, PRIOR TO INSTALLATION. IF GASKET IS DAMAGED, PROTECT BOTH A/C AND CABINET FROM DUST AND RAIN UNTIL NEW GASKETING IS AVAILABLE
3. LIFT (2) AND THREAD IN LEVELING FEET UNTIL THEY BOTTOM OUT AT THE BASE OF THE A/C UNIT
4. MOVE (2) IN PLACE, ALIGNING (2) 11X PLENUM MOUNTING HOLES WITH (1) 11X MOUNTING HOLES. KEEP (2) WEIGHT SUPPORTED BY RIGGING UNTIL ALL BOLTS ARE ALIGNED AND INSTALLED, AS WELL AS ALL LEVELING FEET ARE SET APPROPRIATELY TO SUPPORT THE A/C PRIOR TO REMOVING THE LIFTING SYSTEM OR SETTING THE WEIGHT ONTO THE LEVELING FEET
   - UTILIZE 4X (2) LEVELING FEET AS NECESSARY TO ALIGN PLENUM HOLES WITH CABINET HOLES AND TO KEEP A/C LEVEL WITH CABINET
     - TOOL: 10MM WRENCH
5. SECURE USING (2) 11X SUPPLIED WASHERS AND 11X SCREWS - HEX HEAD 1/4"-20 X 1". A/C HARDWARE SHIPPED IN A BAG WITH CABINET
   1. TOOL: 7/16" SOCKET
   2. LOCTITE: NONE
   3. TORQUE: 7 FT-LBS. [9.4 N-M]
6. FOLD DOWN (2) 4X LIFTING EYES AFTER INSTALLATION OF (2)



A/C GASKET VIEW



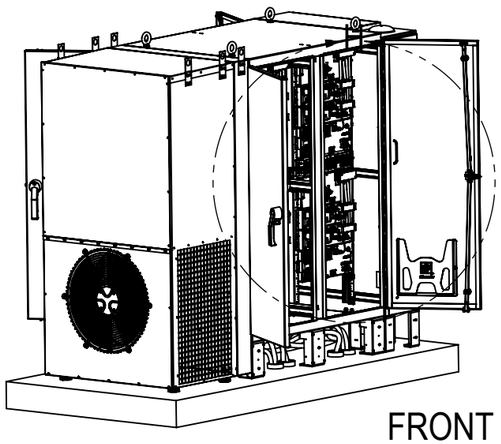


DETAIL G
11X

INDUCTEV

PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 11 OF 14

1. CAUTION: DO NOT ENERGIZE INCOMING POWER FEEDS UNTIL INSTALLATION IS FULLY COMPLETE AND COMISSIONED/APPROVED BY MOMENTUM DYNAMICS SITE ENGINEERING
2. ENSURE INCOMING POWER FEED DISCONNECT IS LOCKED OUT/TAGGED OUT PRIOR, DURING AND AFTER INSTALLATION UNTIL APPROVED FOR ENERGIZING
3. REMOVE ELECTRICAL CABINET PANEL
    1. TOOL: FLAT HEAD SCREW DRIVER AND SQUARE KEY
4. PUNCH OUT CONDUIT ENTRANCE POINTS, KEEPING WITHIN THE INCOMING POWER FEED GUIDELINES
    1. KEEP METAL SHAVINGS (IF ANY) FROM ENTERING THE CABINET OR EQUIPMENT
5. ROUTE 5X INCOMING POWER FEED CABLES FROM RIGHT SIDE WALL TO THE BOTTOM OF THE ENCLOSURE AND TO THE LEFT SIDE. SEE DETAIL H
6. FROM THE LEFT SIDE OF THE ENCLOSURE
    1. ROUTE INCOMING POWER FEED CABLES FOR GEM 1 AND 2 POWER MODULES FROM THE FLOOR ALONG THE FARTHEST LEFT RMU RAIL TO GEM 1 AND GEM 2 AC ENCLOSURES. SECURE ROUTES
    2. ROUTE INCOMING POWER FEED CABLES FOR GEM 3 AND 4 POWER MODULES FROM THE FLOOR ALONG THE MIDDLE, LEFT RMU RAIL TO GEM 3 AND GEM 4 AC ENCLOSURES. SECURE ROUTES
    3. ROUTE INCOMING POWER FEED CABLE FOR THE AIR CONDITIONER ALONG THE FLOOR TO THE BACK OF THE ENCLOSURE. SEE NEXT SHEET FOR CONTINUATION OF ROUTE
7. CONNECT 4X INCOMING POWER FEED CABLES FOR POWER MODULE CABLE WIRES TO THE GEM 1, 2, 3, AND 4 AC ENCLOSURE TERMINAL BLOCKS. AC ENCLOSURE TERMINAL BLOCKS ACCEPT COPPER CONDUCTORS ONLY UP TO 1/0 [50MM2]. MATCH WIRE WITH THE LABELED TERMINAL BLOCK. SEE DETAIL J
    1. TOOL: STRAIGHT BLADE
    2. LOCTITE: NONE
    3. TORQUE: 53 IN-LBS. [6 NM]



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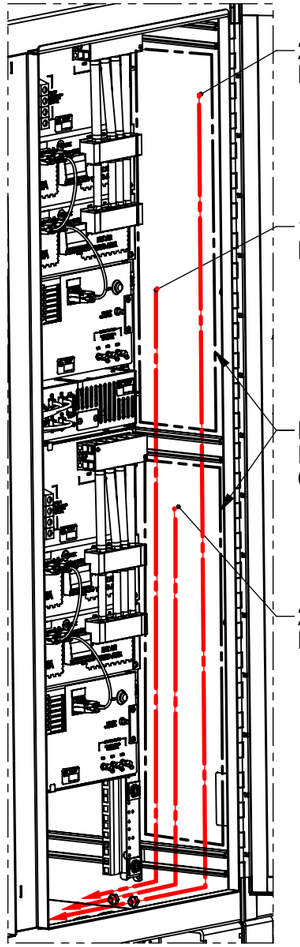
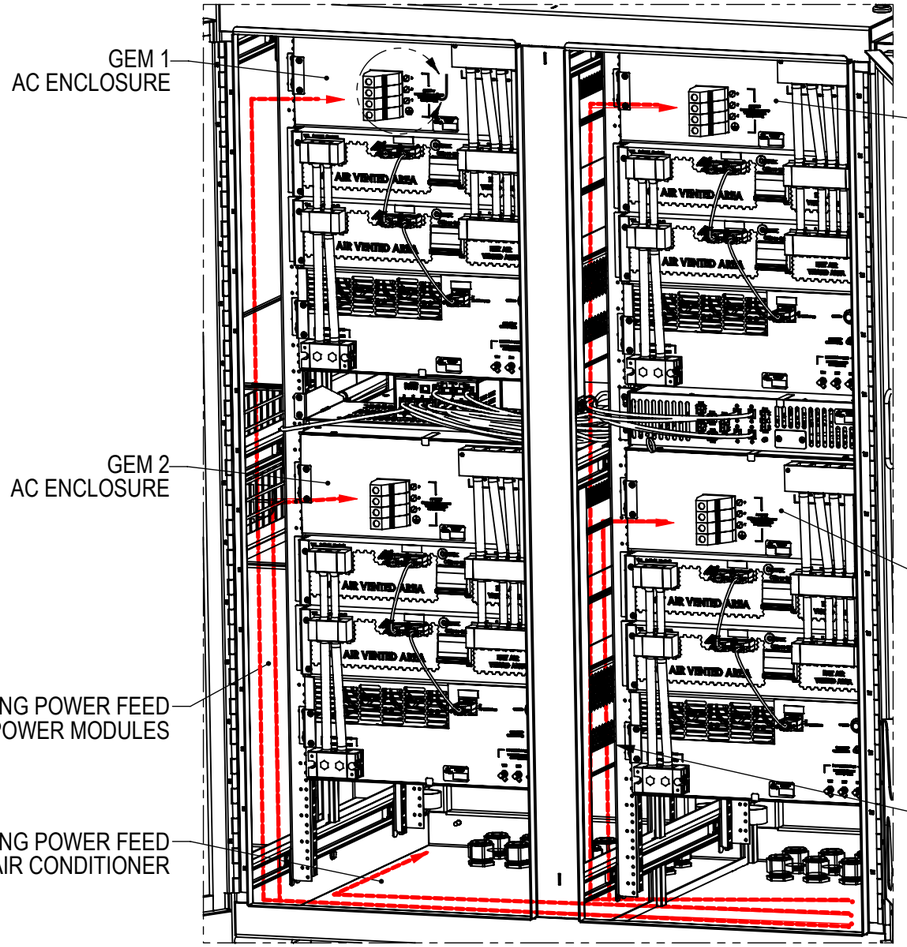


DETAIL H



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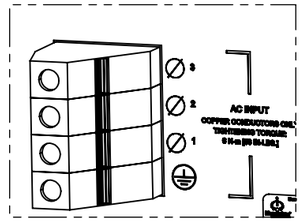
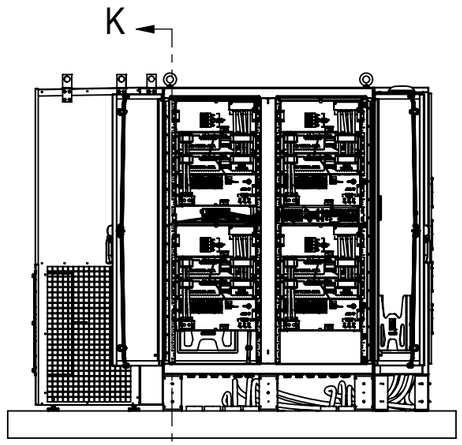


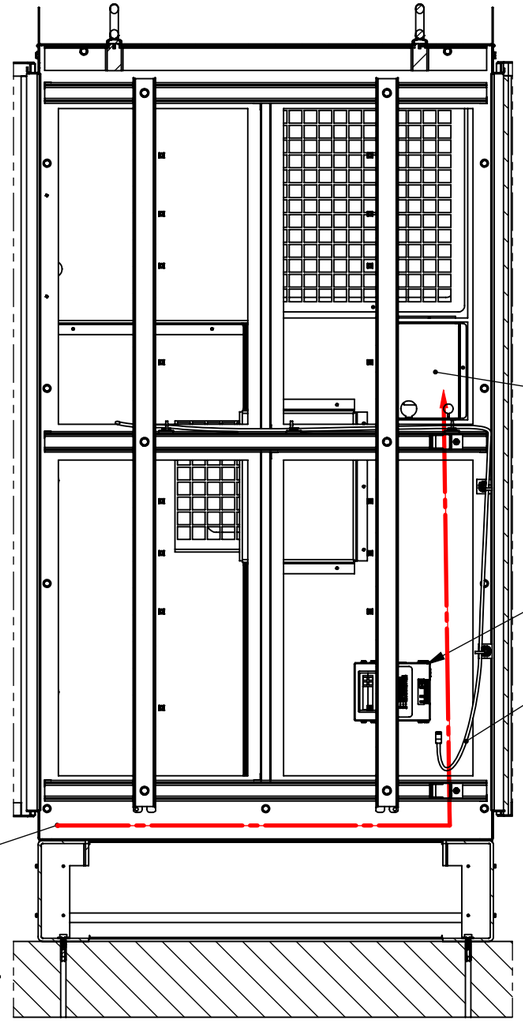
DETAIL J
4X

INDUCTEV

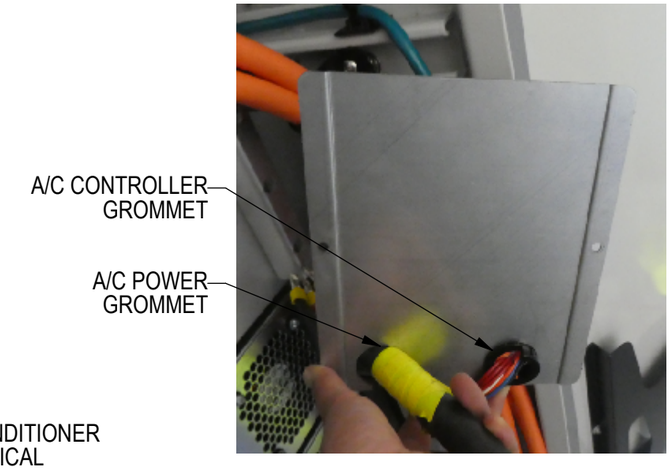
PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 12 OF 14

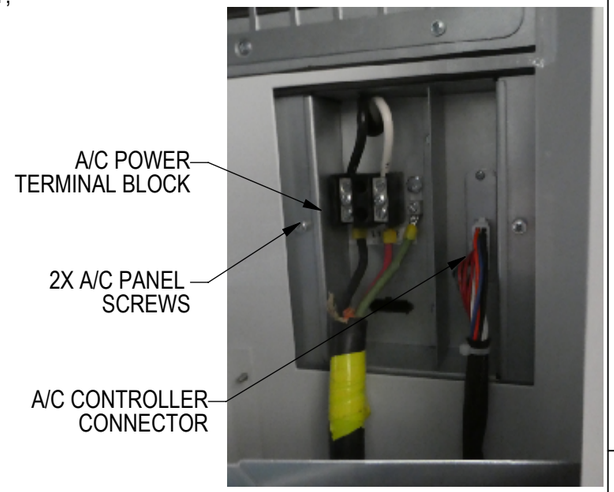
1. REMOVE THE AIR CONDITIONER (A/C) JUNCTION BOX COVER. SECURED WITH 2X #10-24 PANEL SCREWS
   1. TOOL: PH 2 DRIVE
2. ROUTE THE INCOMING POWER FEED FOR THE A/C ALONG THE LEFT SIDE FLOOR AND THEN UP INTO THE PLENUM TO THE A/C JUNCTION BOX. ROUTE THE INCOMING POWER FEED CABLE THROUGH THE LEFT JUNCTION BOX COVER GROMMET
3. CONNECT THE INCOMING POWER FEED FOR THE A/C WIRES TO THE A/C POWER TERMINAL BLOCK. CONNECT PHASE 1 TO L1, PHASE 2 TO L2, AND GROUND TO GND.
   1. TOOL: FLAT HEAD SCREWDRIVER
   2. LOCTITE: NONE
   3. TORQUE: 22 IN-LBS. [2.5 NM]
4. RE-INSTALL A/C JUNCTION BOX COVER WITH SUPPLIED 2X #10-24 PANEL SCREWS
   1. TOOL: PH 2 DRIVE
   2. LOCTITE: NONE
   3. TORQUE: 24 IN-LBS.
5. CONNECT THE A/C CONTROLLER ETHERNET CABLE TO THE A/C CONTROLLER ETHERNET PORT. THE A/C CONTROLLER ETHERNET CABLE FREE END IS LOCATED IN THE CABINET, ALONG THE BACK RIGHT RMU RAIL TOWARDS THE BOTTOM.





SECTION K-K





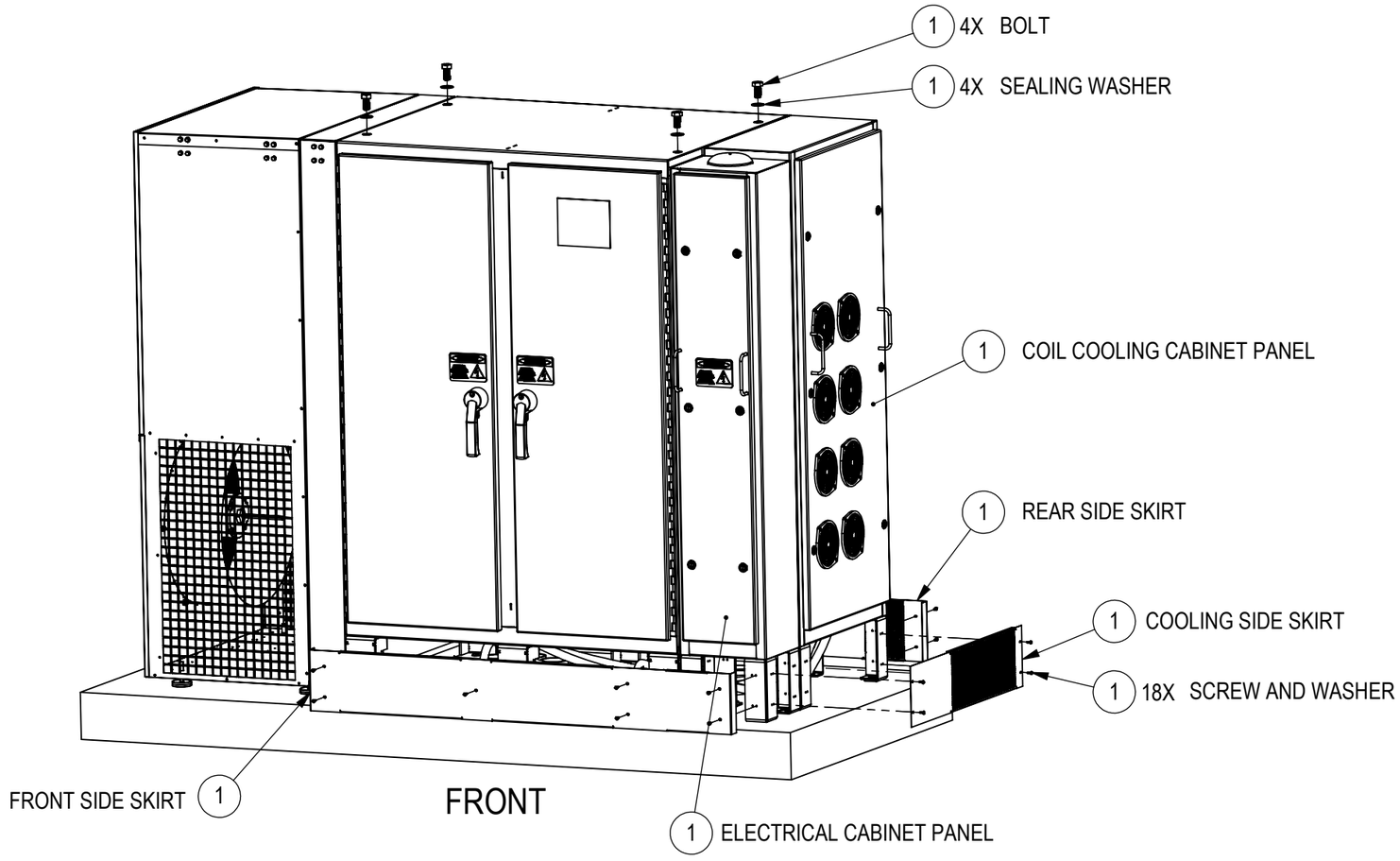
A/C ELECTRICAL JUNCTION BOX

A/C CONTROLLER

INDUCTEV

PART NO	DWG NO	
A-01503	0100004069	
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A
SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 13 OF 14

1. REMOVE (1) 4X EYEBOLTS FROM THE TOP OF THE CABINET, BAG, AND STORE IN FRONT CABINET DOOR POCKET
2. INSTALL (1) 4X SEALING WASHERS AND (1) 4X BOLTS TO THE TOP OF THE CABINET
    1. TOOL: 1-1/8" WRENCH OR SOCKET
    2. LOCTITE: NONE
    3. TORQUE: 50 IN-LBS [5.6 NM]
3. INSTALL 3X REMAINING SKIRTS IN SHOWN POSITIONS AND ORIENTATIONS TO CABINET FEET AND SECURE WITH (1) 18X PLASTIC WASHERS AND (1) 18X #10-32 SCREWS
    1. TOOL: PH 2 DRIVE
    2. LOCTITE: NONE
    3. TORQUE: 22 IN-LBS [2.5 NM]
4. INSTALL AND LOCK THE (1) ELECTRICAL CABINET PANEL AND (1) COIL COOLING CABINET PANEL
    1. TOOL: FLAT HEAD SCREW DRIVER AND SQUARE KEY
5. CLOSE AND LOCK ALL DOORS



INDUCTEV

PART NO	DWG NO
A-01503	0100004069

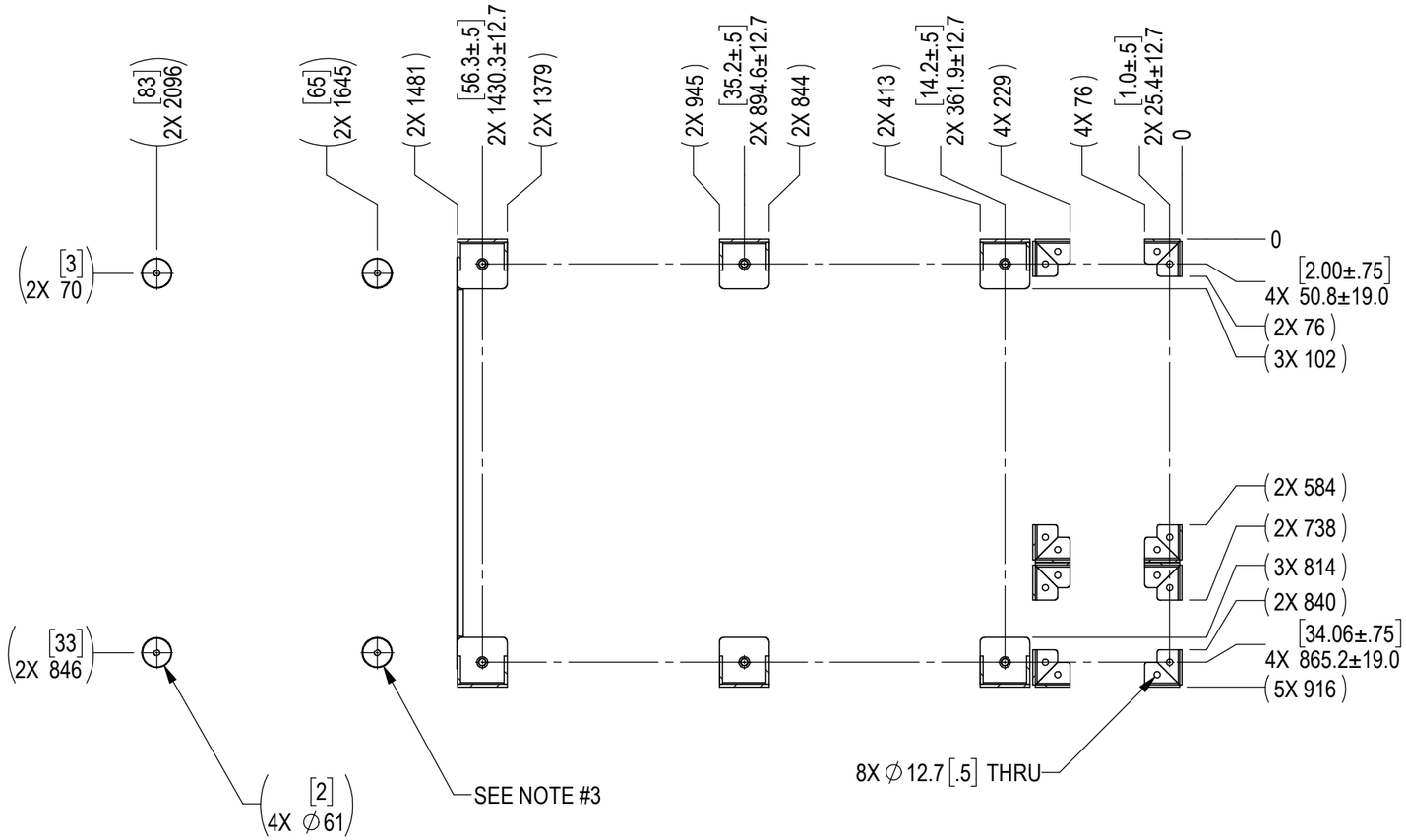
SIZE	LIFECYCLE STATE	REV
B	Preproduction	A

SCALE: NONE	WEIGHT: 1270.06 kg (2800 lbs)	SHEET 14 OF 14

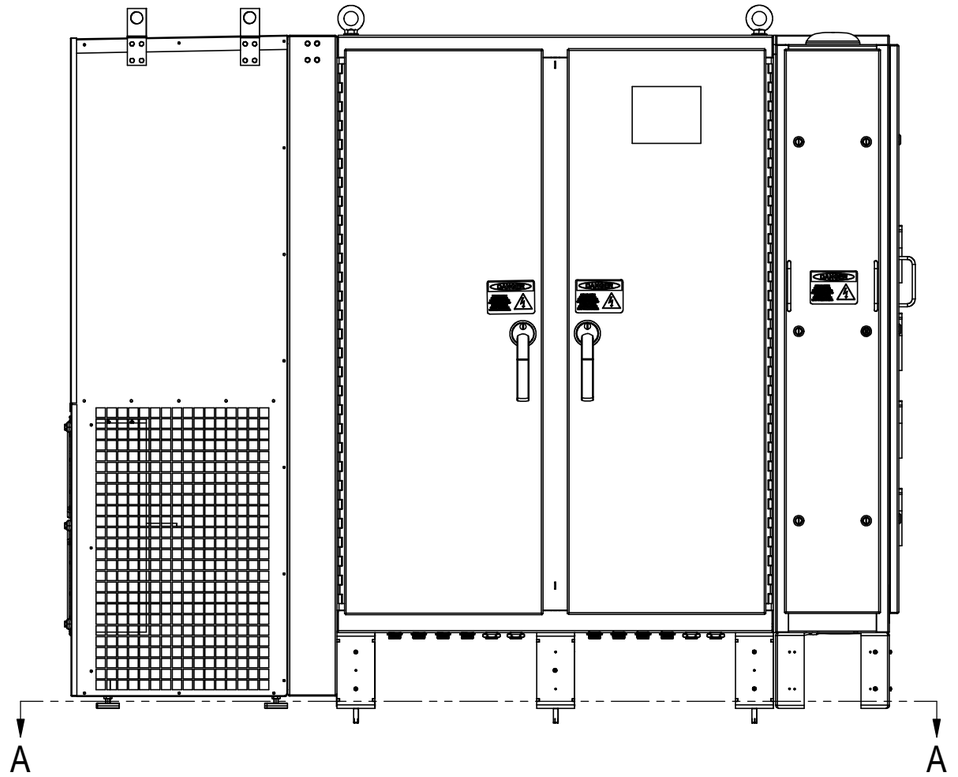
NOTES:

1. PLACE ANCHORS ONLY AT DIMENSIONED HOLE LOCATIONS
2. ALL DIMENSIONS ARE METRIC (MM). BRACKETED DIMENSIONS ARE IMPERIAL (IN)
3. AIR CONDITIONER THREADED LEVELING FEET (4X)
4. ALL FEET MUST BE FULLY SUPPORTED

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	3/10/2021	B. Van De Wiele
B	ADDED REFERENCE DIMENSIONS TO THE FEET LOCATIONS AND ADDED NOTE #4	3/23/2021	B. Van De Wiele



SECTION A-A



THIRD ANGLE PROJECTION	UNLESS OTHERWISED SPECIFIED, DIMENSIONS ARE IN MILLIMETERS			NAME	DATE
	TOLERANCES		DRAWN	R. Dortone	03/10/2021
			CHECKED	B. VanDeWiele	3/11/2021
	FAB	MACH	MFG APVD		
	X ±0.5 mm	±0.2 mm	DWG TYPE		
	X.X ±0.25 mm	±0.1 mm			
CONFIDENTIAL AND PROPRIETARY THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF MOMENTUM DYNAMICS CORP. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT WRITTEN PERMISSION OF MOMENTUM DYNAMICS CORP. IS PROHIBITED.	X.XX ±0.125 mm	±0.025 mm	MATERIAL	N/A	
	X° 1°	0.5°			
	SURFACE FINISH	1.6	FINISH	N/A	
			DO NOT SCALE DRAWING		

INDUCTEV

TITLE: Footing - Field Enclosure Assy. - GenII, GA, US, 300kW enclosure with air conditioner/plenum

SIZE	DWG NO	REV
B	A-02360	B

SCALE: NONE | WEIGHT: 1046.36 kg (2306.82 lbs) | SHEET 1 OF 1

INDUCTEV

Enclosure Field Assy - 300kW
Hose/Wiring Installation

NUMBER:	1000001098
REVISION:	A
DATE:	November 4, 2021

History

Date	Rev	Author	Changes	Approver
11/04/2021	A	M. Tabbut	Preproduction Release	J. Wendschuh

Table of Contents

Introduction

Purpose

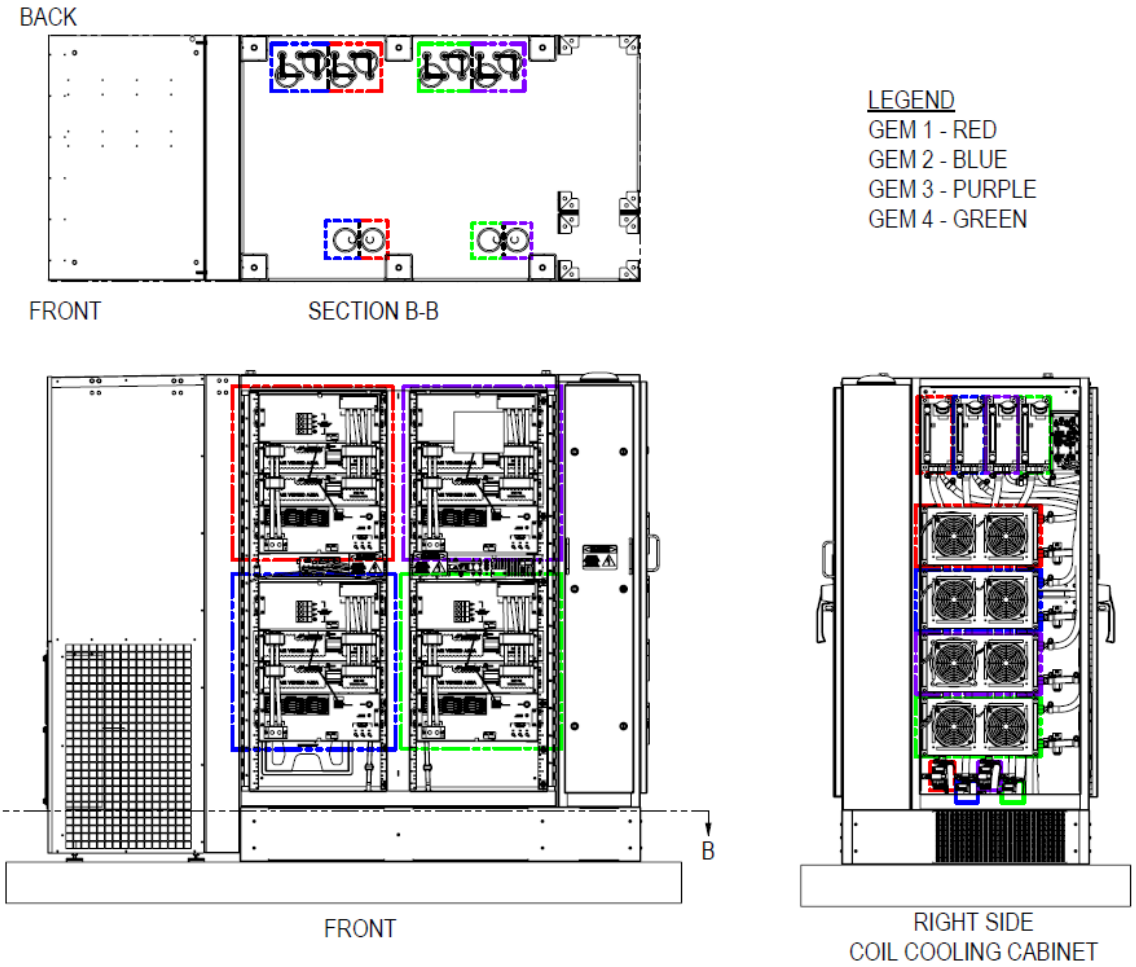
The purpose of this document is to provide instructions on how to route and hook up the wiring and hose from GA flush mount coil to the 300kW cabinets in the field.

References

This document is a reference document to the 300kW US and EU field assembly documents and Bill of Materials. Please reference those first before any field installation.

- 300kW US Field Assembly Drawing, Number: 0100004069, latest revision
- 300kW US Field Assembly BOM, Number: A-01503, latest revision
- 300kW EU Field Assembly Drawing, Number: 1000002785, latest revision
- 300kW EU Field Assembly BOM, Number: 1000000695, latest revision

GEM Mapping



Bill of Materials

Bill of materials for this document are pulled from the 300kW EU and US Field Assembly BOMs, latest version.

Item	Number	Name	QTY
7	0100007769	Hose Clamp - Const Tension, Soft Hose, 9/16" to 1-1/16"	4
8	0100004501	Hose Clamp - Const Tension, Soft Hose, 11/16" to 1-1/4" ID	4
9	0100004758	Connector - compact, splicing, 2-conduct w. levers	20
10	0100000316	Cable Tie - 7" L, 50 lbs, Nylon, Black	22
11	1000000086	Electrical Tape - Orange Vinyl Tape 35, 3/4" W, 7mil thick	AR
12	P-001663	Threadlocker - Loctite #425	AR

Procedure

RF Cable Installation

1. Uninstall 4X cord grips from the front of the cabinet and disassemble. Cables cannot pull through unless the grommets with cord grips are disassembled. See Figure 1.
    a. Remove 3X of the 4X plugs from each cord grip and discard
2. For each GEM group, repeat steps 3 through 5 4X. Be sure to match the correct GEM #'s from conduit to cord grip to cabinet as mapped on page 4 of this document.
3. Route 3X RF cables within loom from the conduit below the GEM # cord grip. Cut back loom approx. 1.5" below the cabinet. Then take the 3X RF cables through the cord grip nut, enclosure cutout and grommet to the GEM# inverter RF terminations. Provide a service loop for the extra cable at the floor of the cabinet. See Figures 2 and 3.
    a. Be careful handling and pulling the cable through the unprotected cutout to avoid cable damage
4. Connect 3X RF cables to 3X Inverter RF terminations. Match cable label with Inverter termination label. RX1 to RX1; RX2 to RX2; TX1 to TX1. See Figures 3 and 4.
    a. Tool: SMA Torque Tool (5/16", 5 in-lbs.)
    b. Loctite: None
    c. Torque: 5 in-lbs. [0.5 N-m]
5. If installing fiber cable at the same time as RF cables, skip steps 7 and 8 and jump to page 10 for fiber cable installation.
6. Secure all routes to the pre-installed right side RMU rail adhesive mounts with Item 10.
    a. For top inverters, GEM 1&3, there are 4X adhesive mounts per RMU rail to secure to
    b. For bottom inverters, GEM 2&4 there are 2X adhesive mounts per RMU rail to secure to
7. Once GEM 1-4 RF cable routes are set, tighten 4X cord grip cover lid screws. See Figure 5.
    a. Tool: 3mm Hex Plus
    b. Loctite: None
    c. Torque: 1.8 ft-lbs. [2 N-m]
8. Re-install 4X GEM # RF cord grips to the cabinet
    a. Tool: 41mm crow's foot
    b. Loctite: None
    c. Torque: 10 in-lbs. [1.1 N-m]

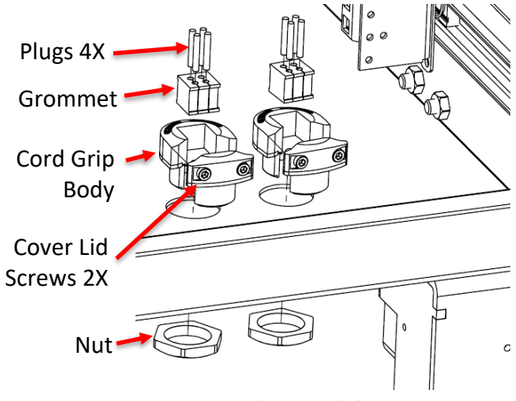


Figure 1: RF Cord Grips Explode View

Figure 2: GEM 1 & 2 Routes thru cutouts

Figure 3: GEM 1 & 2 RF Route Path

Figure 4: Inverter RF Terminations 4X

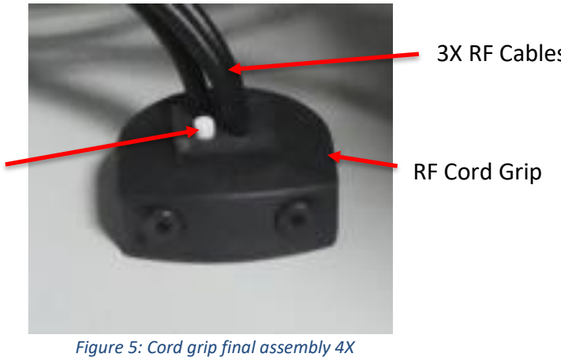


Figure 5: Cord grip final assembly 4X

Hose Installation

1. Remove coil cooling cabinet panel on the right side of the cabinet.
    a. Tool: Flat head screwdriver and square key
2. Remove 8X end caps from 4X pump outlet barbs and 4X quick connect fitting barbs. Discard.
3. For each GEM group, repeat steps 4 and 5 4X. Be sure to match the correct conduit with GEM #'s as mapped on page 4 of this document.
4. Route GEM # supply hose (3/4" ID) from conduit to GEM # pump barb under the cabinet to coil cooling cabinet side open bottom. The hoses are shipped with extra length. Cut off extra hose, so that the hose routes directly from conduit to pump barbs without any service loops. Be sure ¾" ID hose isn't bent past 3.25" [8.3 cm] minimum bend radius and the hose doesn't kink when installed. Cut back the loom approximately 1" [25 mm] from the end of the hose. Secure the connection with Item 8. See Figures 6 and 7.
    a. Tool: 5/16" socket
    b. Loctite: None
    c. Torque: 30 in-lbs. [40 N-m]
5. Route GEM # return hose (5/8" ID) from conduit to GEM # quick connect barb under the cabinet to coil cooling cabinet side open bottom. The hoses are shipped with extra length. Cut off extra hose, so that the hose routes directly from conduit to quick disconnect barb without any service loops. Be sure 5/8" ID hose isn't bent past 2.5" [6.4 cm] minimum bend radius and the hose doesn't kink when installed. Cut back the loom approximately 1" [25 mm] from the end of the hose. Secure the connection with Item 7. See Figures 6, 8, and 9.
    a. Tool: 5/16" socket
    b. Loctite: None
    c. Torque: 30 in-lbs. [40 N-m]

Figure 6: Hose with loom cut back (4X)

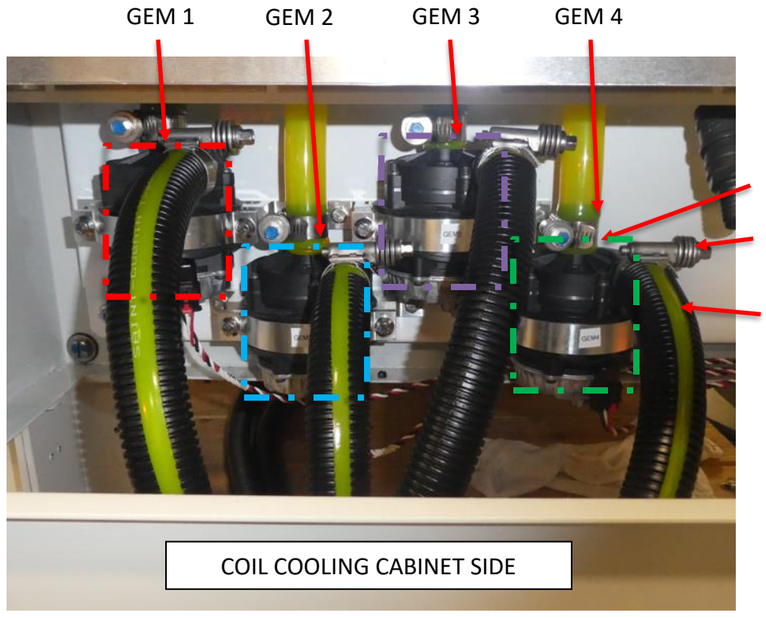


Figure 7: Pumps with hose connected

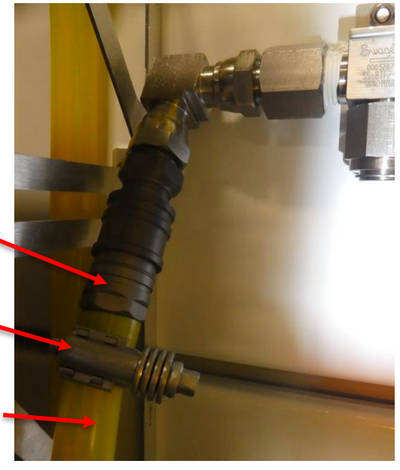


Figure 8: Fitting assembly with hose connection (4X)

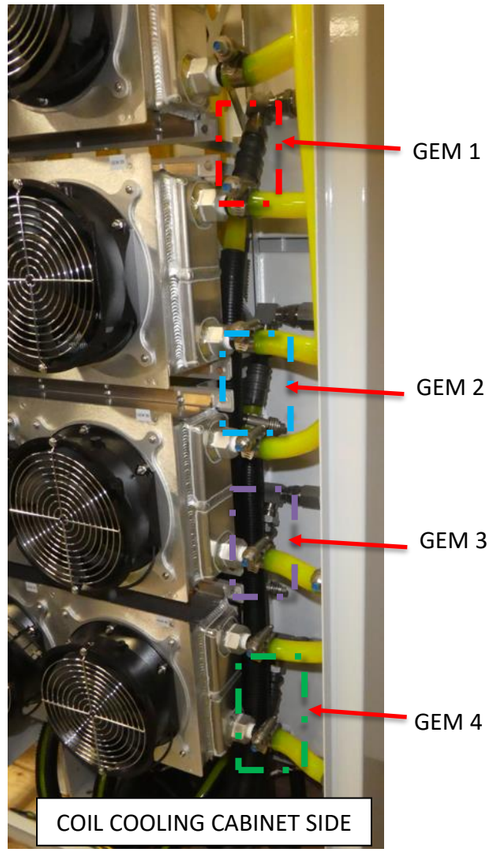


Figure 9: Fitting assemblies with hose connected

Litz Wire Installation

1. Locate GEM 2 group litz wire cables at back of cabinet, left side. Route 6X left (GEM 2 A thru GEM 2 F) cables from the left cord grips to the GEM 2 inverter, making a service loop at the bottom of the cabinet. See Figure 10.
2. Connect GEM 2 A cable to GEM 2 inverter terminal block group -A-. Torque spec on inverter label
    a. Purple wire to GEM 2 HVIL terminal. See Figure 12.
    b. Blue wire to GEM 2 terminal -A-, B. See Figure 12.
    c. Green wire to GEM 2 terminal -A-, G. See Figure 12.
    d. Red wire to GEM 2 terminal -A-, R. See Figure 12.
    e. Purple wire to Item 9 A/B Wire Connector. See Figure 11.
3. Connect GEM 2 B cable to GEM 2 inverter terminal block group -B-. Torque spec on inverter label
    a. Purple wire to Item 9 A/B Wire Connector
    b. Blue wire to GEM 2 terminal -B-, B
    c. Green wire to GEM 2 terminal -B-, G
    d. Red wire to GEM 2 terminal -B-, R
    e. Purple wire to Item 9 B/C Wire Connector
4. Connect GEM 2 C cable to GEM 2 inverter terminal block group -C-. Torque spec on inverter label
    a. Purple wire to Item 9 B/C Wire Connector
    b. Blue wire to GEM 2 terminal -C-, B
    c. Green wire to GEM 2 terminal -C-, G
    d. Red wire to GEM 2 terminal -C-, R
    e. Purple wire to Item 9 C/D Wire Connector
5. Connect GEM 2 D cable to GEM 2 inverter terminal block group -D-. Torque spec on inverter label
    a. Purple wire to Item 9 C/D Wire Connector
    b. Blue wire to GEM 2 terminal -D-, B
    c. Green wire to GEM 2 terminal -D-, G
    d. Red wire to GEM 2 terminal -D-, R
    e. Purple wire to Item 9 D/E Wire Connector
6. Connect GEM 2 E cable to GEM 2 inverter terminal block group -E-. Torque spec on inverter label
    a. Purple wire to Item 9 D/E Wire Connector
    b. Blue wire to GEM 2 terminal -E-, B
    c. Green wire to GEM 2 terminal -E-, G
    d. Red wire to GEM 2 terminal -E-, R
    e. Purple wire to Item 9 E/F Wire Connector
7. Connect GEM 2 F cable to GEM 2 inverter terminal block group -F-. Torque spec on inverter label
    a. Purple wire to Item 9 E/F Wire Connector
    b. Blue wire to GEM 2 terminal -F-, B
    c. Green wire to GEM 2 terminal -F-, G
    d. Red wire to GEM 2 terminal -F-, R
    e. Purple wire to GEM 2 Inverter HVIL terminal

Figure 10: Bottom Inverter Litz Cable Paths

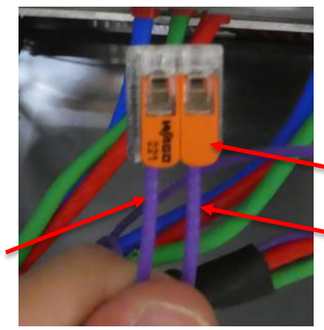


Figure 11: Item 9 Connection Example

Figure 12: Bottom Inverter Litz Cable Connections

8. Locate GEM 1 group litz wire cables at back of cabinet, left side. Route 3X cables (GEM 1 A thru GEM 1 C) from the cord grips to the GEM 1 inverter along the left RMU rail, making a service loop at the bottom of the cabinet. Secure 3X cables with 2X provided loop clamps. See Figure 13.
9. Connect GEM 1 A cable to GEM 1 inverter terminal block group -A-. Torque spec on inverter label
    a. Purple wire to GEM 1 HVIL terminal
    b. Blue wire to GEM 1 terminal -A-, B
    c. Green wire to GEM 1 terminal -A-, G
    d. Red wire to GEM 1 terminal -A-, R
    e. Purple wire to Item 9 A/B Wire Connector
10. Connect GEM 1 B cable to GEM 1 inverter terminal block group -B-. Torque spec on inverter label
    a. Purple wire to Item 9 A/B Wire Connector
    b. Blue wire to GEM 1 terminal -B-, B
    c. Green wire to GEM 1 terminal -B-, G
    d. Red wire to GEM 1 terminal -B-, R
    e. Purple wire to Item 9 B/C Wire Connector
11. Connect GEM 1 C cable to GEM 1 inverter terminal block group -C-. Torque spec on inverter label
    a. Purple wire to Item 9 B/C Wire Connector
    b. Blue wire to GEM 1 terminal -C-, B
    c. Green wire to GEM 1 terminal -C-, G
    d. Red wire to GEM 1 terminal -C-, R
    e. Purple wire to Item 9 C/D Wire Connector
12. Route 3X cables (GEM 1 D thru GEM 1 F) from the cord grips to the GEM 1 inverter along the right RMU rail, making a service loop at the bottom of the cabinet. Secure 3X cables with 2X provided loop clamps. See Figure 13.
13. Connect GEM 1 D cable to GEM 1 inverter terminal block group -D-. Torque spec on inverter label
    a. Purple wire to Item 9 C/D Wire Connector
    b. Blue wire to GEM 1 terminal -D-, B
    c. Green wire to GEM 1 terminal -D-, G
    d. Red wire to GEM 1 terminal -D-, R
    e. Purple wire to Item 9 D/E Wire Connector
14. Connect GEM 1 E cable to GEM 1 inverter terminal block group -E-. Torque spec on inverter label
    a. Purple wire to Item 9 D/E Wire Connector
    b. Blue wire to GEM 1 terminal -E-, B
    c. Green wire to GEM 1 terminal -E-, G
    d. Red wire to GEM 1 terminal -E-, R
    e. Purple wire to Item 9 E/F Wire Connector
15. Connect GEM 1 F cable to GEM 1 inverter terminal block group -F-. Torque spec on inverter label
    a. Purple wire to Item 9 E/F Wire Connector
    b. Blue wire to GEM 1 terminal -F-, B
    c. Green wire to GEM 1 terminal -F-, G
    d. Red wire to GEM 1 terminal -F-, R
    e. Purple wire to GEM 1 Inverter HVIL terminal
16. Repeat steps 1-15 for GEM 3 and GEM 4, replacing all references to GEM 1 with GEM 3 and GEM 2 with GEM 4.
17. After connecting all cables, tighten 24X cord grip tops to secure the cables
    a. Tool: 42mm crow's foot
    b. Loctite: None
    c. Torque: Hand tight to snug

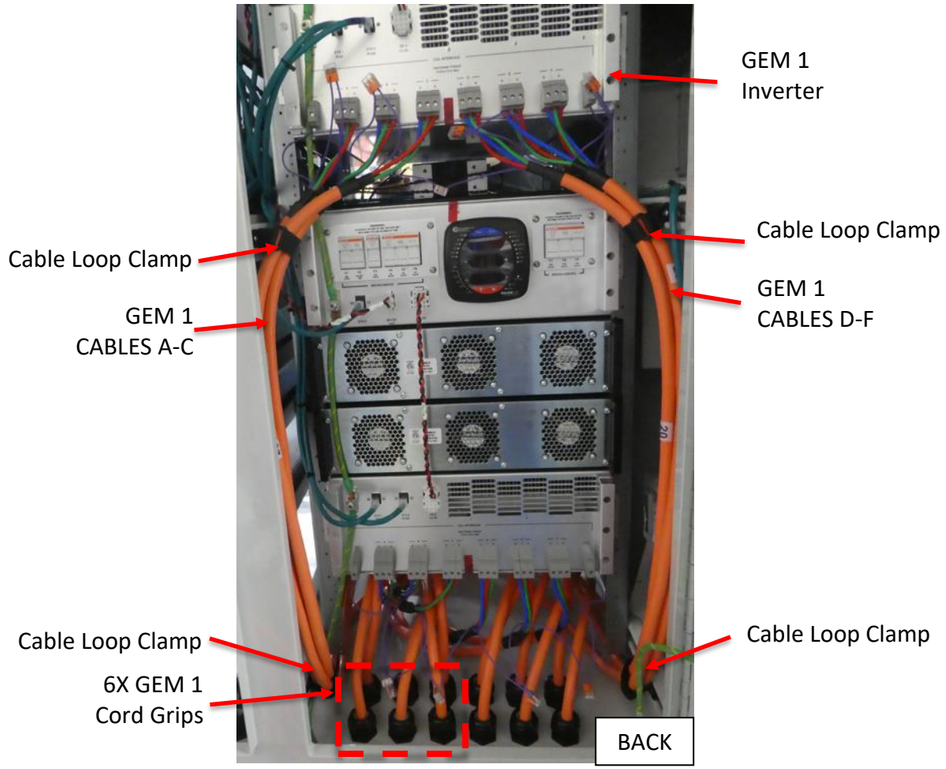


Figure 13: Top Inverter Litz Cable Paths

Figure 14: Top Inverter Litz Cable Connections

Fiber Optic Cable Installation

1. While handling the fiber optic cables, do not kink or exceed the 2” [50mm] minimum bend radius.
2. Disassemble 4X cord grips from the front of the cabinet, unless installing at the same time as the RF cables. Cables cannot pull through unless the grommets with cord grips are disassembled. Discard the remaining plug. See Figure 15.
3. For each GEM Group, repeat steps 4 through 9 4X. Be sure to match the correct GEM #’s as mapped on page 4 of this document.
4. Route 1X fiber cable and loom from the conduit directly below each cord grip up until the underside of the cabinet. Cut back the loom right below the cord grip.
5. Continue the 1X fiber cable route through the cord grip nut, enclosure cutout, and grommet.
    a. Leave the cord grip disassembled while routing 1X fiber cable to destination
6. Route fiber cable along the right RMU rail for the specified GEM # and up to the top of the cabinet.
7. At the top of the cabinet at the AC Enclosure, provide a service loop for the cable and any excess. See Figure 16.
8. Route the cable back down the right RMU rail to the GEM # Inverter. See Figure 19.
9. Connect the fiber cable at the GEM # Inverter Coil Temp Sense Fiber connector. See Figure 20.
    a. Note that the connector is keyed.
10. Once all GEM# fiber cables have been routed. Secure all routes to pre-installed adhesive mounts along the right RMU rails with Item 10. Be sure to only tighten zip tie partially to not kink the fiber optic cable. See Figure 19.
11. Before placing 4X grommets back in the cord grip bodies, the fiber cable will need to be wrapped with Item 11 in the location where the cable will sit in the grommet to properly seal. See Figure 17 and 18.
    a. Apply enough wraps (approx. 6 wraps) to get the OD of the electrical tape around the fiber cable to be between 4.7 mm and 4.9mm OD, measured with a caliper. See Figure 17.
    b. Ensure the tape wrap is positioned such that it fits snugly within the grommet hole. See Figure 18.
12. Once 4X fiber cable routes are set, tighten cord grip cover lid screws. See Figure 21.
    a. Tool: 3mm hex plus
    b. Loctite: None
    c. Torque: 1.8 ft-lbs. [2 N-m]
13. Re-install the 4X cord grips to the cabinet
    a. Tool: 41mm crow’s foot
    b. Loctite: Item 12 (#425)
    c. Torque: 10 in-lbs. [1.1 N-m]

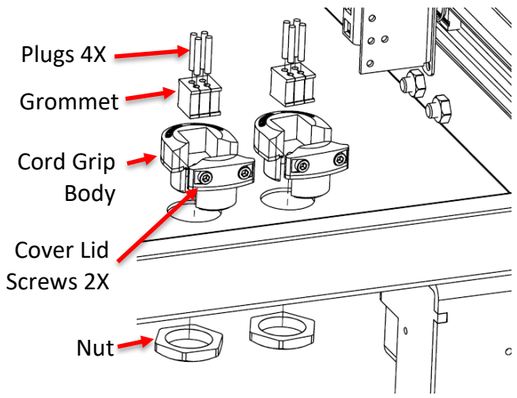


Figure 15: RF Cord Grip Explode View

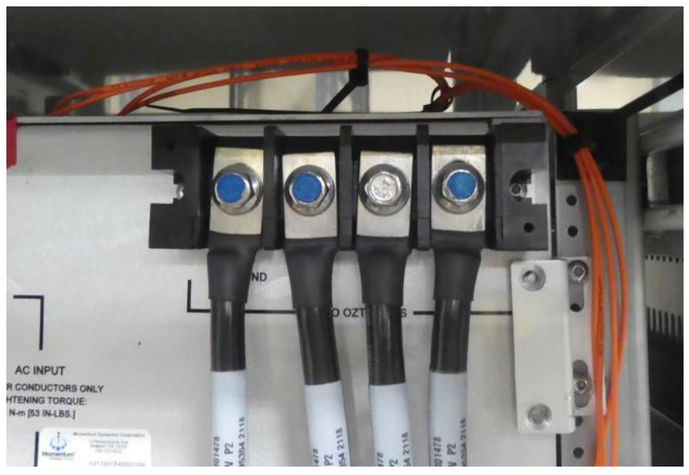


Figure 16: GEM 1 & 2 service loop above GEM 1 AC Enclosure

Figure 17: Item 11 Wrap around cable (4X)

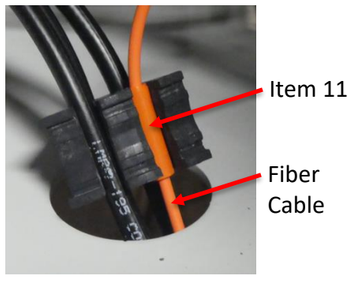


Figure 18: Fiber Cable with Item 11 in Cord Grip Grommet (4X)

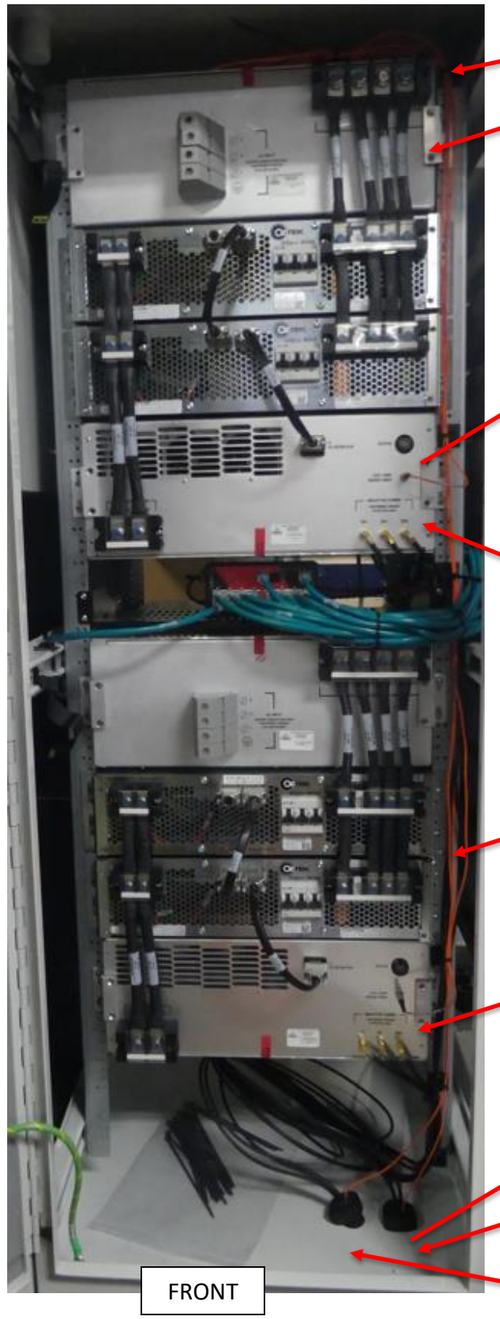


Figure 19: GEM 1 & 2 Fiber Optic Cable Route Path

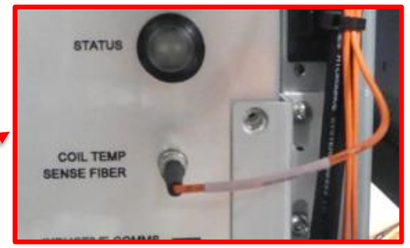


Figure 20: Fiber Optic Cable Connection at Inverter (4X)

Figure 21: Cord Grip with fiber cable (4X)

INDUCTEV

Process Notes for Installing Wire and Hose in Buried Conduit

Cable Information

1. The following cable & bending information are as follows:
    a. **Orange LITZ Cable**
        i. UL22154 Shielded Jacketed 4 Conductor #8AWG Cable
        ii. Min. bending radius = 4.5".
        i. Min Dia. = 0.662”
        ii. Nom Dia. = 0.689”
        iii. Max Dia. = 0.716”
    b. **Fiber Optic Cable (EXT-200)**
        i. Min. bend radius = 0.98425"
    c. **RF Coaxial Cable**
        i. Min. bending radius = 0.5".
        ii. Nom Dia. = 0.195”
    d. **Hose**
        i. For ¾” ID hose: min bend radius = 3.25”
        ii. For 5/8” ID hose: min bend radius = 2.5”

Also,

- **Please see Fiber Optic Ext Cable datasheet at end of this document**
- **With installation wire pulling/tugging equipment has been found to apply 8,000lb ratings and more, for the Orange Litz please ensure we don't exceed 3,500lb of static or dynamic tension on the cables at any point during the installation.**
- **Fiber Optic Ext. Cable short term installation force on the cable itself is 110 lbf, Continuous pull force is 55 lbf. Pulling force on the connectors if 5 lbf.**

Overview

The nature of the installation is such that each of the **line elements** (Litz wire cables, cooling hoses, radio frequency wires) is extensively customized in both length and termination so that it will fit in only one location in the final installation. Typically, a **line** will connect a specific, predetermined point on the **coil** to a specific, predetermined point within the **cabinet** (on the power supply, the cooling system or the RF output).

In connecting these two points, the **route** the line must follow is also predetermined, and thus, its length. Each route has three **segments**: 1) the **socket connection length**, 2) the **conduit run**, and 3) the **cabinet connection length**. The sum of these three route segments equals the total length of the line.

The socket connection length includes all of the line that is contained in one or more **sockets** between the connector on the coil to the entrance to the underground **conduit** that leads to the cabinet. Note that the socket connection length is different for each line that enters the socket(s)and is predetermined based on the need for smooth and easy positioning of the hoses and wires as the connections to the coil are made and the coil is inserted into the socket. Therefore, when the coil layout is designed (one coil, two coils in series, two coils in parallel, four coils) the service loop length for each line is fixed and can be placed in a table for repeated use in the measuring process.

The conduit run includes all the line in the buried conduit from its entrance into the socket to the open end below the cabinet. It is the length of the actual, physical conduit at the installation site measured by pulling a 100-foot tape measure though the conduit and adding an adjustment for each bend in that conduit's run based on records (photos, sketches, lists) made of the conduit before it is covered.

The cabinet connection length allows the lines arriving from the coils to reach and connect to the correct terminal points on the cabinet equipment. When the cabinet is in place, the lines exit the underground conduits below the floor of the cabinet and the power cables (6 per coil) pass individually through cord grips in the the cabinet floor, form a "service loop" of extra wire, then connect to the power circuits of inverter assemblies supported in racks at one of two possible heights above. The radio communication wires (3 per coil) pass through a different set of grommets in the cabinet floor and connect to the radio frequency terminals at the back of the same inverters. The cooling hoses 92 per coil) are led sideways to the end of the cabinet and pass through the open bottom of the cooling enclosure where the 3/4" supply hose connects to a pump and the 5/8" return hose connects to a heat exchanger.

It will be understood from the foregoing paragraphs that material to be installed is not only customized to its exact position not only in overall LENGTH, but also in POSITION, (how much of it is required at the socket end, how much in the conduit, how much in the cabinet). For this reason marks are placed on the material to guide the installers to the correct final positions to pull lines to.

Verified Job-Specific Routing Documentation

Every installation will be different. The job-specific drawings and instructions give the correct routes for the materials in each case. The material in the spooling cases should have been measured, marked, cut, terminated, re-spooled and placed into the proper case compartment following an exactly defined and documented route from the coil to the cabinet equipment that is unique to that particular installation.

Identifying Labels

Each piece of material is labeled at both ends with the complete identity if its final, installed location. The label contains 5 levels of information:

Client name and geographical location
Charging station name
Coil name
Conduit Name
Circuit Name

This info appears on the label in the following format:
For power cables LOC: XX-XX|STA:XX|COI:XX|CON:XX|CIR:XX
For cooling hoses LOC: XX-XX|STA:XX|COI:XX|CON:XX|SUP or RET
For low voltage bundle LOC: XX-XX|STA:XX|COI:XX|CON:XX|RF

The individual wires in the RF bundle are labeled with part numbers to which have been added color codes at both ends: numbers ending in 44, red, 45, yellow, 46, green.

Pulling Marks

To aid the installer in positioning the materials correctly, colored bands of tape have been placed directly on the wires and hoses at measured distances along the length, dividing the lines into the three main segments. As the materials pulled through the conduit from the socket to the cabinet location, the first segment to emerge will be the cabinet connection length. When this segment is fully out of the conduit, the pull stops. This segment ends with a triple mark so that the technician operating the puller will have warning that the pull is about to stop. 8 inches before the end a green mark appears. 4 inches before the end a yellow mark appears. At the end, a red mark appears. The second segment of the material is the conduit run length. This segment ends with a black mark on the Litz cables or a red mark on the hoses and RF. If the measurement of the conduit run length is perfect, this mark will be at the beginning of the conduit at the socket wall when the red mark is at the end of the conduit at the cabinet location. If the marking is found to be very far off, then it is preferable that the black mark at the socket end be the more exactly positioned of the two marks because the service loop provided inside the cabinet allows greater flexibility than the line routing inside the socket.

The Material Shipping and Dispensing Case

All wires and hoses are pulled FROM the socket TO the power cabinet.

Each case contains only the prepared wires and hoses needed for one particular coil installed in one particular ground socket. The case is partitioned internally into 9 compartments of two different sizes: 3 large, and 6 small. The each compartment has metal hardware that supports one plastic reel of material so that it may rotate independently.

The front of the case (the side that faces the socket) has 3 reels that measure 15” wide and 24” in diameter, the middle reel of the three is spooled with a bundle of 3 coaxial radio frequency wire sheathed in corrugated plastic loom. The two reels on either side contain cooling hoses made of Tygon tubing sheathed in corrugated plastic loom, one contains 3/4”dia. supply hose, the other 5/8” dia. return hose.

The back of the case (the side away from the socket) has 6 reels that measure 7” wide and 22” in diameter, each spooled with one Litz cable.

The case is provided with two material guides made of notched, 4” diameter PVC pipe to allow the lines to feed smoothly over the plywood walls of the box as the material is paid out.

The plastic reels and their steel axles are secured in the box by long threaded rods held by locknuts. There is no reason to remove the reels from the case during the installation process.

Equipment Required

The job-specific drawings and instructions that give the correct routes for the materials.

The correctly identified material shipping and dispensing case (spooling case) for each coil.

Equipment for moving the cases (backhoe, fork lift, slings, hooks, etc.).

Power wire-pulling winch.

Fish tape or other tool for getting the pulling cable through the conduits.

3” cable-pulling grip for the hoses/RF.

2” cable-pulling grip for the Litz.

Wire pulling lubricant

Gloves

General Rules for Pulling

In multi-coil installations where there are main and dependent sockets used, dependent socket lines MUST be installed BEFORE lines in adjoining main sockets, because the dependent lines run through the bottom of the main socket below the main lines and must be put in place first. On all sockets, the cooling hoses and RF bundle are pulled FIRST, the power cables in two subsequent pulls.

All the material being installed in any one conduit are pulled AT ONE TIME, together, through the length of the conduit.

Each coil and each socket uses three, 3" diameter, conduits, one for the hoses and RF, and two for the power cables, 3 power cables per conduit. So, there are 3 pulls per coil:

1) Supply, return and RF,
2) Cables A,B and C
3) Cables D, E and F

Procedure

Position the wire-pulling machine and its operator at the end of the conduit where the power cabinet will be installed.

Identify the correct spooling case for the socket being pulled. Each case and case lid has a "Case Number" painted on it. The case number appears only on the front of the case (the side where the hoses and RF are spooled). Using available equipment, place the case with the front, numbered, side adjacent to the socket about six feet from the socket, on the opposite side of the socket from the 3" underground conduits.

Unfasten the lid catches and lift off the lid placing it aside. In the center of the case are two notched PVC material guides, one with 2 notches, one with 5. The one with two notches is placed over the plywood outer wall of the box so that wires and hoses pulled from the reels with feed smoothly out of the box and down into the socket. The guide with 5 notches is placed on the internal wall of the box between the wire reels and the hose reels to guide the Litz wire off the back reels.

Dependent sockets, when present, are pulled first. On all sockets, the cooling hoses and RF bundle are pulled first. Following the job-specific diagram provided for the installation, fish the pulling cable from the cabinet location through the correct conduit to the main socket and on through the correct 4 inch diameter communicating conduit into the dependent socket.

Pull several feet of the first three lines, (supply hose, RF bundle, return hose) from the reels. Gather them so that the triple marks, (red, yellow, green) on the three lines are side-by-side and bundle then with a moderate wrap of tape between the marks and the ends. Insert the ends of the three lines into a 3” wire-pulling grip. If, with the marks aligned, one of the lines is too short to enter the grip with the others, switch to a smaller grip and tape the short line very securely to the other lines so that it will pull along with them.

Begin the pull by feeding the lines into the dependent socket, through the connecting conduit, through the main socket, and into the underground conduit.

Apply wire pulling lube generously to the mouth of the conduit, to the grip and to the lines for several feet of length. Continue the pull, using gloved hands to ease the three parts together into position. As the pull completes, the coil ends of the lines will detach from the reels and drop into the socket. In the case of the Tygon tube and the corrugated PE covering the material is very elastic, the loom may slide along the Tygon and the stop marks may be very far off from the ideal locations. This is normal, and the spooled material is provided extra long for this reason.

When the first pull is complete, send the pulling wire down the next conduit and pull the first 3 Litz cables using a 2” pulling grip. Pull the cables off their reels right over the hose/RF reels just vacated. Line up the marks and follow substantially the same procedure as for the hoses. The marks will be more accurate

When that pull is complete, move to the next conduit and pull the last 3 Litz wires.

After three pulls the case is empty and the socket is full. Put the lid back on the case matching the case numbers on box and lid, fasten the cargo catches and take the case away, find the correct case for the next coil and place it opposite the correct socket. If the next socket is a main socket, the pulls somewhat simpler because the dependent socket and 4” connecting conduit are not involved.

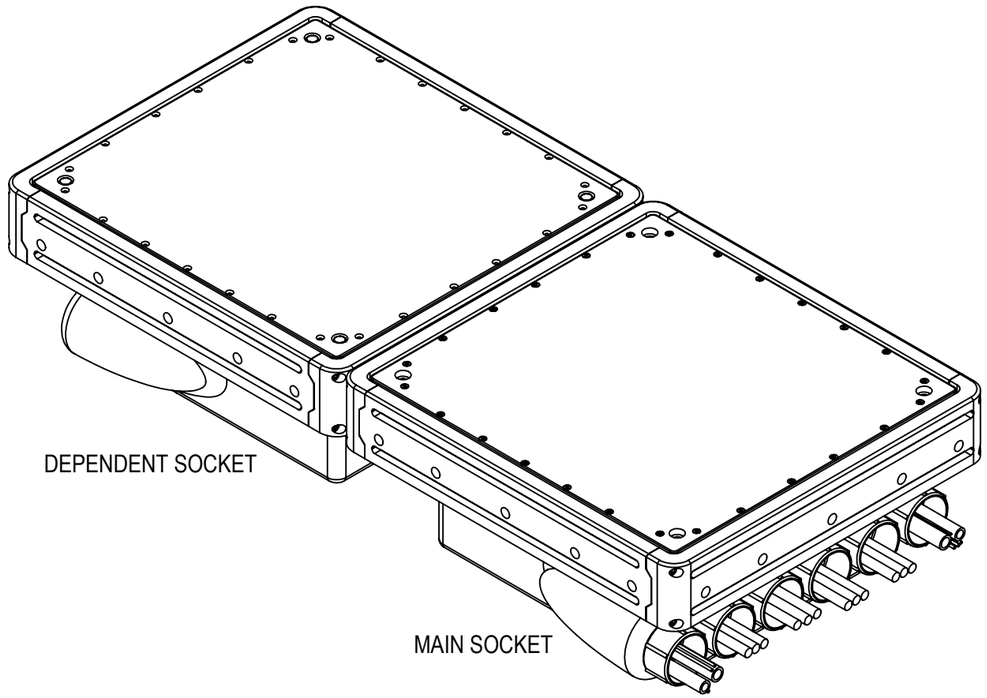
Cases with the reels still in them are shipped back to MD to be reloaded for the next installation.

NOTES:
1. THIS DOCUMENT WILL DETAIL THE FIELD INSTALLATION FOR A SINGLE FLUSH MOUNT GA COIL, BUT WILL SHOW IT IN THE CONTEXT OF TWO CONJOINED SOCKETS.
    1. THE STEPS IN THIS DOCUMENT ARE SIMPLY REPEATED FOR A SECOND COIL, IF NEEDED
    2. THE PROCESS IS EASILY EXTENDED TO A 4-COIL SYSTEM (WITH TWO PARALLEL SETS OF CONJOINED SOCKETS)
    3. QUANTITIES LISTED IN BOM ARE FOR A SINGLE COIL INSTALLATION
2. IN A CONJOINED PAIR OF SOCKETS:
    1. THE 'MAIN SOCKET' IS CONNECTED TO THE MAIN CONDUITS, WHICH CONVEY CABLES AND HOSES TO THE GA CABINET
    2. THE 'DEPENDENT SOCKET' IS CONNECTED ONLY TO THE 'MAIN SOCKET' WITH TWO SHORT LENGTHS OF CONDUIT. CABLES AND HOSES ORIGINATING IN THE 'DEPENDENT SOCKET' MUST PASS THROUGH THE 'MAIN SOCKET' TO REACH THE GA CABINET.

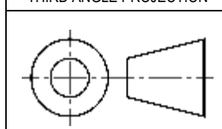
REVISIONS

REV	DESCRIPTION	DATE	APPROVED
A	INITIAL RELEASE	05/10/2021	

ITEM No	PART No	DESCRIPTION	VENDOR	MANUFACTURER	QTY.
1	A-01307	Assembly - GA Coil, Gen 2, Core Assy, Flush	Momentum Dynamics	Momentum Dynamics	1
2	3100T14	Stainless Steel Eyebolt -M16 x 2 x, 27 mm	McMaster-Carr	--	4
3	A-02269	GA Coil Install Spacer Clamp	Momentum Dynamics	Momentum Dynamics	4
4	A-01118	Cable Assy - GenII, GA Coil, Souriau Plug Assembly to Inverter			6
5	A-02044	Cable Assy. - GenII, GA, TX1, RF cable, LMR195 -DB cable, generic length			1
6	A-02045	Cable Assy. - GenII, GA, RX1, RF cable, LMR195 -DB cable, generic length			1
7	A-02046	Cable Assy. - GenII, GA, RX2, RF cable, LMR195 -DB cable, generic length			1
8	A-02119	Hose Assy - GenII, GA, Supply, 3/4" Hose, Enclosure to Coil			1
9	A-02120	Hose Assy - GenII, GA, Return, 5/8" Hose, Enclosure to Coil			1
10	1000000690	Cable Assy - GenII, GA, Fiber Optic, Enclosure to Coil (Route 1)			1
11	1000000652	Heat Shrink - 6:1, ID 19mm, Black, 4' length, Polyolefin	--	Newark	As Required
12	A-02309	Hose Fitting Assy - Flush, GA Coil, Supply	Momentum Dynamics	Momentum Dynamics	1
13	0100007163	Fitting - 3/4" BSPP F Swivel x 3/4" Push Barb, SS		Adaptall	1
14	54205K13	Hose Clamp - Constant-Tension, Soft Hose and Tube, 11/16" to 1-1/4" ID	McMaster-Carr	--	1
15	54205K11	Hose Clamp - Constant-Tension, Soft Hose and Tube, 9/16" to 1-1/16"	McMaster-Carr		1
16	1000000650	Adhesive - High Strength Anchoring Epoxy, Quikrete			As required
17	0100000854	Screw - Hex Hd, M12x1.75x150mm, 18-8 SS	McMaster-Carr	--	4
18	0100003950	Washer - Flat, M12, 18-8 SS	McMaster-Carr		4
19	P-002147	Threadlocker - Loctite #243, As Required	McMaster-Carr	Loctite	As required
20	P-002321	Foam Cord - Poly Foam Backer Rod, 1/2" Dia, Frost King	Home Depot	Thermwell Products	6m
21	1000000693	Foam Cord - Poly Foam Backer Rod, 3/8" Dia, Frost King			As required
22	P-002326	Adhesive - Loctite PL Marine Fast Cure Adhesive Sealant	Home Depot	Loctite	As required
23	P-002150	Acetone, As Required			As required
24	1000000694	Masking Tape - 1.88 in wide			As required
25	1000000695	Stucco Tape - 1.89 in wide, film			As required



THIRD ANGLE PROJECTION



UNLESS OTHERWISED SPECIFIED, DIMENSIONS ARE IN MILLIMETERS

TOLERANCES

	FAB	MACH
X	±0.5 mm	±0.2 mm
X.X	±0.25 mm	±0.1 mm
X.XX	±0.125 mm	±0.025 mm
X°	1°	0.5°

SURFACE FINISH 1.6

	NAME	DATE
DRAWN	R. Dortone	5/5/2021
CHECKED	J. Laucharoen	5/7/2021
MFG APVD		

DWG TYPE: Assembly

MATERIAL: N/A

FINISH: N/A

DO NOT SCALE DRAWING

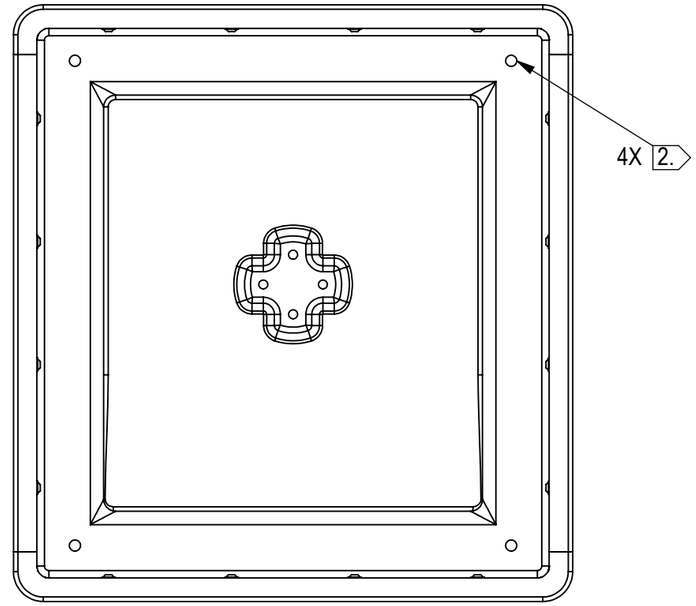
INDUCTEV

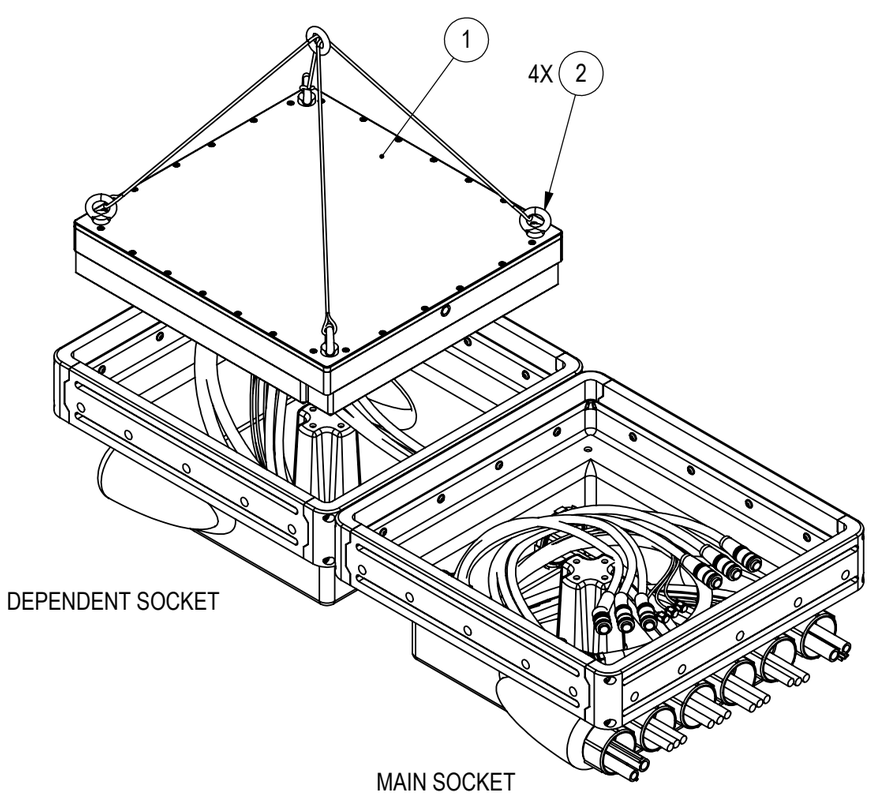
TITLE: Field Installation - Flush Mount GA Coil

SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE | SHEET 1 OF 8

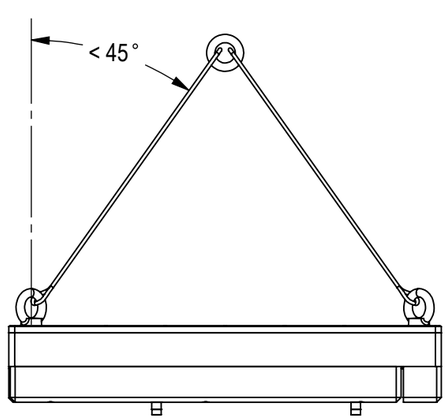
1. IT IS PREFERABLE TO INSTALL (1) GA COIL IN THE 'DEPENDENT SOCKET' FIRST.
2. THOROUGHLY CLEAN OUT 4X FEMALE THREADED ANCHORS (FIRST BY DEGREASING THREADS WITH (23) ACETONE OR OTHER DE-GREASER, AND BOTTLE BRUSH)
3. TEST FIT 4X (17) HEX BOLTS INTO FEMALE THREADED ANCHORS (RE-TAP ANCHORS USING M12 X 1.75 TAP, IF BOLTS STILL WILL NOT THREAD IN)
4. ATTACH 4X (2) EYEBOLTS TO (1) GA COIL.
5. SUSPEND (1) GA COIL FROM A SINGLE POINT, CONNECTED TO THE 4X (2) EYEBOLTS
   1. ANGLE OF SUSPENSION CABLES SHOULD BE NO MORE THAN 45° OFF VERTICAL (4-CABLE LIFTING RIG IS INCLUDED)
6. LOWER (1) GA COIL FULLY INTO SOCKET AND REMOVE 4X (2) EYEBOLTS.
7. SHIFT COIL AS NEEDED TO TEST FIT 4X (17) HEX BOLTS.
   1. TOOL: 19MM SOCKET
   2. IF ALIGNMENT OF ALL 4 HOLES IS IMPOSSIBLE, THE ALUMINUM BODY OF THE (1) GA COIL WILL NEED TO BE DRILLED OUT. BEGIN BY DRILLING OUT A SINGLE HOLE, STEPPING UP ONE DRILL BIT SIZE. OPEN UP THE OTHER 4 HOLES BEFORE STEPPING UP ANOTHER DRILL SIZE.
8. REMOVE 4X (17), REATTACH 4X (2) EYEBOLTS AND CABLE, AND LIFT (1) GA COIL BACK OUT OF SOCKET.

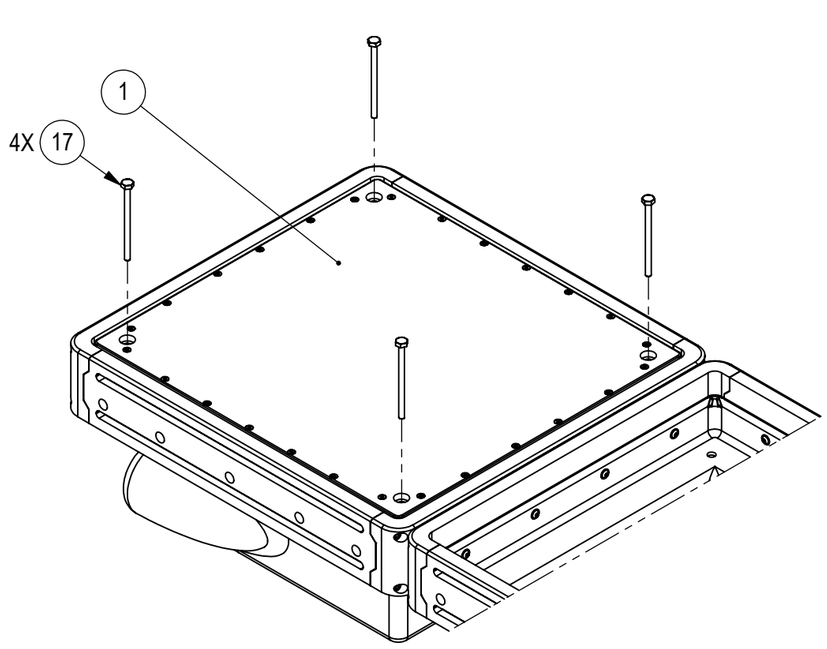




DEPENDENT SOCKET

MAIN SOCKET





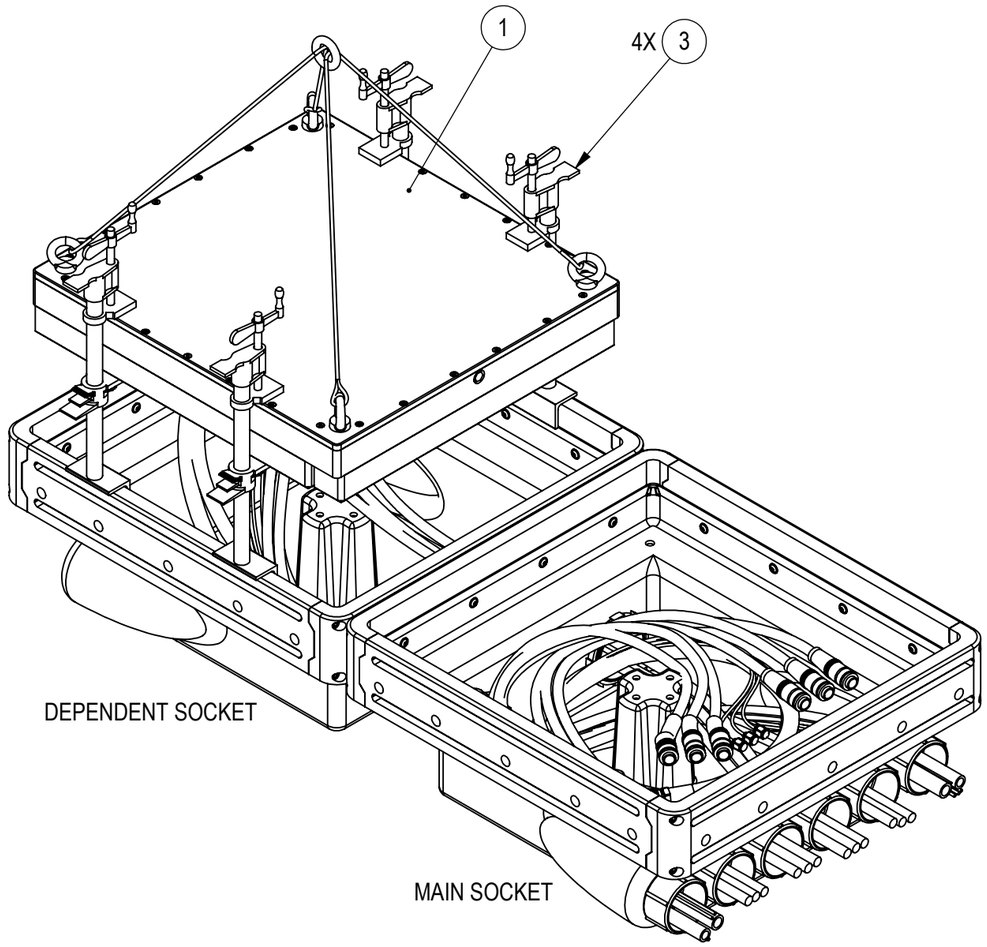
INDUCTEV

SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE	WEIGHT: N/A	SHEET 2 OF 8

1. LOWER (1) GA COIL UNTIL IT IS SLIGHTLY HIGHER THAN 20CM OFF THE GROUND.
2. POSITION 4X (3) SPACER CLAMPS ON (1) GA COIL, BY OPENING THE JAWS, AND PUSHING THE STEEL ANGLE BASE AGAINST THE INSIDE WALL OF THE SOCKET FRAME. KEEP CLEAR OF SUSPENSION POINTS.
3. ADJUST THE LOWER JAWS OF 4X (3) TO MARKED POSITIONS (20CM FROM THE GROUND). (1) GA COIL WILL REST AT THIS HEIGHT.

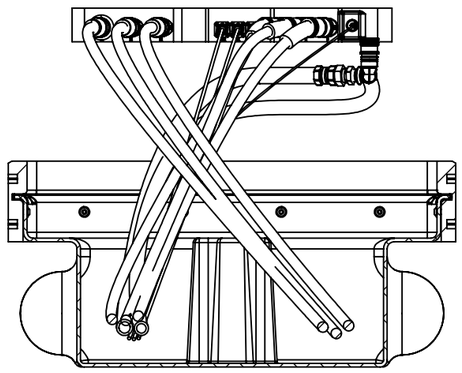
   TIGHTEN THE UPPER JAWS AND ENSURE THAT THE WEIGHT OF THE (1) GA COIL IS FULLY SUPPORTED BY THE CLAMPS.



INDUCTEV

SIZE	DWG NO	REV
B	A-01427	A

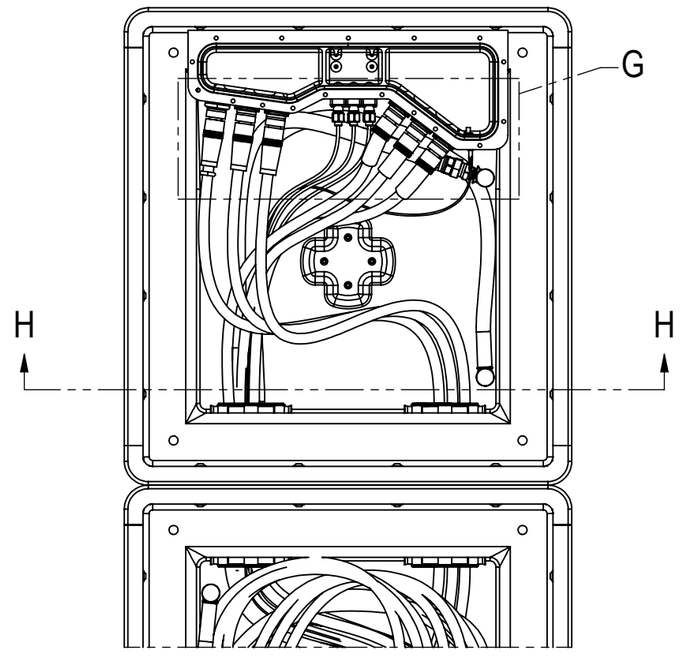
SCALE: NONE	WEIGHT: N/A	SHEET 3 OF 8

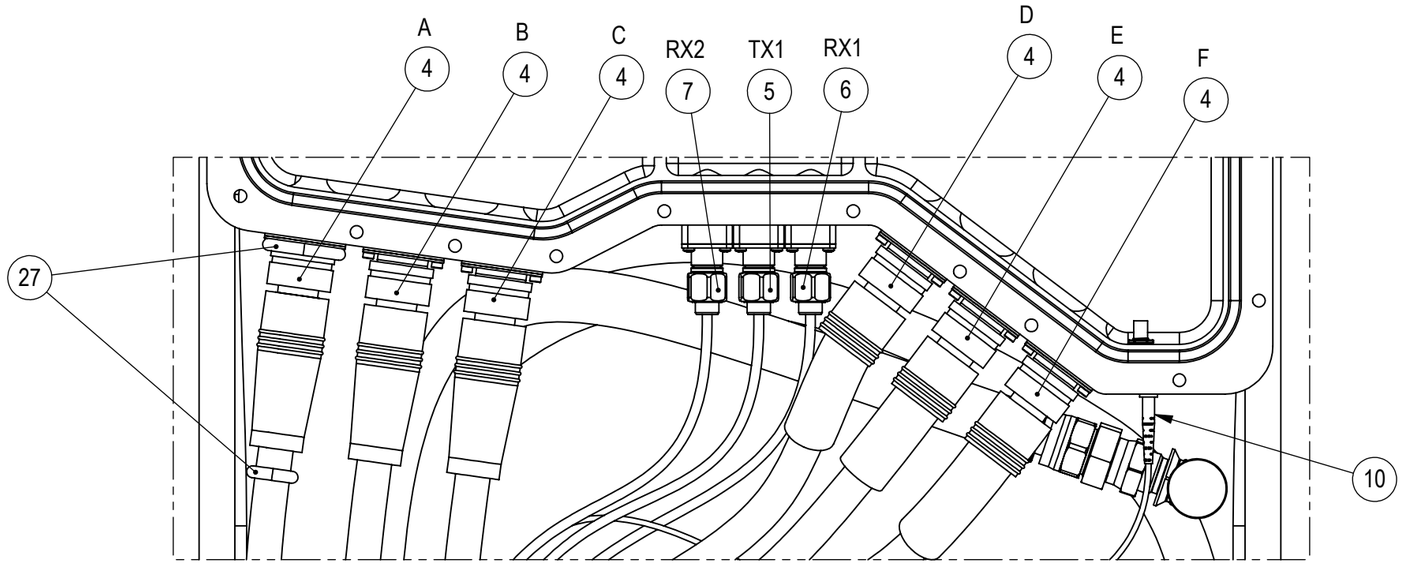


SECTION H-H

FOR CLARITY, JUNCTION BOX IS SHOWN,
BUT REST OF COIL IS HIDDEN

1. CONNECT 6X (4) HIGH VOLTAGE CABLES TO GA COIL JUNCTION BOX
   1. PRIOR TO CONNECTION, SLIDE HEAT SHRINK (28) (~125MM LENGTHS) OVER 6X CONNECTOR ENDS. DO NOT SHRINK YET.
   2. CABLES WILL BE LABELED 'CIR:A' - 'CIR:F', AND SHOULD BE CONNECTED TO JUNCTION BOX CONNECTORS LABELED 'A' - 'F'.
   3. AFTER CONNECTION, APPLY TWO THICK (6MM MIN) RINGS OF SEALANT (27) AROUND THE CIRCUMFERENCE OF EACH CABLE: ONE AT THE INTERFACE BETWEEN THE CABLE-SIDE CONNECTOR AND THE BULKHEAD CONNECTOR, AND ONE ON THE CABLE JUST PAST THE OVERMOLD. DETAIL G SHOWS SEALANT LOCATIONS ON CABLE 'A'.
   4. SLIDE HEAT SHRINK (28) OVER CONNECTION BETWEEN CABLE-SIDE CONNECTOR AND BULKHEAD CONNECTOR, AS FAR BACK AGAINST THE JUNCTION BOX WALL AS POSSIBLE. HEAT SHRINK SHOULD FULLY COVER BOTH SEALANT RINGS. HEAT EVENLY WITH HEAT GUN, STARTING FROM JUNCTION BOX, OUT TO THE CABLE.
2. CONNECT LOW VOLTAGE CABLES ((5), (6), (7)) TO GA COIL JUNCTION BOX
   1. PRIOR TO CONNECTION, SLIDE HEAT SHRINK (11) OVER 3X CONNECTOR ENDS. DO NOT SHRINK YET
   2. CABLES WILL BE LABELED 'RX1', 'RX2', AND 'TX', AND SHOULD BE CONNECTED TO JUNCTION BOX CONNECTORS LABELED 'RX1', 'RX2', AND 'TX'
   3. TORQUE CONNECTORS WITH TYPE N-CONNECTOR TORQUE WRENCH
   4. AFTER CONNECTION, SLIDE HEAT SHRINK (11) OVER CONNECTION BETWEEN CABLE-SIDE CONNECTOR AND BULKHEAD CONNECTOR, AS FAR BACK AGAINST THE JUNCTION BOX WALL AS POSSIBLE. HEAT EVENLY WITH HEAT GUN, STARTING FROM JUNCTION BOX, OUT TO THE CABLE.
3. CONNECT FIBER OPTIC CABLE (10) TO GA COIL JUNCTION BOX, LAST. HANDLE VERY CAREFULLY, AS THE CABLE IS VERY BRITTLE.





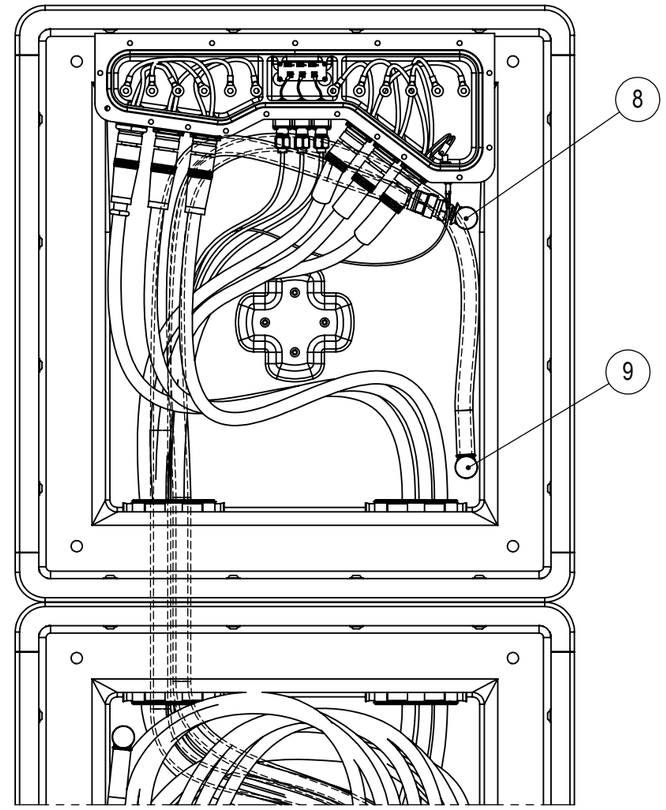
DETAIL G

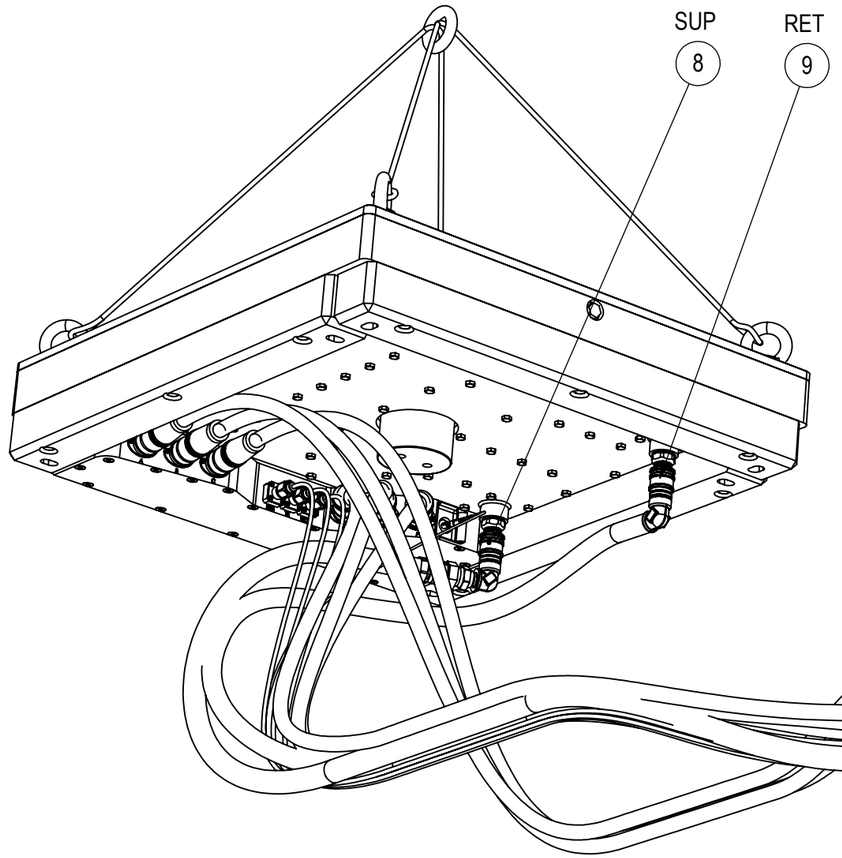
INDUCTEV

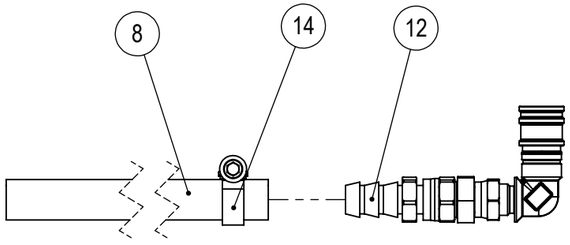
SIZE	DWG NO	REV
B	A-01427	A

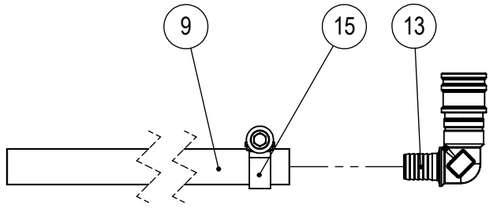
SCALE: NONE	WEIGHT: N/A	SHEET 4 OF 8

1. CONNECT COOLANT (8) SUPPLY AND (9) RETURN TO COIL COLD PLATE.
   1. UN-TERMINATED HOSES ARE EXTRA LONG. ENSURE THAT (8) AND (9) ARE ROUTED ROUGHLY ALONG THE PATH SHOWN (COOLANT PATHS SHOWN IN HIDDEN LINE) TO THE QUICK DISCONNECTS FITTINGS ON THE COLD PLATE.
   2. REMOVE ANY PLUG, CUT (8) HOSE TO SIZE, AND ATTACH TO (12) FITTINGS WITH (14) HOSE CLAMP.
      1. TOOL: 5/16"
      2. LOCTITE: NONE
      3. TORQUE: 30 IN-LBS. [40 N-m]
   3. REMOVE ANY PLUG, CUT (9) HOSE TO SIZE, AND ATTACH TO (13) FITTING WITH (15) HOSE CLAMP.
      1. TOOL: 5/16"
      2. LOCTITE: NONE
      3. TORQUE: 30 IN-LBS. [40 N-m]
   4. HOSES WILL BE LABELED 'GEM __ SUPPLY' AND 'GEM __ RETURN', AND SHOULD BE CONNECTED TO COLD PLATE PORTS LABELED 'SUP' AND 'RET'. IF COLD PLATE PORTS ARE NOT LABELED, SEE ILLUSTRATION.









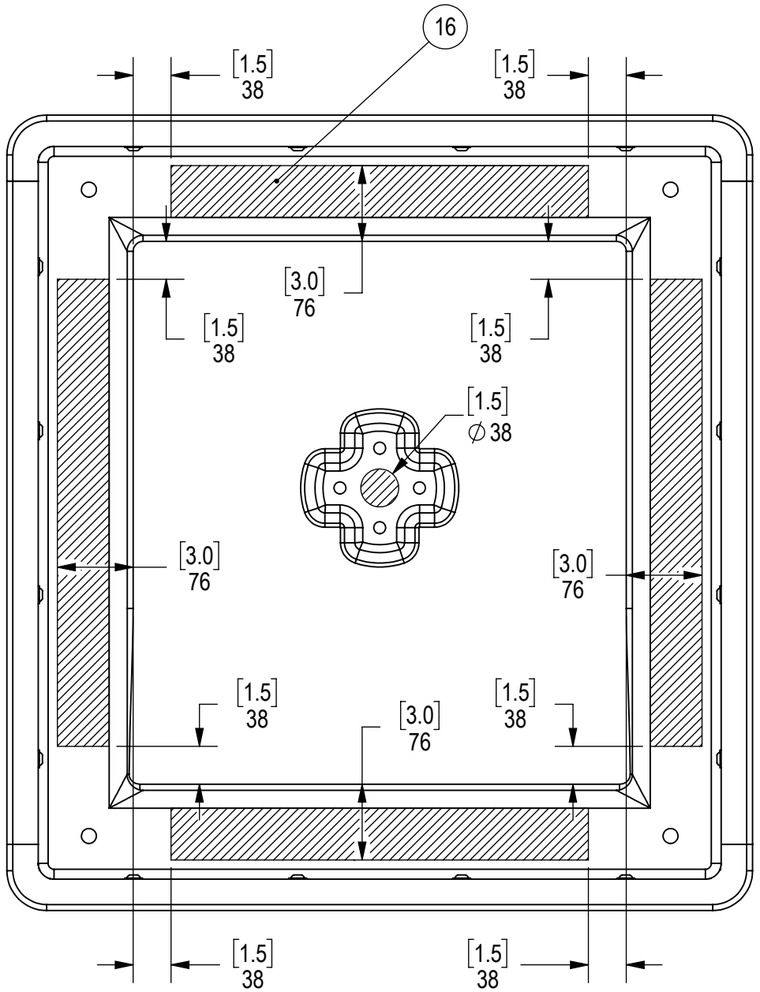
INDUCTEV

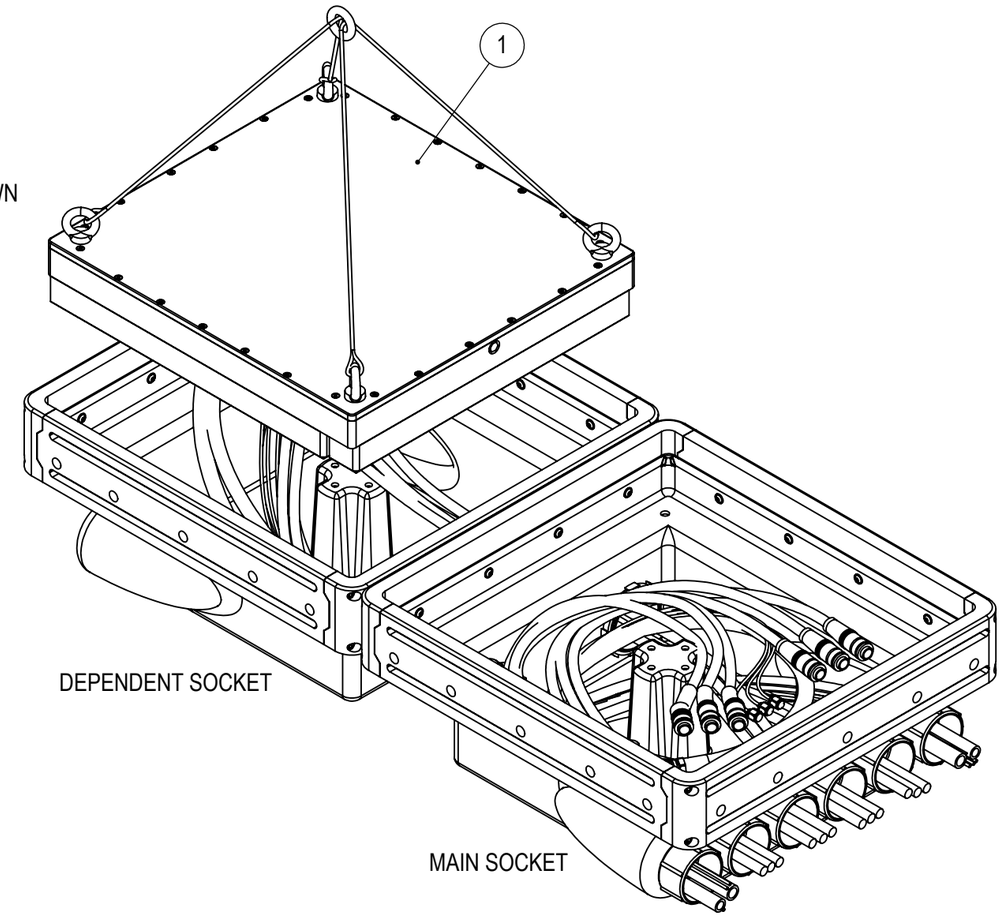
SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE	WEIGHT: N/A	SHEET 5 OF 8

1. IF SOCKET WAS SHIPPED AND INSTALLED WITH LEVELLING COMPOUND PRE-APPLIED, THIS SHEET SHOULD BE DISREGARDED. (PRE-APPLIED LEVELING COMPOUND WILL RESEMBLE HATCHED PATTERN BELOW).

2. IF NO LEVELLING COMPOUND IS ON SOCKET, PROCEED:
   1. BOTTOM SURFACES OF (1) GA COIL (JUNCTION BOX AND SPACER BEAMS), SHOULD BE COVERED IN 3M 3"-WIDE POLYPROPYLENE TAPE. IF FILM IS EXCESSIVELY WORN OR DAMAGED, IT MUST BE REPLACED.
   2. IF THE COIL HAS NO PP TAPE ON IT AT ALL, FIX A 3" WIDE LENGTH OF TAPE ALONG THE BOTTOM SURFACE OF EACH OF THE 4 SIDES OF THE GA COIL (3 PIECES WILL BE ON THE SPACER BEAMS, AND WILL COVER THEIR ENTIRE BOTTOM SURFACE & 1 PIECE WILL BE ON THE JUNCTION BOX, AND WILL COVER THE OUTER 3" OF IT). CUT HOLES IN THE TAPE WHERE BOLTS WILL NEED TO PASS
   3. COMBINE (16) HIGH STRENGTH ANCHORING EPOXY AND SPREAD ON SOCKET SHELF AND CENTRAL COLUMN, AS SHOWN BY HATCHING. (DO NOT ALLOW ADHESIVE NEAR THE SOCKET THRU HOLES)
      1. ADHESIVE SHOULD BE SPREAD THIN OVER SOCKET SHELVES AND CENTRAL COLUMN TO FILL IN ALL DIPS AND DIVOTS.
      2. ADHESIVE THICKNESS AT HIGHEST POINTS SHOULD BE CLOSE TO ZERO.



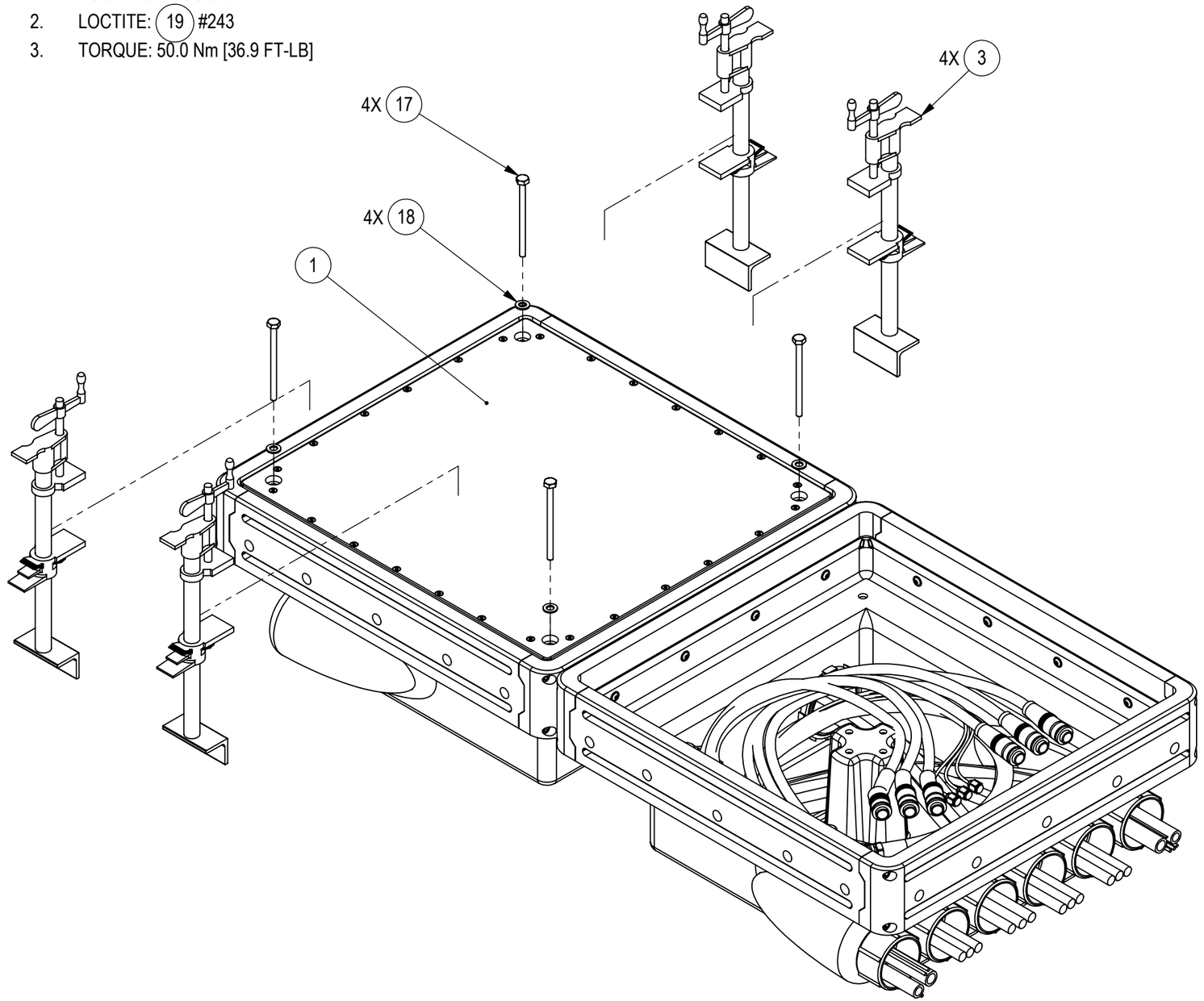


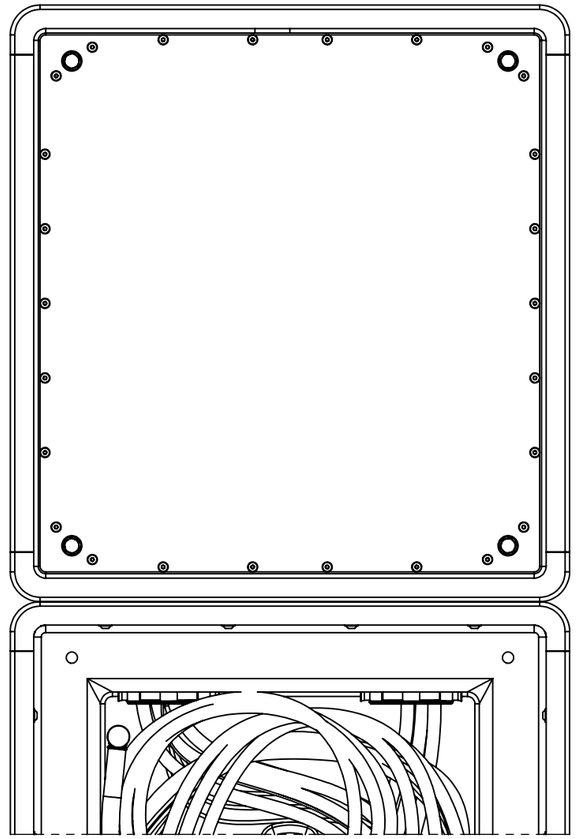
INDUCTEV

SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE	WEIGHT: N/A	SHEET 6 OF 8

1. REMOVE 4X (3) SPACER CLAMPS
2. LOWER (1) GA COIL FULLY INTO SOCKET
3. REMOVE 4X (2) EYEBOLTS
4. FASTEN GA COIL USING 4X (17) AND 4X (18)
    1. TOOL: 19MM SOCKET
    2. LOCTITE: (19) #243
    3. TORQUE: 50.0 Nm [36.9 FT-LB]



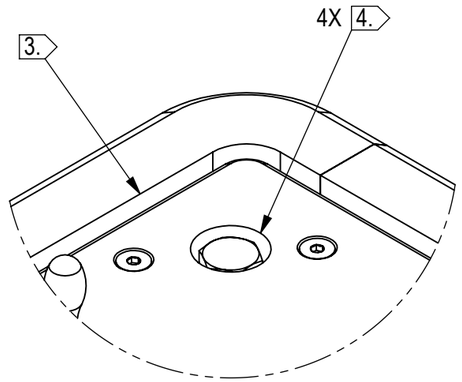


INDUCTEV

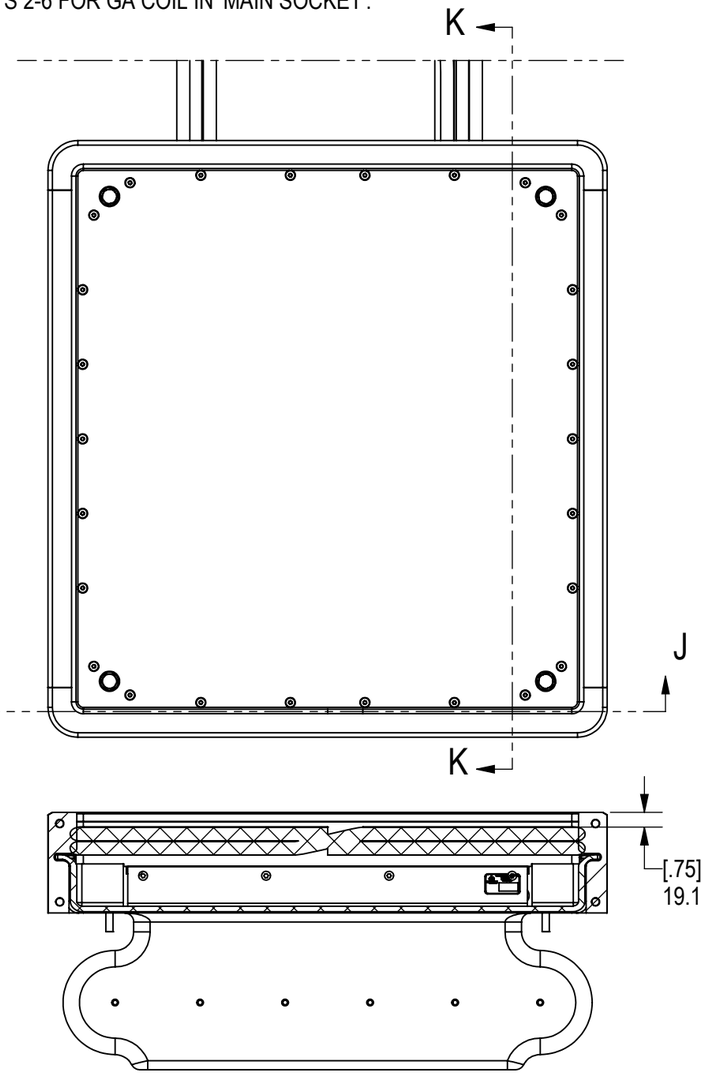
SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE	WEIGHT: N/A	SHEET 7 OF 8

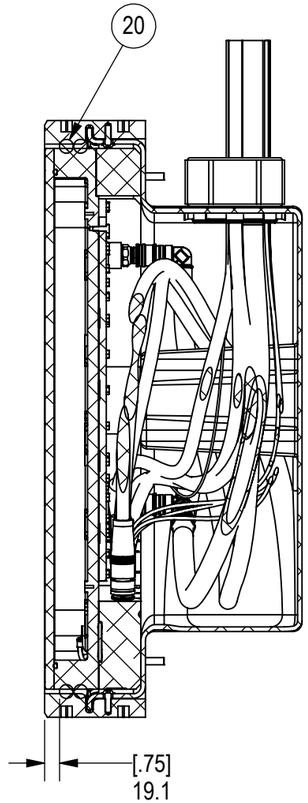
1. STUFF (20) 1/2" POLYETHYLENE FOAM CORD AROUND PERIMETER, BEGINNING ON JUNCTION BOX SIDE OF COIL, USING THE RADIUSED PLASTIC SPATULAS AND CONICAL CUSTOM TOOLS FOR CORNERS (SET OF 6 TOOLS INCLUDED)
   1. MAKE TWO ROUNDS, ONE ABOVE THE OTHER
   2. FOAM CORD SHOULD BE STUFFED DOWN SUCH THAT TOP LAYER IS NO MORE THAN 19MM [3/4"] BELOW SURFACE
   3. IF SPACE ON ANY ONE SIDE MAKES THESE STEPS IMPOSSIBLE, (21) 3/8" POLYETHYLENE FOAM CORD MAY BE SUBSTITUTED AT THAT LOCATION.
   4. IF ADDITIONAL BREAKS IN FOAM CORD ARE NEEDED, OVERLAP THE CORD AND USE (22) LOCTITE PL MARINE FAST CURE ADHESIVE SEALANT AT THE OVERLAP.
2. BEFORE CAULKING, MASK SOCKET FRAME EDGES WITH (24) MASKING TAPE AND MASK COIL EDGES WITH (25) STUCCO TAPE.
3. COVER FOAM CORD WITH BEAD OF (22) LOCTITE PL MARINE FAST CURE ADHESIVE SEALANT, AROUND PERIMETER OF COIL.
4. FILL BOLT HEAD CAVITIES WITH (22) LOCTITE PL MARINE FAST CURE ADHESIVE SEALANT. COVER 24 HOURS FOR CURE.
5. REPEAT SHEETS 2-6 FOR GA COIL IN 'MAIN SOCKET'.



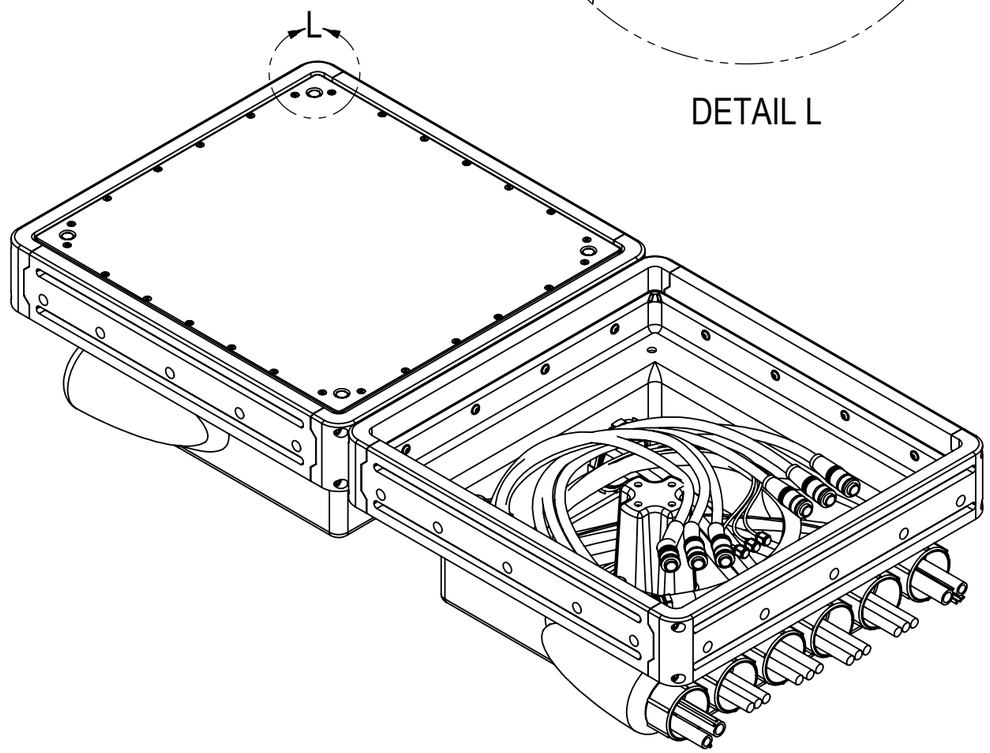
DETAIL L



SECTION J-J



SECTION K-K



INDUCTEV

SIZE	DWG NO	REV
B	A-01427	A

SCALE: NONE	WEIGHT: N/A	SHEET 8 OF 8

Fiber Optic Extension Cables

Industrial Extension Cables

OSENSA offers three standard fiber optic extension cables, each with a different core diameter to match with the corresponding temperature probe style. The EXT-100 style extension cable is an all polymer optical fiber that is extremely durable. The EXT-400 and EXT-200 style extension cables are glass optical fiber, and may be more easily damaged if not handled with care. Custom cables available upon request.

EXT-100-10M-ST-ST

EXT-200-10M-ST-ST

EXT-400-10M-ST-ST

Product Specifications

Model #	Core/Jacket	Probe Style	Max Length	Temp Rating	Jacket	Bend Radius
EXT-100	1000um 2.3mm	PRB-100 PRB-PF1 PRB-GB3	20m	-55 to +85°C	Nylon	15 mm
EXT-400	400um 2.3mm	PRB-400 PRB-G40	50m	0 to +70°C	PVC	25 mm
EXT-200	200um 2.3mm	PRB-G20	50m	0 to +70°C	PVC	25 mm

How to Order

EXT-400-02M-STM-STM

1st and 2nd Connector Style:
ST – Standard ST
STM – Non-Magnetic ST

Cable Length:
02M – 2 meters (min)
50M – 50 meters (max)

Cable Style:
100 – for PRB-100, PRB-PF1 or PRB-GB3 Probes
400 – for PRB-G40 Probes
200 – for PRB-G20 Probes

TECHNICAL SUPPORT

OSENSA Innovations offers on-site support, commissioning, and training for all of its products. For immediate assistance with any technical issue, please contact support@osensa.com or call 1-888-732-0016.

WARRANTY INFORMATION

OSENSA Innovations stands behind its products and services. All fiber optic temperature probes and signal conditioners ship with a full one year repair or replacement warranty. You may also purchase an extended five year warranty. Some conditions apply.

CUSTOM OEM SOLUTIONS

OSENSA offers cost-effective design and consulting services at discounted rates for high-volume OEM customers. Let the engineering team at OSENSA Innovations help you rapidly develop custom probes for your research application. OSENSA's team has many years of experience designing fiber optic temperature probes for various laboratory environments.

FURTHER INFORMATION

For more information on any of our products or services please visit our website: www.osensa.com or email: info@osensa.com.

Certified System
SAI GLOBAL
ISO 9001
Quality

DMK-0011A-4 ECO 0354

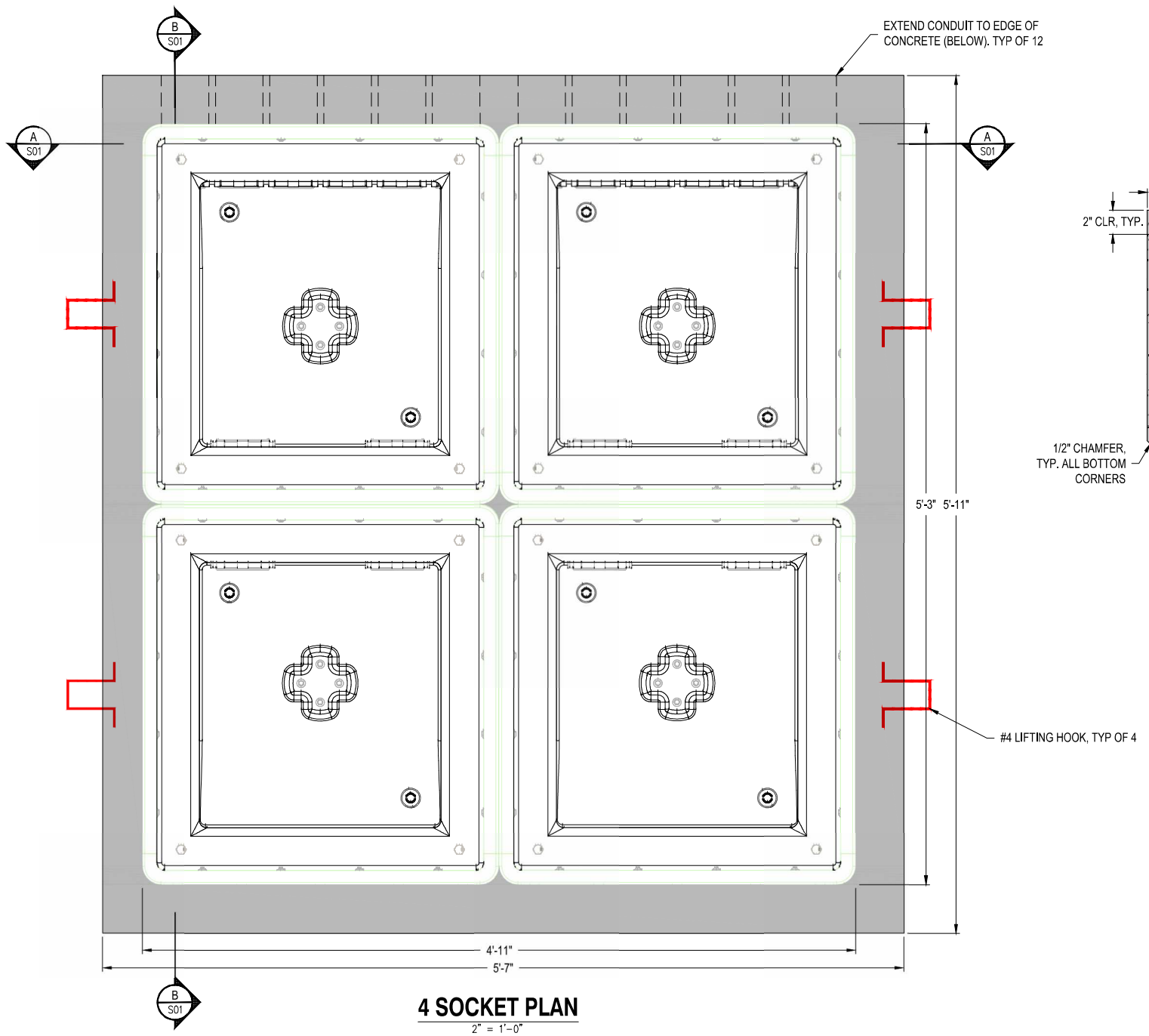
February 2019

OSENSA Innovations Corp.
8672 Commerce Court
Burnaby, BC, Canada, V5A 4N7

Toll Free: 1-888-732-0016
International: 1-604-259-7177
Email: info@osensa.com

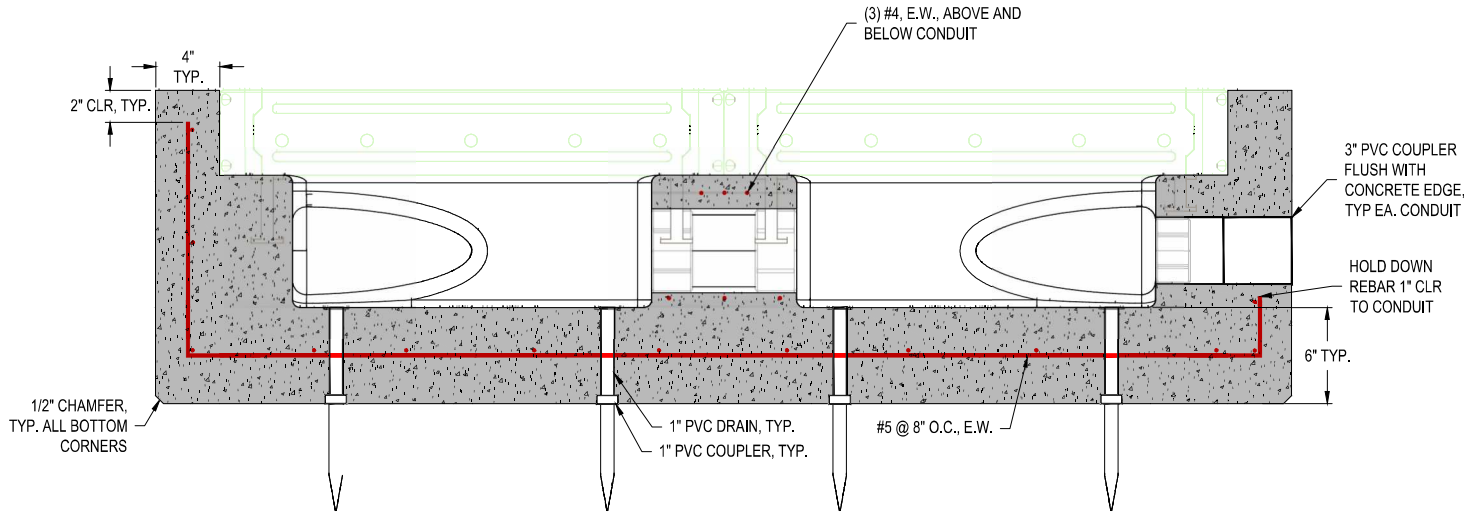
www.osensa.com

ATTACHMENT 3: 4 SOCKET PLAN, SECTIONS, AND DETAILS



4 SOCKET PLAN

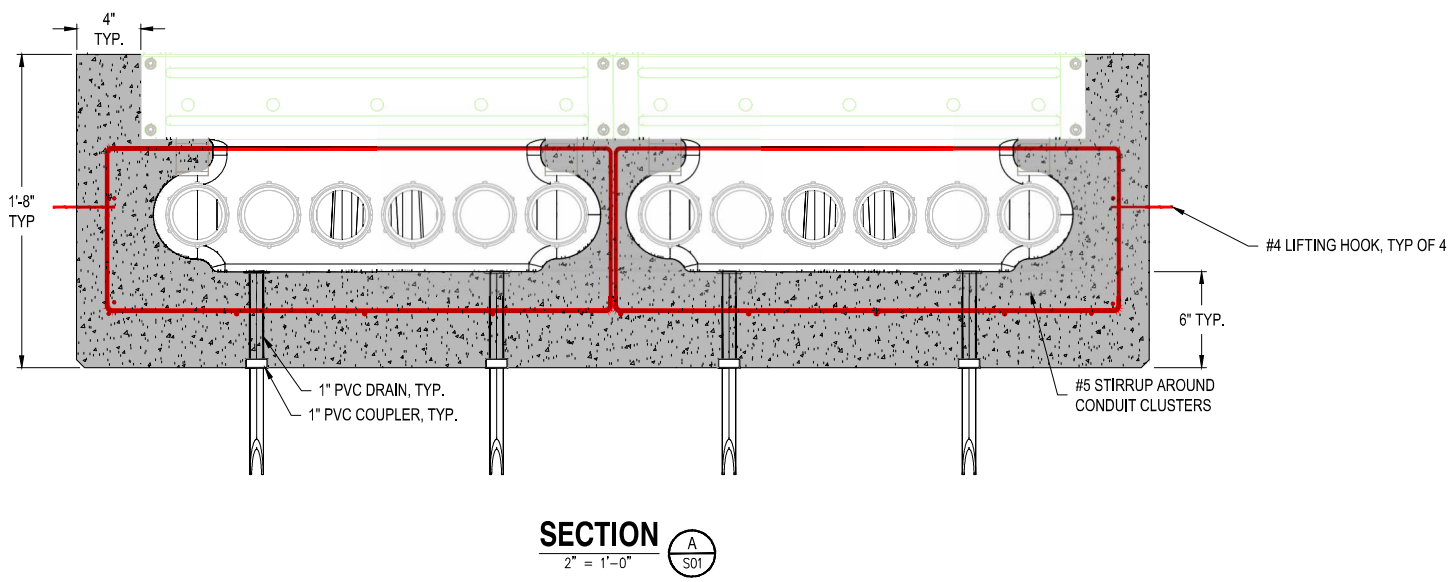
2" = 1'-0"



SECTION

2" = 1'-0"

B
S01



SECTION

2" = 1'-0"

A
S01

SPECIFICATIONS

CONCRETE SPECIFICATIONS:

STRENGTH: 28-DAY COMPRESSIVE STRENGTH:	4,500 PSI
SLUMP:	WITHOUT PLASTICIZERS: 4" WITH PLASTICIZERS: MAXIMUM 9" OR AS DESIRED FOR PLACEMENT USE WATER REDUCERS AS REQUIRED TO ACHIEVE SLUMP
W/C:	0.40
MINIMUM AGGREGATE SIZE:	3/4" (AASHTO GRADING NO. 67)
ENTRAINED AIR RATIO:	3.5% - 6.5%

REINFORCING STEEL BARS SPECIFICATIONS:

GRADE:	ASTM A706, GRADE 60

FIBROUS REINFORCEMENT:

CONCRETE FIBROUS REINFORCEMENT:	SIKA FIBERMESH-150 OR EQUAL
SPECIFIC GRAVITY;	0.91
FIBER LENGTH:	MULTI-DESIGN GRADATION
DOSAGE:	0.75 LB/CY MIN

INSTALLATION: ADD FIBROUS CONCRETE REINFORCEMENT TO CONCRETE MATERIALS AT TIME CONCRETE IS BATCHED IN AMOUNTS IN ACCORD WITH APPROVED SUBMITTALS.
MIX CONCRETE IN STRICT ACCORD WITH FIBER REINFORCEMENT MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS FOR UNIFORM AND COMPLETE DISTRIBUTION.

RH2

PRECAST - 4 SOCKET PLAN, SECTIONS, AND DETAILS

JOB NO.: 20-0052
CLIENT: MD
FILENAME: MDC-D-S01.DWG
SAVE DATE: Dec 21, 2020
PLOT DATE: Dec 21, 2020
ENGINEER: DMD
REVIEWED: JMC

REVISIONS

NO.	DATE	DESCRIPTION	BY	REVIEW

SCALE: SHOWN

0" 1" 2"

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

DWG NO.: S01
SHEET NO.: 1 1

ATTACHMENT 4: RAVENVOLT DOCUMENTATION

PROJECT NUMBER: 001322E

LOW VOLTAGE SWITCHBOARD
STATE ROUTE 20/49, GRASS VALLEY CA 95945

SUBMITTAL DRAWINGS PACKAGE

ravenvolt
An ABM Company

April 2024.

Table of Contents

1. Drawings Submittal Set

1.1. Low Voltage Switchboard MSB-1

1.1.1. One-Line Diagram

1.1.2. Elementaries Drawings

1.1.3. Mechanical Drawings

1.1.1. One-Line Diagram

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A | B | C | D | E | F

1 2 3 4 5 6

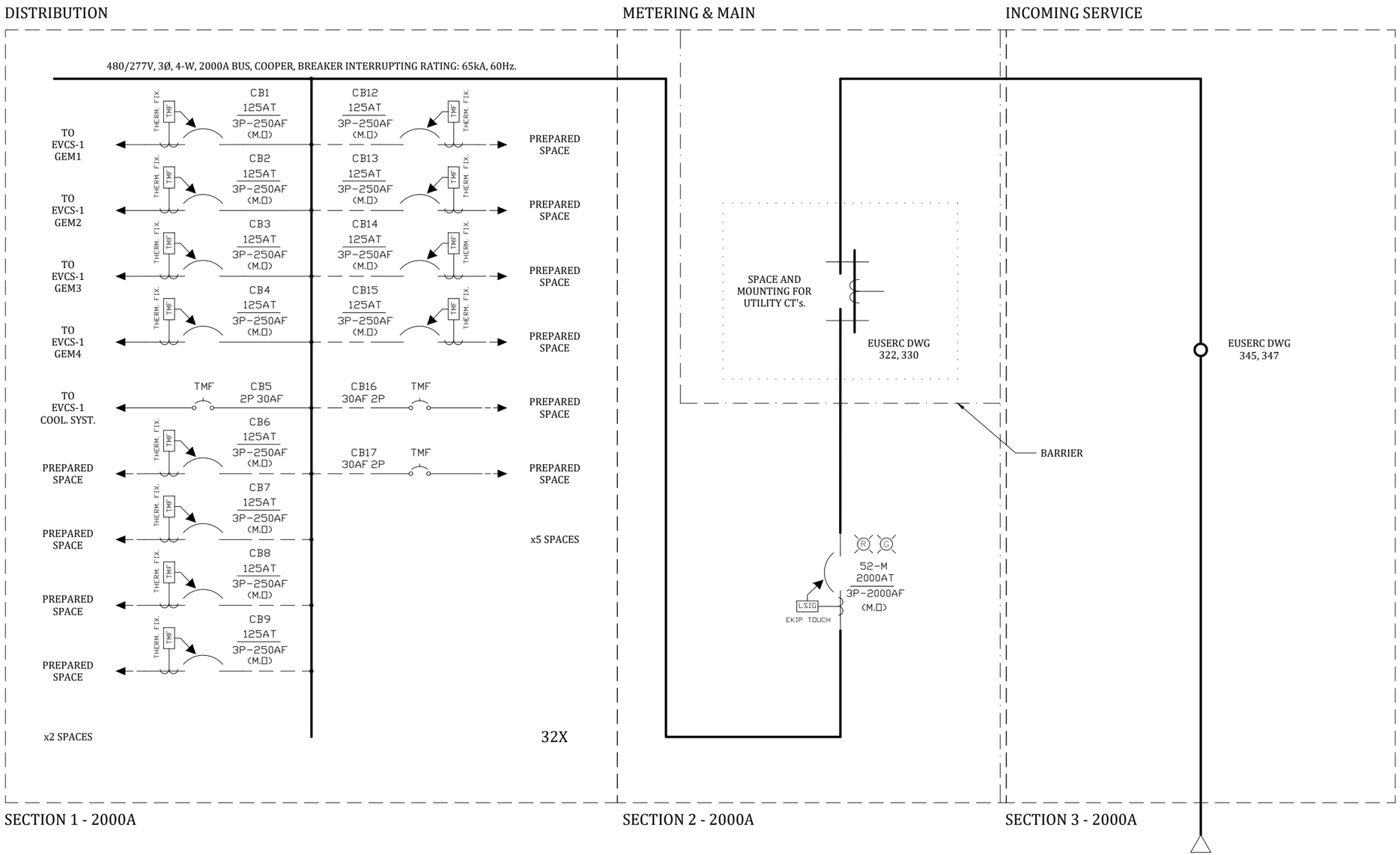
INDEX
ONE LINE DIAGRAM

DRAWING NUMBER	DRAWING NAME
O001322-01-01	INDEX ONE LINE DIAGRAM
O001322-01-02	LOW VOLTAGE SWITCHBOARD MSB-1 _ ONE LINE DIAGRAM

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	One Line Diagram
ENGR:	JPR	ravenvolt An ABM Company	
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# O001322-01-01	PG 01 OF 02 REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

LOW VOLTAGE SWITCHBOARD MSB-1
ONE LINE DIAGRAM



NOTES:
1. THE SWITCHBOARD WILL BE MANUFACTURED IN ACCORDANCE WITH THE EUSERC STANDARDS AND SPECIFICATIONS.
2. GROUND BUS PER UL891.
3. MAIN CIRCUIT BREAKER USE A "RELT" FUNCTION FOR ARMS.
4. THE DISTRIBUTION SECTION WILL BE FURNISHED WHIT BUS STACK CONFIGURATION.
5. THE AVAILABLE SPACES ARE 3X OF MOUNTING POSITIONS.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
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DRAWN BY:	ATG	DRAWING TYPE:	One Line Diagram
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# O001322-01-02	PG 02 OF 02 | REV

1.1.2. Elementaries Drawings

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A | B | C | D | E | F

1 2 3 4 5 6

INDEX
ELEMENTARIES DRAWINGS

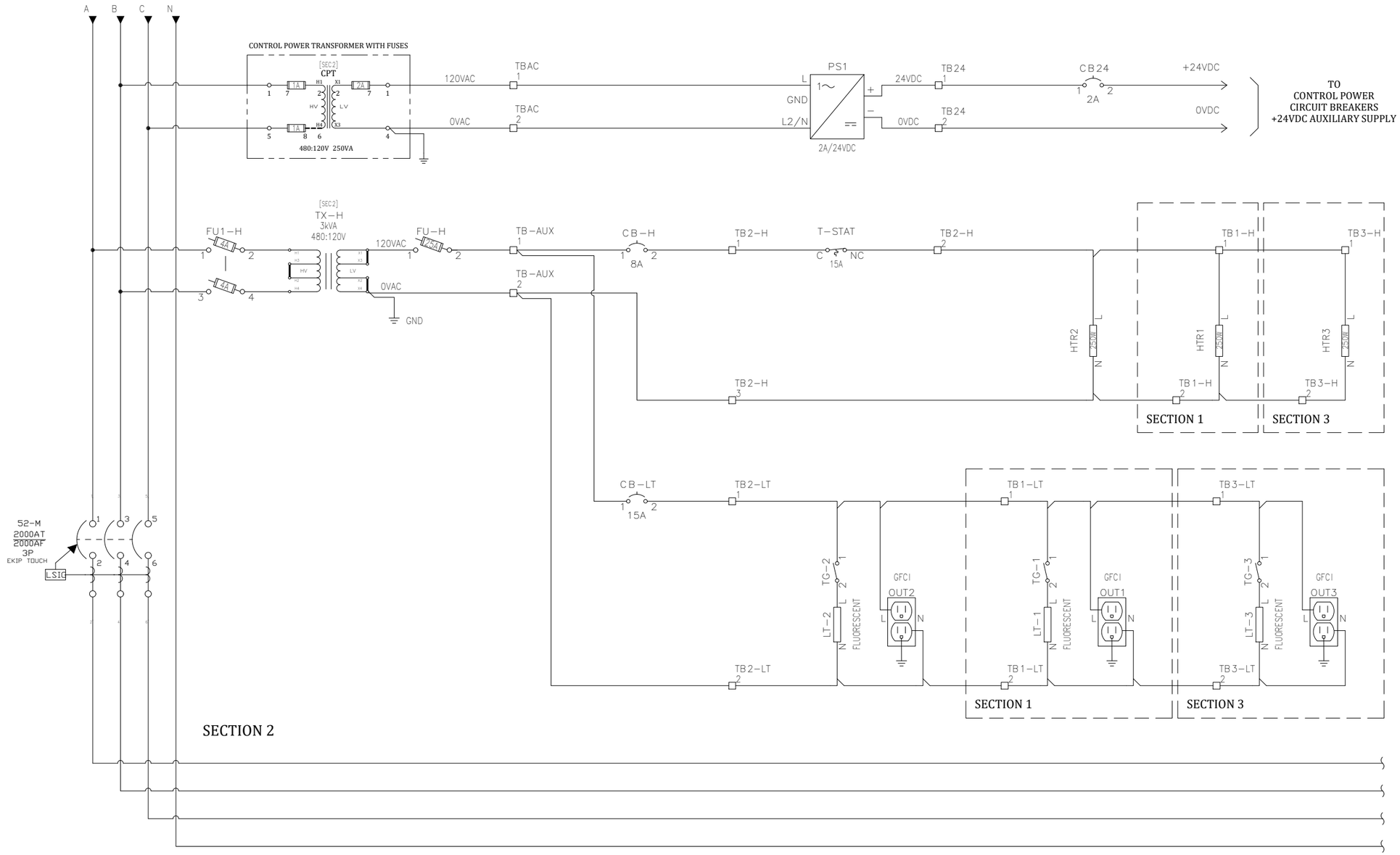
DRAWING NUMBER	DRAWING NAME
C001322-01-01	INDEX ELEMENTARIES DRAWINGS
C001322-01-02	LOW VOLTAGE SWITCHBOARD MSB-1 _ HEATER WITH THERMOSTAT POWER

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Elementaries Drawings
ENGR:	JPR	ravenvolt An ABM Company	
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# C001322-01-01	PG 01 OF 02 | REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

LOW VOLTAGE SWITCHBOARD MSB-1
HEATER WITH THERMOSTAT POWER

FROM PAD MOUNTED PG&E TRANSFORMER
480/277V, 3Ø, 4-W.



NOTES:
1. WATTAGE FOR HEATERS 250W@120V.
2. NO MORE THAN THREE HEATERS TO BE CONNECTED IN THE CIRCUIT.
3. THE GFCI OUTLETS WILL BE DUPLEX WITH WEATHERPROOF COVER.
4. 600W MAX. CONNECTED LOAD ON THE OUTLETS SIMULTANEOUSLY, UP TO 1.8 kW CONNECTED LOAD WHEN USING A SINGLE OUTLET.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Elementaries Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# C001322-01-02	PG 02 OF 02 | REV

1.1.3. Mechanical Drawings

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A | B | C | D | E | F

1

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3

4

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INDEX
MECHANICAL DRAWINGS

DRAWING NUMBER	DRAWING NAME
M001322-01-01	INDEX - MECHANICAL DRAWINGS
M001322-01-02	LOW VOLTAGE SWITCHBOARD MSB-1_ GENERAL INFORMATION
M001322-01-03	ISOMETRIC FRONT VIEW - NEMA 3R ENCLOSURE
M001322-01-04	ELEVATION & SIDE VIEW - EQUIPMENTS ENCLOSURE
M001322-01-05	TOP VIEW & FLOOR PLAN
M001322-01-06	CONDUITS AREA - FLOOR PLAN
M001322-01-07	BREAKER SCHEDULE
M001322-01-08	UL NAMEPLATES

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-01	PG 01 OF 08 | REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A | B | C | D | E | F

1

LOW VOLTAGE SWITCHBOARD MSB-1
GENERAL INFORMATION

2

PRODUCT DESCRIPTION AND RATINGS
Quantity: 1
Alignment: Front and Rear (optional) Access / Front and Rear Align
Service: 480/277VAC, 3-Phase, 4-Wire, 60Hz
Breaker Interrupt Rating: 65kA

BUS SPECIFICATIONS
Bus Amps: 2000
Neutral Amps: 2000
Bus Material: Copper
Ground Bus Material: Copper Ground Bus Isolated To Frame, Solidly Grounded
System Short Circuit Current Rating: 65kA

3

INCOMING INFORMATION
Incoming Entry: Bottom
Incoming Qty & Size: Bus Bar Termination, Mechanical Lugs, (Up to 8) # 500-750 kcmil per phase.
Incoming Location: Right

STRUCTURE SPECIFICATIONS
Enclosure Type: NEMA Type 3R Free Standing
Exterior Paint Color: ANSI 61

4

ENCLOSURE PROPERTIES
Section #1 Distribution Mounted Feeders / Bus Section (2000A Max.)
Section #2 Main Breaker & Metering / Bus Section (2000A Max.)
Section #3 Incoming Service / Bus Section (2000A Max.)

MECHANICAL CHARACTERISTICS
Estimated Section 1 Weight: 1058 lb
Estimated Section 2 Weight: 971 lb
Estimated Section 3 Weight: 800 lb
Estimated Complete Lineup Weight: 2829 lb

5

Estimated Shipping Weight: 3129 lb

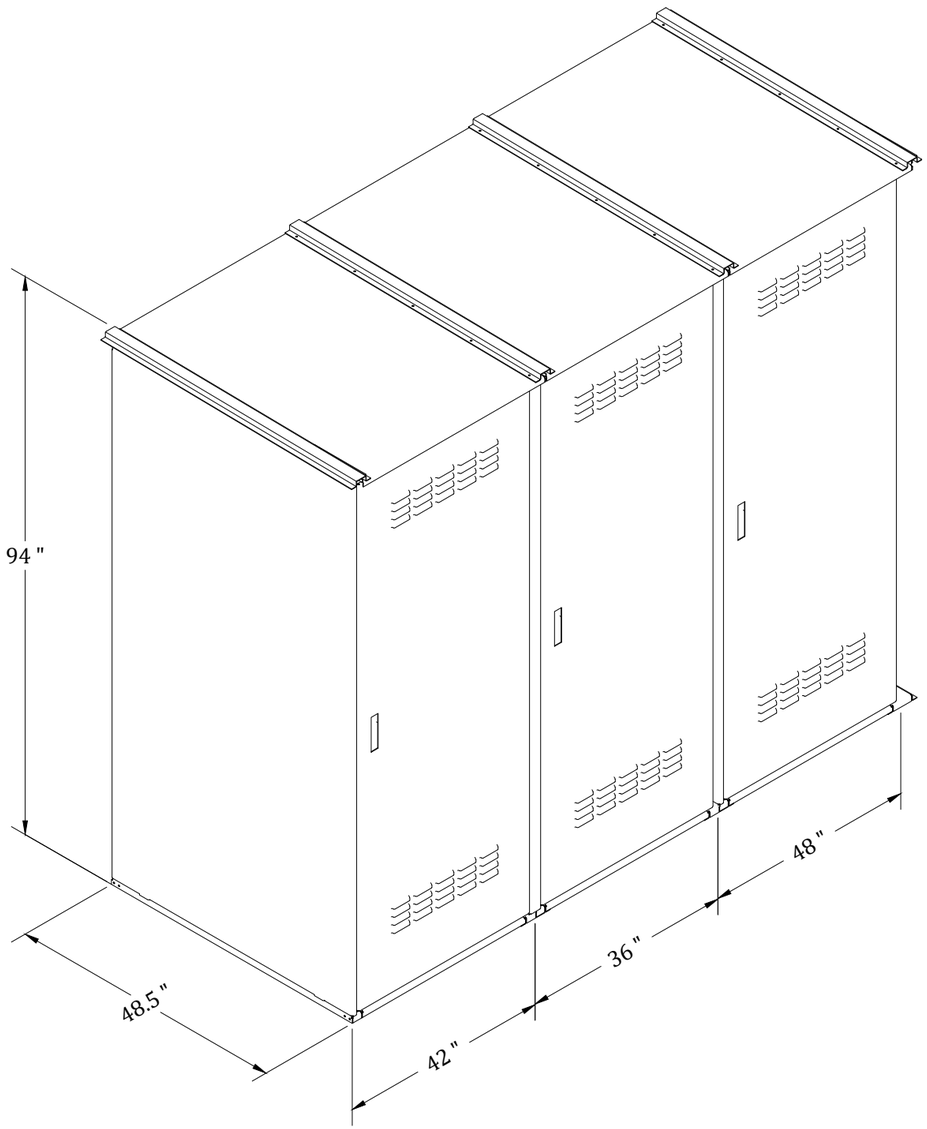
PROJECT EVCS. GRASS VALLEY				
CODE:	CA	PT COMPT.		DRAWING.
UTILITY PER EUSERC PG.				322, 330
METER PER EUSERC PG.				333, 326, 354
UGPS PER PG.				345
LUG LANDING PER				347

6

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-02	PG 02 OF 08 REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

LOW VOLTAGE SWITCHBOARD MSB-1
NEMA 3R ENCLOSURE



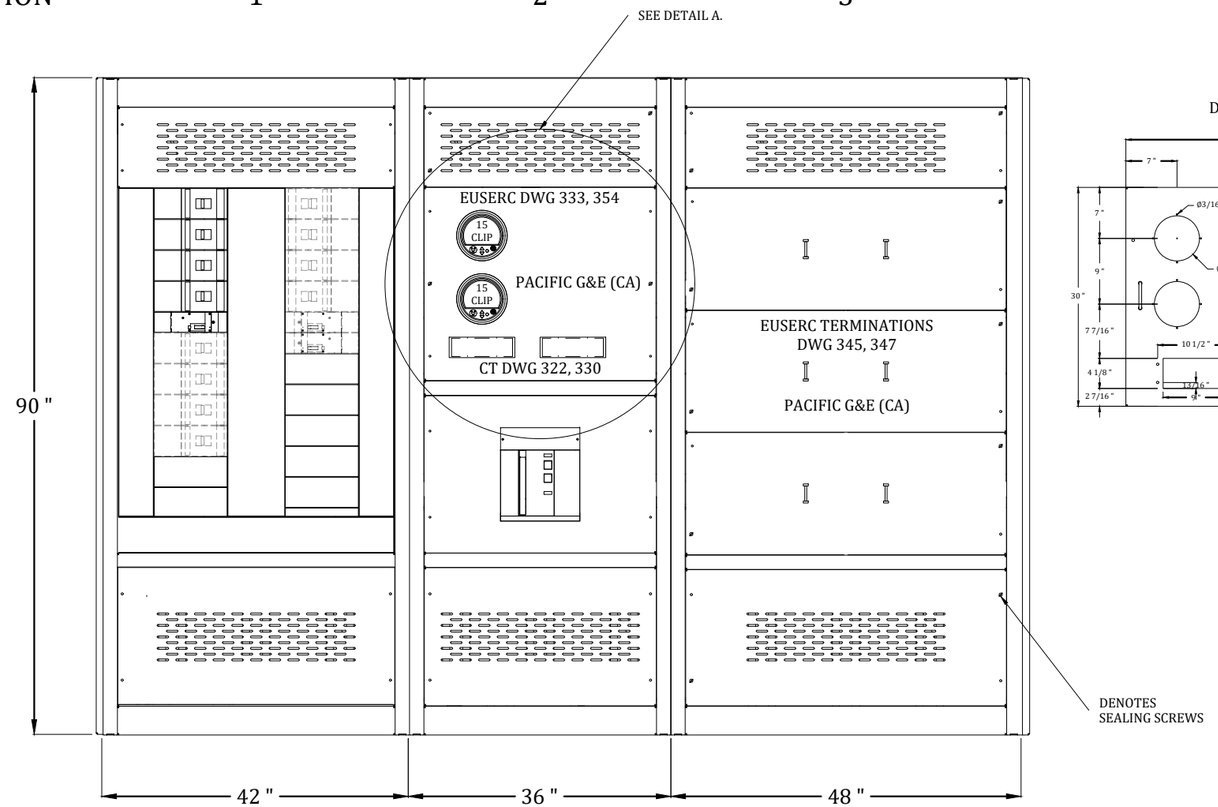
NOTES: ALL DIMENSIONS ARE IN INCHES.
THE DIMENSIONS ON THIS PAGE ARE FOR THE NEMA 3R ENCLOSURE.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-03	PG 03 OF 08 REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

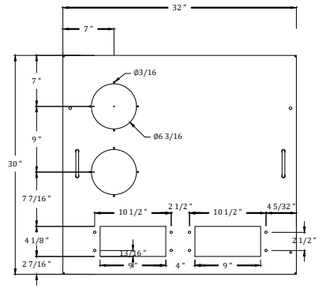
LOW VOLTAGE SWITCHBOARD MSB-1
EQUIPMENTS ENCLOSURE

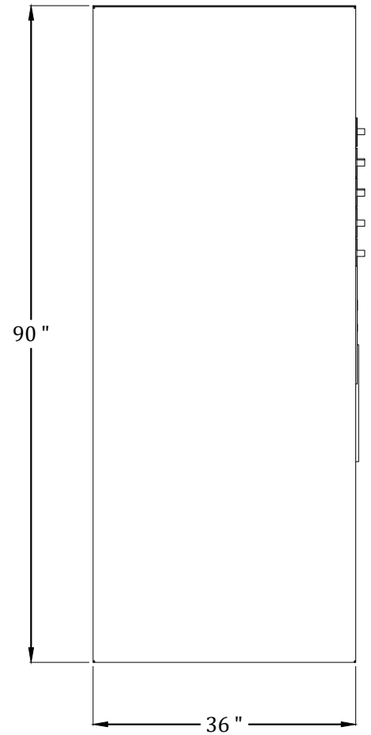
SECTION 1 2 3



ELEVATION VIEW

DETAIL A





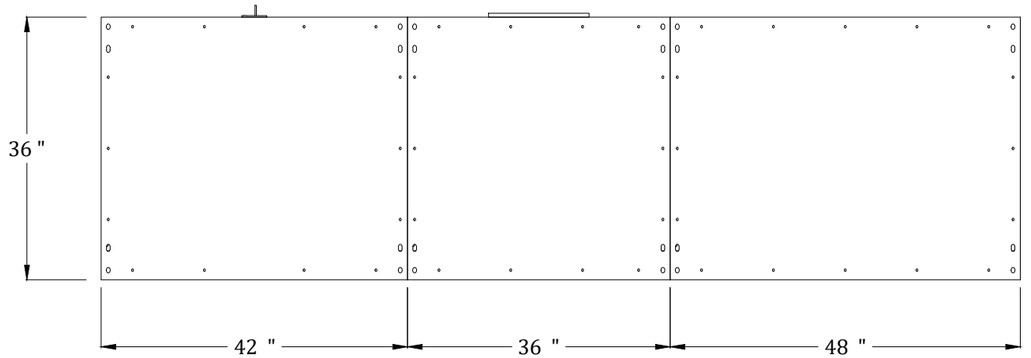
SIDE VIEW

NOTES: ALL DIMENSIONS ARE IN INCHES.
THE DIMENSIONS ON THIS PAGE ARE FOR THE INDOOR PANELS WITHOUT THE NEMA 3R ENCLOSURE.
THE MAIN BREAKER INCLUDED A LOCKING PROVISION FOR 8MM PADLOCK SHAFT.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR	ravenvolt An ABM Company	
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-04	PG 04 OF 08 REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

LOW VOLTAGE SWITCHBOARD MSB-1
TOP VIEW & FLOOR PLAN



TOP VIEW - REAR

FLOOR PLAN - REAR

NOTES: ALL DIMENSIONS ARE IN INCHES.
THE DIMENSIONS ON THIS PAGE ARE FOR THE INDOOR PANELS WITHOUT THE NEMA 3R ENCLOSURE.

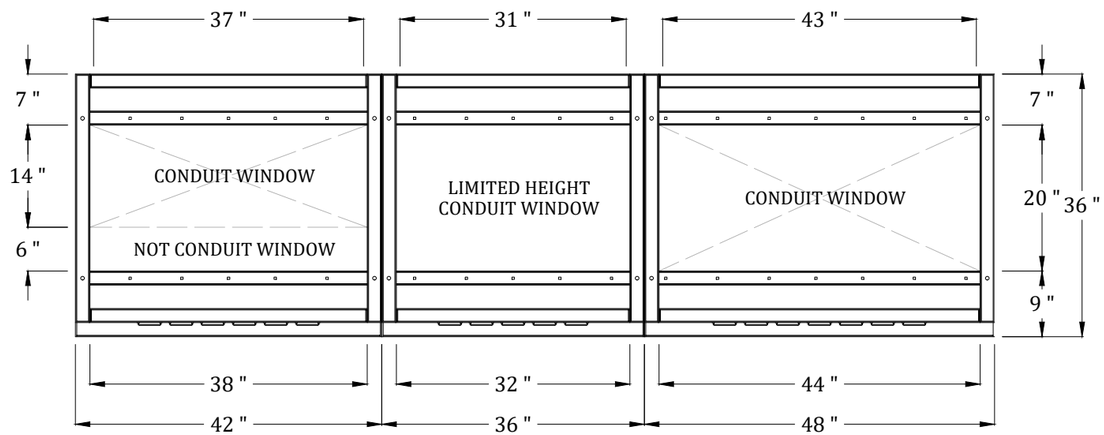
JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-05	PG 05 OF 08 REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A | B | C | D | E | F

1

LOW VOLTAGE SWITCHBOARD MSB-1
CONDUITS AREA - FLOOR PLAN



FLOOR PLAN - FRONT

2

3

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NOTES:

1. ALL DIMENSIONS ARE IN INCHES.
2. SWITCHBOARD ENCLOSURE IS NEMA 3R WITH AN OPEN BOTTOM, NO PLATES AVAILABLE.
3. FRONT CONDUIT WINDOWS HAVE LIMITED HEIGHT DUE TO BREAKERS ABOVE.
4. THE DIMENSIONS ON THIS PAGE ARE FOR THE INDOOR PANELS WITHOUT THE NEMA 3R ENCLOSURE.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-06	PG 06 OF 08 | REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

LOW VOLTAGE SWITCHBOARD MSB-1
BREAKER SCHEDULE

Switchboard Section	Circuit No.	Breaker Designation	Breaker Type	Breaker Rating	Trip Unit	Frame Current	Rated Current	Short Circuit Current Rating	Load Side Terminals	Accessories	Breaker Part Number
2C1	52-M	Main Breaker	E2.2H-A / F	100%	Ekip Touch LSIG (RELT)	2000 A	2000 A	65.000 A	Busbar Termination	(4) Aux., (1) Bell AL, Supply Mod. 24V, Sig. 2k-3, PB Cover, 8mm Padlock.	Z2HFUKJF30LA000005XX
3B1	1	EVCS-1 GEM1	XT4H / F	100%	Thermomagnetic Fixed	250 A	125 A	65.000 A	Mechanical CuAl (1) - 4 AWG - 300 kcmil	Padlock OP/CL Position	XT4HQ3125AYJ00GXXX
3B1	2	EVCS-1 GEM2	XT4H / F	100%	Thermomagnetic Fixed	250 A	125 A	65.000 A	Mechanical CuAl (1) - 4 AWG - 300 kcmil	Padlock OP/CL Position	XT4HQ3125AYJ00GXXX
3B1	3	EVCS-1 GEM3	XT4H / F	100%	Thermomagnetic Fixed	250 A	125 A	65.000 A	Mechanical CuAl (1) - 4 AWG - 300 kcmil	Padlock OP/CL Position	XT4HQ3125AYJ00GXXX
3B1	4	EVCS-1 GEM4	XT4H / F	100%	Thermomagnetic Fixed	250 A	125 A	65.000 A	Mechanical CuAl (1) - 4 AWG - 300 kcmil	Padlock OP/CL Position	XT4HQ3125AYJ00GXXX
3B1	5	EVCS-1 COOL. SYST.	FBN-100	80%	Thermomagnetic Fixed	30 A	-	65.000 A	Wire Range (CuAl) (1) - 10 AWG - 4 AWG	Padlock Kit	NEFBN26TE030R2AB

NOTES:

1. MAIN CIRCUIT BREAKER USE A "RELT" FUNCTION FOR ARMS.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-07	PG 07 OF 08 | REV

REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE	REV	DESCRIPTION	BY	DATE
							DATE2				

A B C D E F

1

2

3

LOW VOLTAGE SWITCHBOARD MSB-1
UL NAMEPLATES

Powergen Controls
7322 Almeda Genoa Rd
Houston, TX 77075
info@powergencontrols.com

Serial No. 001322E-01-01 | Manufactured Date: XX/XX/XXXX | Through Bus 2000 Amps

VOLTAGE	PHASE	WIRE	FREQUENCY	SECTION RATING
480/277Vac	3Ø	4-W	60 Hz	2000 Amps

Maximum short circuit current rating R.M.S. Through Bus 65.000 A.I.C.

Note: The short circuit rating of the switchboard is equal to the lowest interrupting rating of any installed circuit breaker, but not more than 65.000 R.M.S. symmetrical amperes at 480 Volts, 3-Phase.

Maximum continuous loads not to exceed 80 percent of the overcurrent protective device rating (Circuit Breaker), except for those circuits employing circuit breakers marked as suitable for continuous operation at 100 percent of their rating.

UL 891 - DeadFront Switchboard File Number E490036

FOR SECTIONS 1, 2 & 3

4

5

6

NOTES:

1. NAMEPLATES ARE SUPPLIED WITH ADHESIVE SURFACE FOR FIXING PURPOSE.

JOB NAME:	EV Bus Charging Station	EQUIPMENT DESIGNATION:	Low Voltage Switchboard
JOB LOCATION:	State Route 20/49, Grass Valley, CA 95945	EQUIPMENT TYPE:	480 VAC Distribution Switchboard
DRAWN BY:	ATG	DRAWING TYPE:	Mechanical Drawings
ENGR:	JPR		ravenvolt An ABM Company
DATE:	02/02/2024		
DRAWING STATUS:	Submittal Drawings	DWG# M001322-01-08	PG 08 OF 08 | REV

2. Manufacturer Technical Specs

2.1. Low Voltage Switchboard MSB-1

2.1.1. ABB

2.1.2. EUSERC

2.1.1. ABB

Product data sheet

Emax power circuit-breakers

Emax E2.2

Common data	
UL 1066	
Rated voltage	600 V AC
Rated maximum voltage	635 V AC
Test voltage (1 min. 50/60 Hz)	2.2 kV
Frequency	50 - 60 Hz
Number of poles	3 - 4
Version	Fixed (F) - Drawout (W)

Type of circuit-breaker			Emax E2.2				
Level of performance			**B-A**	**N-A**	**S-A**	**H-A**	**V-A**
Frame size		[A]	1600	1600	800	800	250
		[A]	•	2000	1200	1200	400
		[A]	•	•	1600	1600	800
		[A]	•	•	2000	2000	1200
		[A]	•	•	•	•	1600
		[A]	•	•	•	•	2000
Capacity of neutral pole for 4 pole circuit-breakers		[% Iu]	100	100	100	100	100
Rated short circuit current at max. voltage	**254 V**	[kA]	42	50	65	85	100
	508 V	[kA]	42	50	65	85	100
	635 V	[kA]	42	50	65	85	85
Rated short time current (1s)		[kA]	42	50	65	85	85
Trip units							
Ekip Dip			•	•	•	•	•
Ekip Touch			•	•	•	•	•
Ekip HI-Touch			•	•	•	•	•
Ekip G Touch			•	•	•	•	•
Ekip G HI-Touch			•	•	•	•	•
Trip times							
Break time with fault current < rated short time current		[ms]	40	40	40	40	40
Break time with fault current > rated short time current		[ms]	25	25	25	25	25
Mechanical and electrical life with regular ordinary maintenance							
Mechanical life		[No. Cycles x 1000]	25				
Operation frequency		[Cycles / hour]	60				
Electrical life (at max. voltage)		[No. Cycles x 1000]	15 (less than 1600A) ; 10 (1600A) ; 8 (2000A)				
Operation frequency		[Cycles / hour]	30				
Weights (circuit breaker complete with trip unit, Horz. rear terminals, CS. Excluding accessories)							
Fixed (3p/4p)		[kg]	52/67				
		[lbs]	115/148				
Draw out (3p/4p)		[kg]	58/68 (up to 1600A) ; 61/108 (2000A)				
		[lbs]	128/150 (up to 1600A) ; 135/239 (2000A)				

Contact us

Canada
ABB Inc.
Low Voltage Products
2117 – 32nd Avenue
Lachine, QC, CANADA H8T 3J1
Tel.: 514-420-3100
Fax: 514-420-3137
Toll Free: 1-800-567-0283

www.abb.ca

1SXP200008D0201 / September 2015

Power and productivity
for a better world™

Qty	Description	Catalog No
1	**E2.2H-A 2000 EKIP TOUCH LSIG 3P FHR (1SDX248929R1)**	**Z2HFUKJF30LA000005XX**
1	E2.2H-A 2000 EKIP TOUCH LSIG 3P FHR (1SDA077273R1)	Z2HFUKBF000A000000XX
1	KIT VR SUP E2.2 F 3PCS UL INST (1SDA079852R1)	1SDA079852R1
1	KIT VR INF E2.2 F 3PCS UL INST (1SDA079854R1)	1SDA079854R1
1	S51 250V E2.2...E6.2 (1SDA073778R1)	ZEBBA
1	PBC D=8mm E2.2...E6.2 (1SDA073861R1)	ZEBPBC8
1	Ekip Supply 24-48VDC (1SDA074173R1)	ZEAPWRSD
1	Ekip 2K-3 E1.2...E6.2 (1SDA074169R1)	ZEB2K3

DATA SHEET

SACE® Tmax® XT Molded Case Circuit Breakers

XT4 – 250A Frame Size

250 A frame available up to 600 V UL. Thermal-magnetic, MCS, MCP basic and advanced trip units. Max interrupt rating of 200 kA at 480 V, 100 kA at 600 V. Advanced electronic trip offer embedded Bluetooth® communication, allowing interaction without direct contact.

Molded Case Circuit Breaker (MCCB)			**XT4**					
Frame Size		[A]	250					
Poles		[No.]	2 (for N fixed version only), 3, 4					
Rated Voltage	(AC) 50-60 Hz	[V]	600					
	(DC)	[V]	600					
Versions			Fixed, Plug-in, Withdrawable					
Interrupting Ratings			**N**	**S**	**H**	**L**	**V**	**X**
240 VAC		[kA]	65	100	150	200	200	200
480 VAC		[kA]	25	35	65	100	150	200
600Y/347 VAC		[kA]	-	-	-	-	-	-
600 VAC		[kA]	18	22	25	50	65	100
250 VDC 2p in series		[kA]	35	42	50	85	100	100
500 VDC 2p in series		[kA]	-	-	-	-	-	-
500 VDC 3p in series		[kA]	-	-	-	-	-	-
500 VDC 4p in series		[kA]	-	-	-	-	-	-
600 VDC 3p in series		[kA]	35	50	65	75	85	85
Mechanical Life		[No. Operations]	25,000					
		[No. Hourly Operations]	240					
Dimensions - Fixed (W x D x H)	3p	[mm]/[in.]	[105 x 82.5 x 160]/[4.13 x 3.25 x 6.3]					
	4p	[mm]/[in.]	[140 x 82.5 x 160]/[5.51 x 3.25 x 6.3]					
Weight	Fixed 3p/4p	[kg - lb]	[2.5 - 5.51]/[3.5 - 7.72]					
	Plug-in (EF) 3p/4p	[kg - lb]	[4.19 - 9.24]/[5.52 - 12.17]					
	Withdrawable (EF) 3p/4p	[kg - lb]	[5 - 11.02]/[6.76 - 14.9]					

Compliance with standards
SACE® Tmax XT circuit breakers and their accessories are constructed in compliance with[1]:
- Standards:
  - UL489 (MCCB File # E93565, MCS File # E116595, & Accessories File # E116596) and CSA C22.2;
  - HACR Type
- Directives:
  - EC "Low Voltage Directive" (LVD) N° 2014/35/EC;
  - EC "Electromagnetic Compatibility Directive" (EMC) 2014/30/EC;
- Shipping Registers approvals upon request.

Terminal options
Fixed version:
The standard fixed version of the SACE® Tmax XT circuit breakers are supplied with front terminals (F) and can be fitted with the following types of terminals as accessories using special kits:
- Extended front (EF)
- Extended spread front (ES)
- Front for copper/aluminum cables (FCCuAl)
- Front for copper cables (FCCu)
- For flexible busbars (FB)
- Multicable (MC)
- Rear oriented (R)

Plug-in and Withdrawable versions:
Please see the Tmax XT Technical Catalog for more details.

Trip unit options
- Thermal Magnetic Fixed (TMF)
- Thermal Magnetic Adjustable (TMA)
- Ekip Dip (LS/I, LSI, LIG, LSIG)
- Ekip Touch (LSI, LSIG)
- Ekip Touch Measuring (LSI, LSIG)
- Ekip Hi-Touch (LSI, LSIG)
- Ekip M Dip (I)
- Ekip M Touch (LRIU)
- Motor Circuit Protector (MCP)
- Molded Case Switch (MCS)

Accessories
- Terminal Options
- Auxiliary Contacts
- Operating Mechanisms (Direct Handles, Extended Handles, Flange Handles, etc.)
- Remote Control (Shunt Trip, Undervoltage Release, Motor Operator, etc.)
- Safety and Protection (Terminal Covers, Phase Separators, Padlocks, Keylocks, IP Protection, etc.)
- Interlocks
- Residual Current Devices

Included with the breaker
The breaker comes with breaker mounting hardware, terminal hardware, phase barriers, and an insulation backplate.

Temperature rating
The Tmax XT circuit breakers can be used in ambient air temperatures varying between -25°C and +70°C, and can be stored at temperatures between -40°C and +70°C. Please consult the temperature performance derating tables for temperature values outside of +40°C. The reference temperature for the trip units is +40°C. Note that the lug and wire insulation ratings are +75°C, so care should be exercised when operating near this temperature in order not to exceed these ratings.

100% rated
A Fixed XT4 breaker is suitable for continuous operation at 100-percent of rating up to 250A, with 90°C wire. The wire size shall be based on the ampacity of 75°C rated wire. With 75°C wire suitable for continuous operation at 100-percent of rating up to 200A with lugs FC CuAl only.

Current limiting
The XT4H, XT4L, and XT4V breakers have undergone tests per the UL489 Standard and are classified as UL current limiting circuit breakers. They have specific characteristics in terms of limiting peak current and specific let-through energy. This pertains to only TMF and TMA with In = 25-250A and Ekip trip units with In= 40, 60, 100, 150, 225, 250A.

Single phase application
XT4 three pole circuit breakers can be used in single phase applications. For this purpose, they are marked as follows according to UL standard: Suitable for single phase application up to 600VAC.

Reverse feed capabilities
Power can be supplied from the bottom terminals of the XT4 breaker up to a maximum of 600V.

Related links
Installation Instructions

Drawings
- XT4 Fixed 3-4p breaker (2D)
- XT4 Fixed 3p breaker (3D)
- XT4 Fixed 4p breaker (3D)

1. Product complies with listed standards and directives as of the date of this publication

ABB Inc.
305 Gregson Drive
Cary, NC 27511

electrification.us.abb.com

Customer Service
888-862-3290
abbinsidesalessupport@us.abb.com
Monday - Friday, 7am - 5:30pm CST
Tech Support
888-437-3765
Monday - Friday, 7am - 5pm CST

1SXU210258D0201

Qty	Description	Catalog No
1	**XT4H 250 TMF 125-1250 3P F F UL/CSA (1SDX157684R1)**	**XT4HQ3125AYJ00GXXX**
1	XT4H 250 TMF 125-1250 3P F F UL/CSA (1SDA080079R1)	XT4HU3125AFF000XXX
1	NEXT XT4 LSC 3000257979A001 (1SDA114242R1)	1SDA114242R1
1	KIT FCCUAL 4-300AWG XT4 3PC UL/CSA (1SDA075861R1)	KXT4CUAL2-3PC
1	PLL XT2-XT4 PADLOCKS DEVICE OP/CL (1SDA066592R1)	KXTCPLLOPCL
1	XT4 UL 3p TARG.LASER PORT.100% Iu (1SDA076606R1)	1SDA076606R1

Representative Image

Catalog No. FBN26TE030R2

Description: 30A MCCB 2P 600Y347

UPC No 783164335477

Home > Circuit Breakers > Molded Case Circuit Breakers > Record Plus™ Thermal Magnetic Trip

Record Plus½ represents the very latest in molded case circuit breaker design. Utilizing design features such as double-break rotary contact structures and advanced ablative materials to enhance interruption, Record Plus½ is capable of interrupting ratings up to 200kA (FB max is 150kA). High kAIC ratings, selective coordination, reduced arc flash energy, and current limitation embody the core design principles of Record Plus½. FB 100 circuit breakers are supplied with factory installed non-user interchangeable thermal-magnetic trip units and ca n be supplie d with o r wit hout l ugs. FB breakers are available in 1-, 2- and 3-pole versions. Record Plus½ product numbers ending in R or R0 do not include lugs. An R1 suffix indicates that the breaker is supplied with line and load lugs, R2 indicates load lugs, and R3 indicates line lugs. RV suffixed product numbers include load lugs and line connections specifically designed for General Electric type AD panels. All frames use common internal accessories (auxiliary switches, UV releases, shunt trips, and bell alarms) UL listed for field installation. UL listed maximum short circuit ratings at 480VAC are 150kA for the 100A frames and 200kA for the 600A frames. Unless noted otherwise, all circuit breakers and accessories are listed in UL file number E11592. 30A MCCB 2P 600Y347

Descriptors

Category	Record Plus™ Thermal Magnetic Trip
Product Line	Record Plus
GO Schedule	EH

Specifications

Poles	2
Amperage	30 A
System Voltage	240 Vac 480 Vac 600/347 Vac
Frame Type	FB 100
240 Vac Interrupting Rating	150 KAIC
480 Vac Interrupting Rating	65 KAIC
600/347 Vac Interrupting Rating	25 KAIC
Trip Function	LI
Trip Indication Target	No
Suitable for Reverse Feed	Yes
Lugs	FCALK13
Long Time	Fixed
Short Time	No
Instantaneous	Fixed
Ground Fault	No
Zone Selective Interlock	No
Current Metering	No
Communications	No
Protective Relays	No
Special Markings	HACR
Wire Range (Cu/Al)	10-4 AWG
GSA Compliance	No

by ABB

Classifications

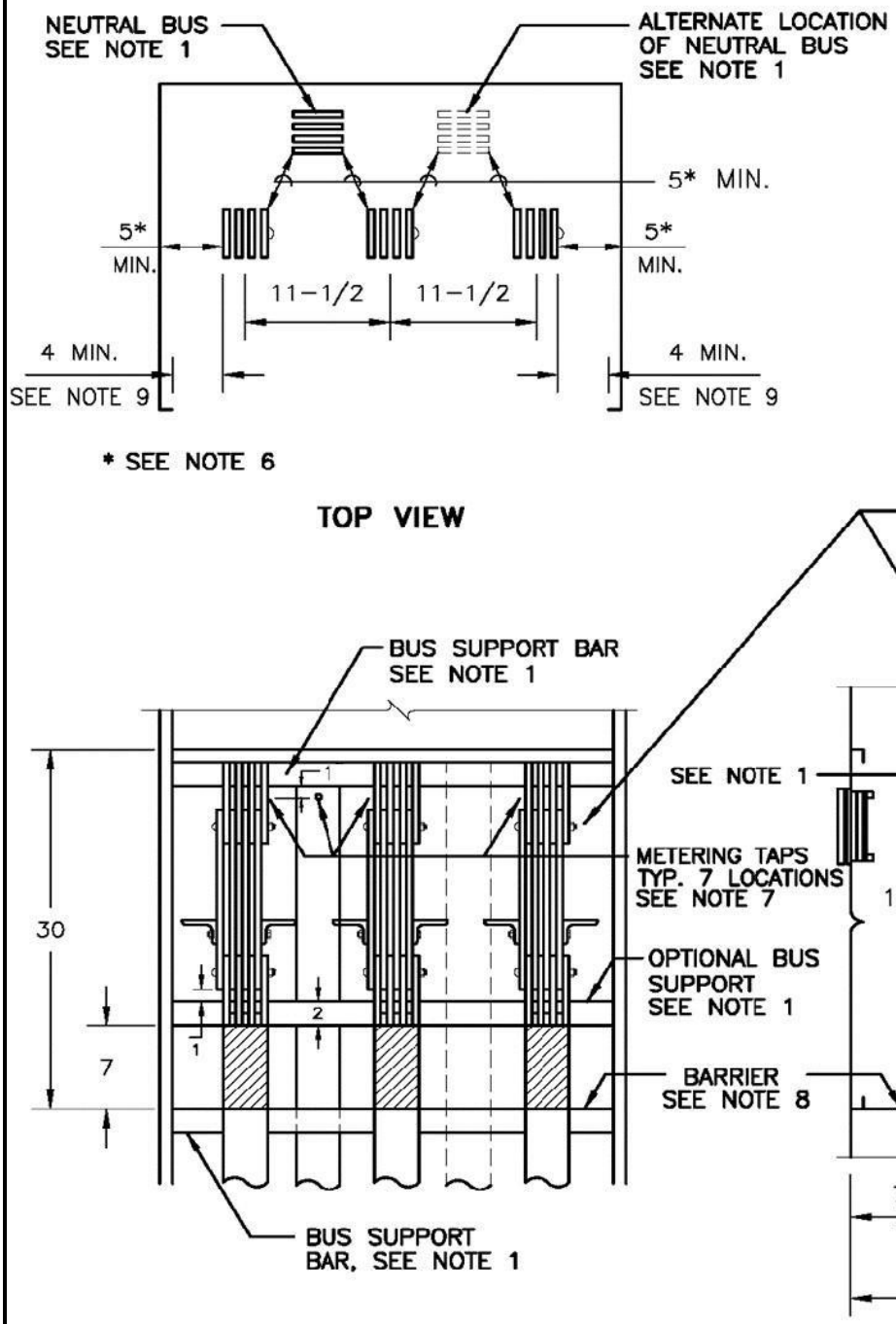
UL File #	E11592

Publications

Title	Publication No.	Publication Type
Record Plus Types FC&FB - Let Through Energy Curves Peak Current Curve	DES-031	Time Current Curves
Record Plus Types FC&FB - 30A 30A	DES-016C	Time Current Curves
Record Plus Types FC&FB - Peak Let Through Current Peak I2t Curve	DES-030	Time Current Curves

Additional Documentation: Visit our Publication Library to find technical documentation, time current curves, CSI Specifications and promotional literature.

2.1.2. EUSERC



ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
5	Revised Bolt Pattern and Note 5 – Project#000814 & #001117	11/01

	Latest Revision		Revised		Information Edited		Information Removed

SHEET 1 OF 2

2023 EUSERC MANUAL

INSTRUMENT-TRANSFORMER COMPARTMENT FOR SWITCHBOARDS 1001-3000 AMPERES AND ABOVE, 0-600 VOLTS, THREE PHASE 3 WIRE AND 4 WIRE

SECTION 300 DRAWING 322

NOTES:

1. Bus arrangements and supports shall be provided as shown, except the neutral bus may located at either side or on either side wall. (Note: neutral bus not required for 3–phase, 3–wire service). Bus units shall be anchored so that busses will remain in position when section "B" is removed. For details of section "B" and the insulated current–transformer support, see Drawing 330 and Drawing 331. Bus supports shall be constructed of a continuous bar of insulating material.

2. The bus units may be supplied from the top or bottom, and shall be constructed of rectangular bus. Maximum allowable bus size shall be four 1/4 inch x 4 inch bars spaced 1/4 inch.

3. Bus units shall be insulated as shown and the insulating material shall be rated for the serving voltage. Round bus corners as necessary to prevent damage to insulation.

4. When the compartment is supplied from horizontal cross–bussing, the bussing shall pass through the compartment or in the sealed area above the compartment.

5. Except for conductors supplying the instrument transformer compartment, and the ground bus, no other conductors or devices shall be installed in, or routed through, the compartment or the sealed area above the compartment. The ground bus shall not infringe on utility compartment space, or reduce any clearances. Customer connections to the ground bus shall not be allowed in the instrument transformer compartment.

6. A clear unobstructed work space shall be provided around the current–transformer bus units from the barrier to 2 inches above the removable current–transformer bus sections ("B").

7. A 10–32 tap for attachment of meter wiring shall be provided as follows:

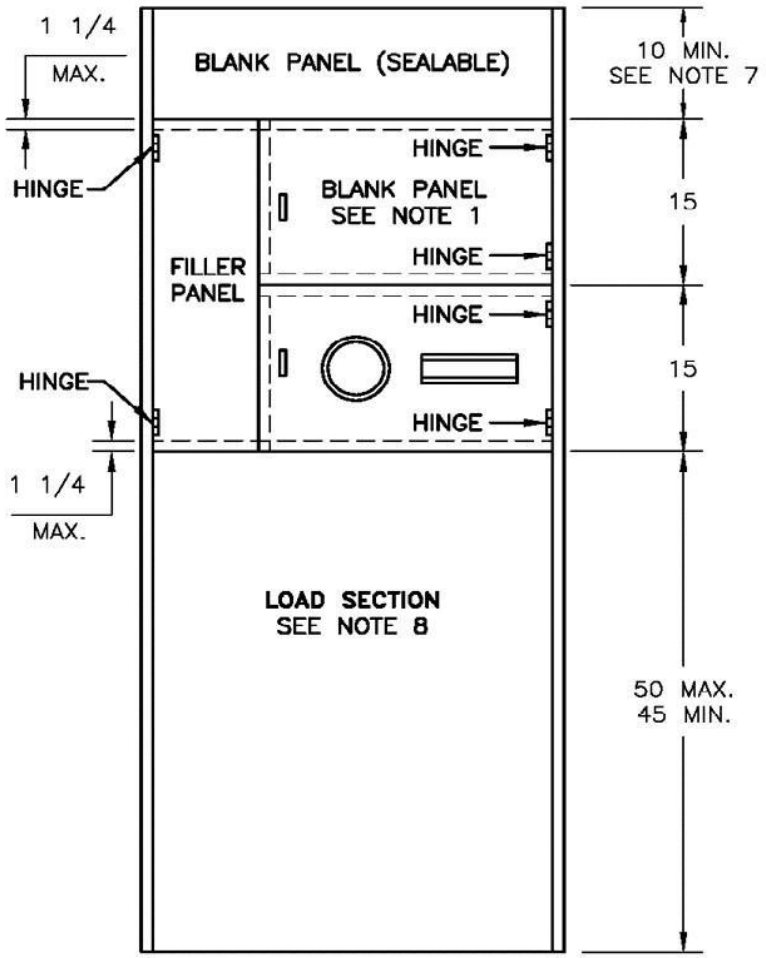
   a. One tap on each upper and lower phase bus unit with a 10–32 screw and washer provided for each phase bus in either the upper or lower position.

   b. One tap on the neutral bus as shown, or when the compartment is supplied from cross–bussing, a tap may be provided on the neutral cross–bus, or on a bus bar extension provided from the neutral cross–bus. A 10–32 screw and washer shall be provided for the neutral bus. Tap locations shall be centered between phase bus units, or at either side, and shall be readily accessible under energized conditions and with the current–transformers in place.

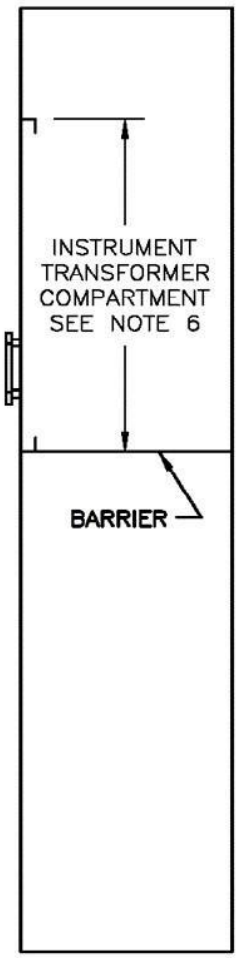
8. The barrier shall be constructed of a rigid insulating material resistant to ARC tracking and shall be secured in place with a maximum deflection of 1/2 inch from an applied force of 25 pounds downward. Openings in the barrier (i.e., peripheral gaps around barrier, cutouts around bus bars, and hole diameters provided for ventilation) shall not exceed 3/8 inch. The barrier shall be attached with nonconductive fasteners.

9. Dimension measured to inside edge of the compartment access opening.

REV	DESCRIPTION	DATE
5	Revised Bolt Pattern and Note 5 – Project#000814 & #001117	11/01



FRONT VIEW



SIDE VIEW

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
6	Added Maximum Dimensions for Flanges	11/09

	Latest Revision		Revised		Information Edited		Information Removed

SHEET 1 OF 2

2023 EUSERC MANUAL

STANDARD SWITCHBOARD SERVICE SECTION WITH INSTRUMENT-TRANSFORMER COMPARTMENT AND FILLER PANEL 0-600 VOLTS

SECTION 300 DRAWING 326

NOTES:

1. Socket meter panel with blank meter panel shown. Consult serving utility regarding alternate meter panel arrangements. Blank meter panel shall be constructed of 12 gauge (minimum) steel. See Drawings 332, 333 and 336 for socket meter panel details.

2. Filler panels shall be used where the service section width exceeds the meter panel width. Meter panels, either socket or blank, shall not be hinged to hinged filler panels. Non–hinged filler panels shall not extend into the required instrument–transformer compartment access opening.

3. Meter panels and filler panels shall be equipped with stops to prevent inward swinging beyond the front surface of the service section.

4. Hinges shall be readily interchangeable, left or right, on the job site.

5. Removable or hinged panels enclosing unmetered bus or cable shall be sealable. See drawing 300, note II(I).

6. For requirements regarding instrument–transformer compartments, see;

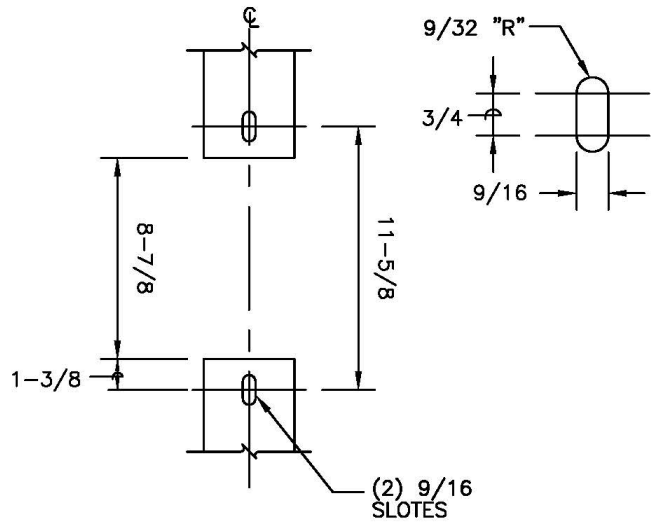
   0 to 1000 Amperes See Drawings 319, 320
   1001 to 3000 Amperes See Drawings 321, 322
   3001 Amperes and above See Drawings 323, 324

7. Dimension may be reduced if the service section is supplied from horizontal cross–bussing or bus duct.

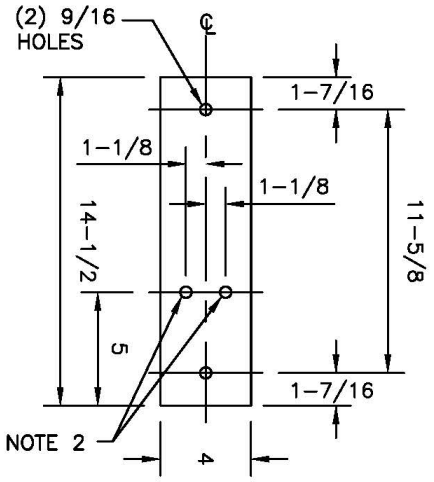
8. When used as a utility terminating section in a bottom–fed service section, See Drawing 327.

9. For outdoor applications, See Drawing 354 for weatherproof enclosure requirements.

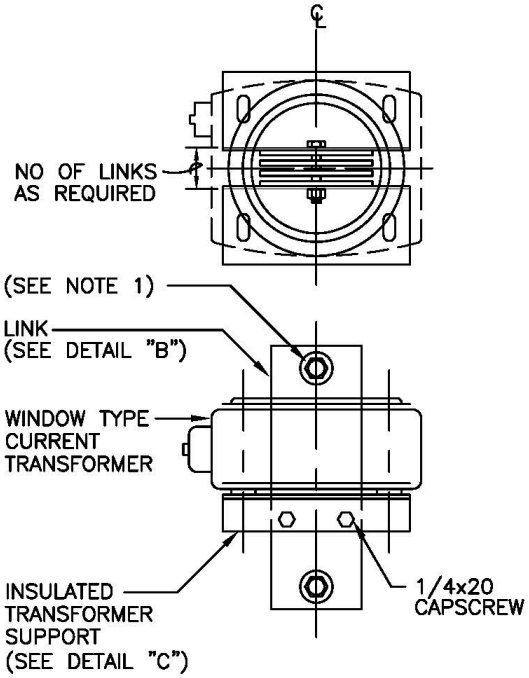
REV	DESCRIPTION	DATE
6	Added Maximum Dimensions for Flanges	11/09



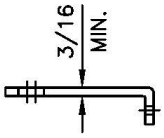
DETAIL 'A"
DRILLING AND SPACING OF BUS

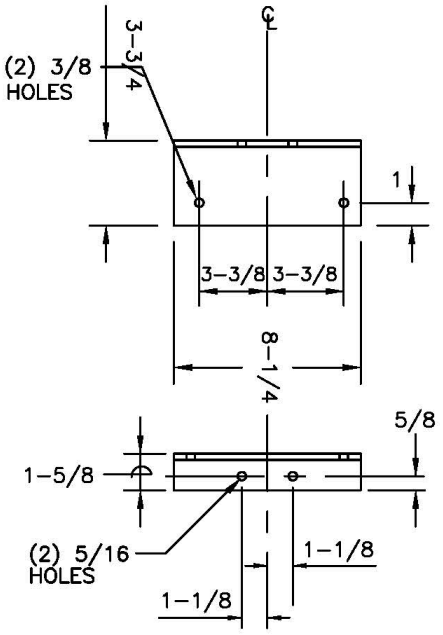


DETAIL "B"
1/4x4 LINK
(SAME MATERIAL AS BUS)



REMOVABLE LINK
(FURNISHED BY MANUFACTURER)





DETAIL"C"
INSULATED SUPPORT FOR
ICURRENT TRANSFORMER
(MATERIAL: INSULATING, NON-TRACKING)

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
6	Revised Note 1 – Torque Setting Label – Project#000808	11/01

	Latest Revision		Revised		Information Edited		Information Removed

SHEET 1 OF 2

2023 EUSERC MANUAL

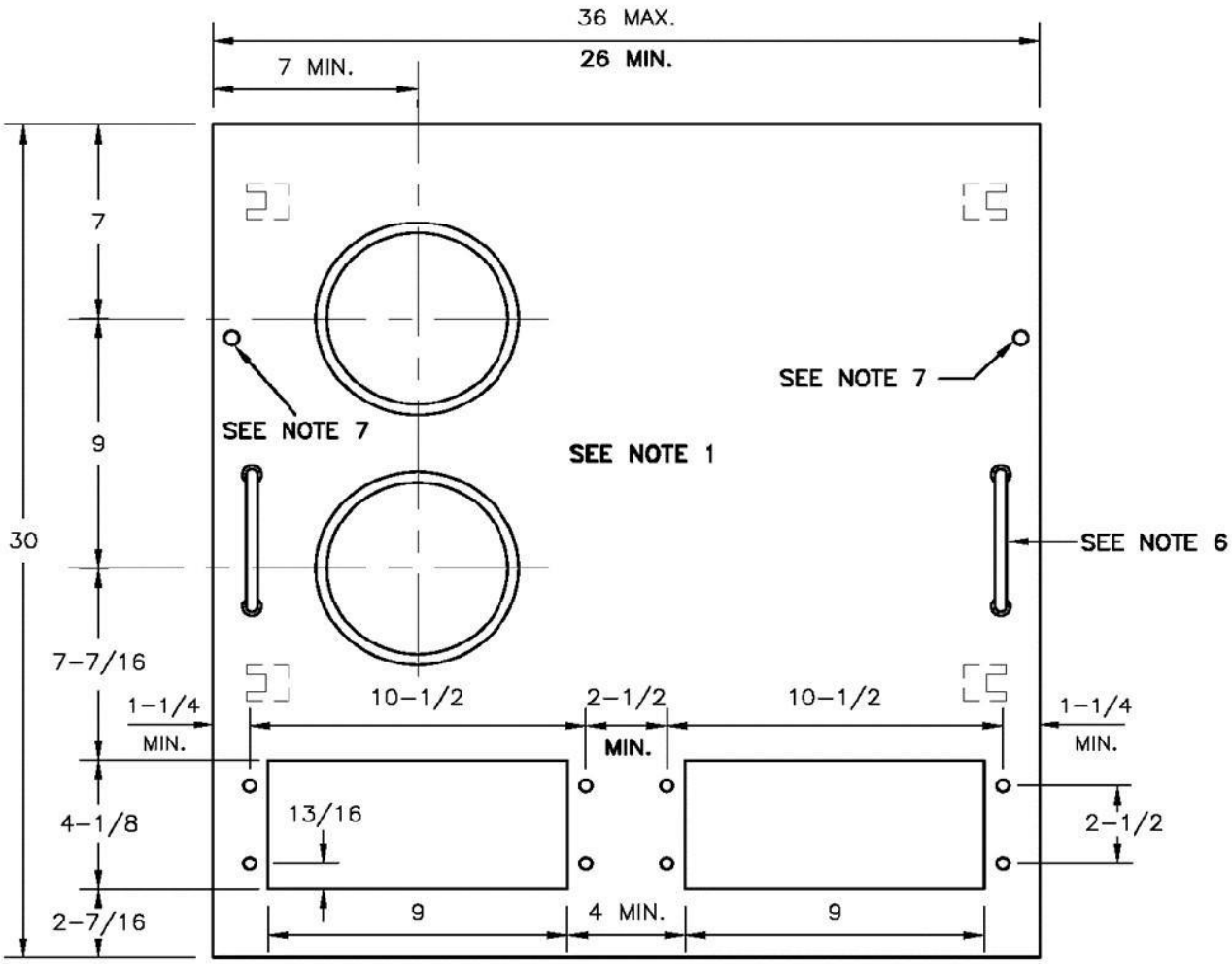
REMOVABLE LINK AND CURRENT TRANSFORMER SUPPORT FOR INSTRUMENT TRANSFORMER COMPARTMENTS WITH 4-INCH BUS, 0-600 VOLTS

SECTION 300 DRAWING 330

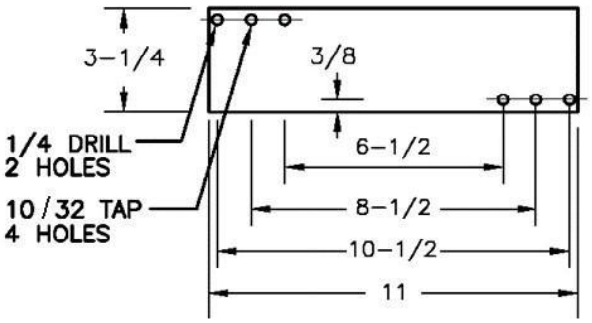
NOTES:

1. Manufacturer shall secure the removable bus link to the upper and lower current transformer bus units using 1/2 inch hex–head (grade 5) steel bolts with associated washers and nut. Each bolt shall be provided with a flat washer, a spring washer and a nut. Spring washer may be either a cone–type (belleville) washer or a split–ring washer with a flat washer. All washers (belleville or flat) shall be 2 1/4 inches minimum. "Note: When belleville washers are used, the manufacturer shall provide a label with the required torque setting. This label shall be in a readily visible location within the compartment that the washers are being utilized and shall not be installed on the meter or filler panels."
2. Drill and tap two holes as shown on the outer bus units for 1/4 inch x 20 capscrews.

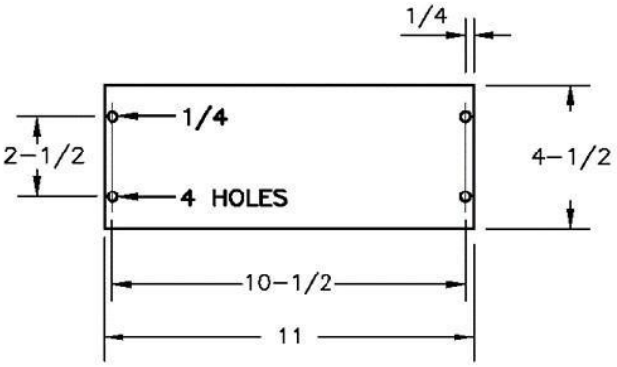
REV	DESCRIPTION	DATE
6	Revised Note 1 – Torque Setting Label – Project#000808	11/01



ALL HOLES 10/32 TAP
EXCEPT AS NOTED



TEST SWITCH MOUNTING



COVER

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
7	Removed Dimensions 6-3/16" & 6 9/16" and Revised Note 1 – Project#030202	12/04

	Latest Revision		Revised		Information Edited		Information Removed

2023 EUSERC MANUAL

SHEET 1 OF 2

SWITCHBOARD PANEL FOR SOCKET METERS AND RECORDERS, 0-600 VOLTS

SECTION 300 DRAWING 333

NOTES:

1. The panel shall be constructed of 12 gauge (minimum) steel, shall be hinged, and furnished with meter sockets, sealing rings, slotted openings, and a removable plate for the installation of a secondary test switch, and a cover plate. The slotted opening and removable plate edges shall be smooth to prevent damage to meter wiring.

   Note: When a cast meter mounting ring is provided, the screws used to attach to the meter panel shall provide a minimum 1/8–inch clearance between the screw heads and the back of the ring.

2. The removable plate shall be attached to the rear of the panel with screws that do not protrude through the face of the panel.

3. Meter sockets shall be designed for back connection.

4. Hinges shall be easily interchangeable, right or left, on the panel and permit the panel to open to 90–degrees. Removable pin type hinges shall be removable from the top.

5. The panel shall support a 25–pound load applied at the unsupported end when fully opened with a maximum sag of 1/8 inch.

6. The panel shall have a handle attached to both sides.

7. Stud and wing–nuts shall be sealable when used.

8. See section 200 for correct meter socket configuration.

9. Test switch mounting holes shall be located on the top left and bottom right for safety.

REV	*DESCRIPTION*	*DATE*
7	Removed Dimensions 6-3/16" & 6 9/16" and Revised Note 1 – Project#030202	12/04

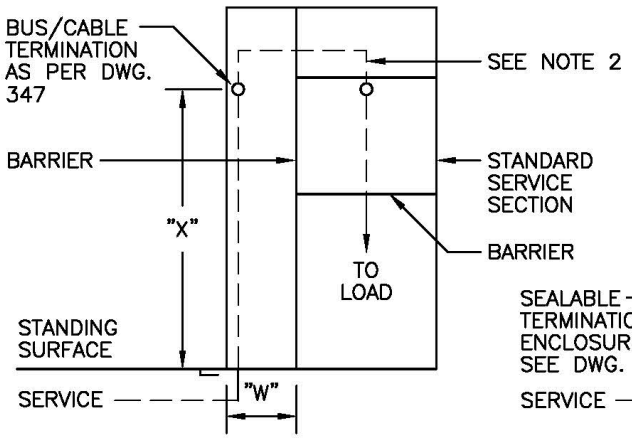


FIGURE 1
SWITCHBOARD PULL SECTION

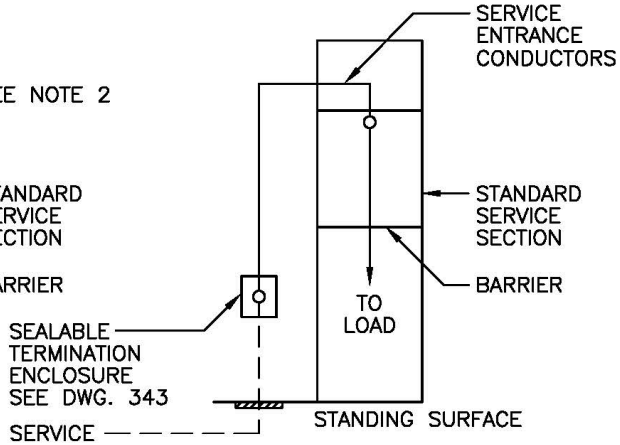


FIGURE 2
1200 AMP MAXIMUM
SEPARATE TERMINATION ENCLOSURE

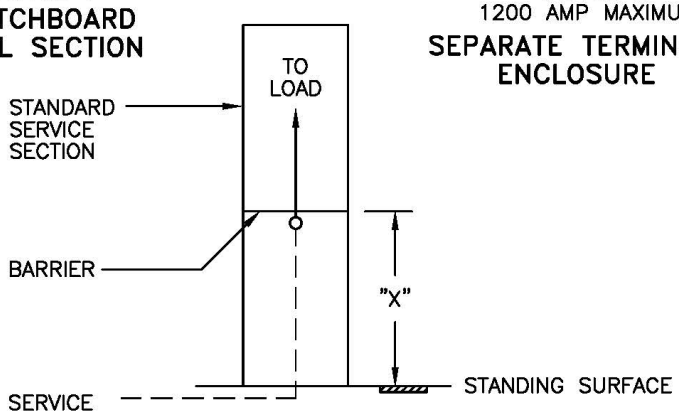


FIGURE 3
2000 AMP MAXIMUM
SEE DRAWING 327 FOR PULL SECTION REQUIREMENTS

BOTTOM FEED PULL SECTION

TABLE 1 MINIMUM PULLBOX DIMENSIONS – SEE NOTE 5

SWITCHBOARD RATING (AMPERES)	MINIMUM ACCESS OPENING DIMENSION (W)–SEE NOTE 4		TERMINATION HEIGHT (X)
	3–WIRE	4–WIRE	
BELOW 400	CONSULT SERVING AGENCY		
400 – 800	24	24	42 MIN. – 72 MAX.
801 – 1200	24	30	
1201 – 2000	30	35	
2001 – 3000	---	42	60 MIN. – 72 MAX.
3001 – 4000	---	44	60 MIN. – 72 MAX.

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
8	Removed Figure 3 Dimensions, Referenced on Drawing 327	10/08

NOTES:

1. A switchboard pull section as shown in Figure 1, a separate (nonattached) termination enclosure as shown in Figure 2, or a combination switchboard service section and pull section (bottom feed) as shown in Figure 3 shall be provided for underground services.

2. Bus bars or cables may extend from the pull section into switchboard service sections rated up to 800 amperes. Bus bars are required when the service section rating exceeds 800 amperes or multiple metering is supplied.

3. When the service section is supplied from a switchboard pull section as shown in Figure 1, the bus bars or cables shall enter through the side of the sealable section above the current–transformer compartment, or by means of horizontal cross–busing in back of the metering compartment.

4. When horizontal cross busing exists the switchboard pull section below the terminating facilities, the lowest cross bus unit and the transition bussing supplying the cross bus units shall not be less than two feet above the bottom of the enclosure or more than 8 inches from the back of the enclosure.

5. The minimum pull section access opening (W) is measured between the left side and right side return flanges.

6. Side or rear entry of service entrance cables into the pull section may require greater dimensions than shown in Table 1. Consult the serving agency for requirements.

7. All terminating enclosures (i.e. pull boxes and pull sections) shall have full front access. Cover panels shall be removable, sealable, provided with two lifting handles, and limited to a maximum of 9 square feet in area.

8. Sealing provisions shall consists of two drilled stud and wing–nut assemblies on opposite sides of the panels.

9. See Drawing 347 for construction details and clearance requirements for terminating facilities in pull boxes and pull section.

10. Ground bus, when provided, shall be located at the rear of the terminating enclosure.

REV	DESCRIPTION	DATE
8	Removed Figure 3 Dimensions, Referenced on Drawing 327	10/08

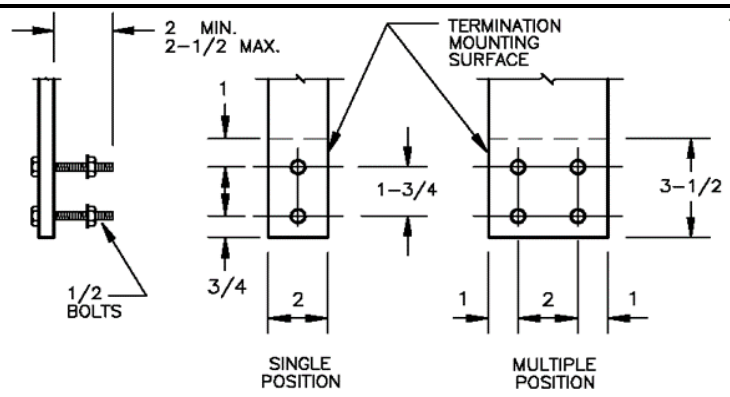


FIGURE 1

TERMINATING BOLT AND DRILLING DETAIL OF TERMINATING FACILITIES

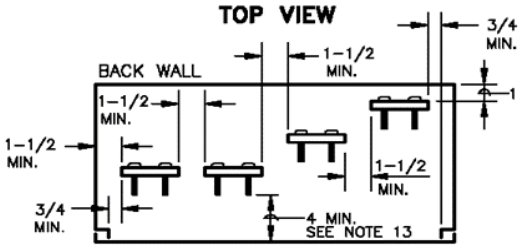


FIGURE 2

SPACING REQUIREMENTS FOR TERMINATING FACILITIES (SIDE BY OR STAGGERED)

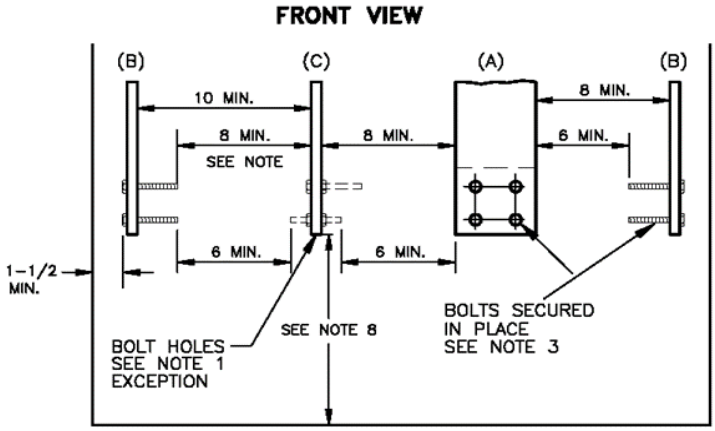


FIGURE 3

SPACING REQUIREMENTS FOR TERMINATING FACILITIES ACCESSIBLE FROM (A) FRONT ONLY, (B) ONE SIDE ONLY, OR (C) FROM EITHER SIDE. SEE NOTE 3 AND 4

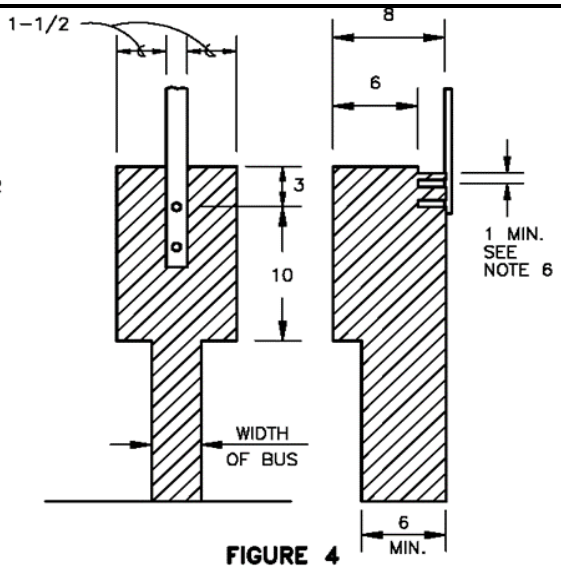


FIGURE 4

REQUIRED UNOBSTRUCTED WORKING SPACE FOR ALL TERMINATIONS.

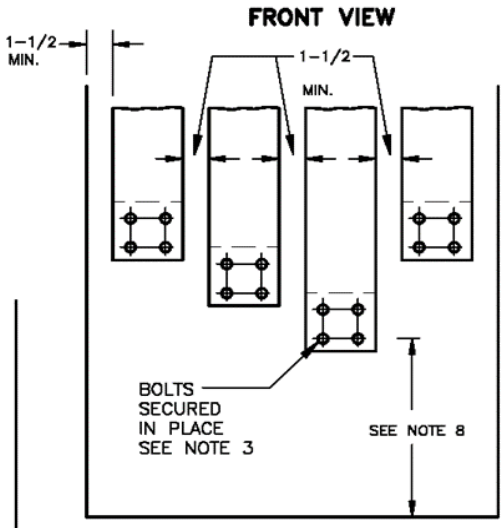


FIGURE 5

SPACING REQUIREMENTS FOR TOP TO BOTTOM STAGGER OF TERMINATING FACILITIES

NOTE:

4 INCH MIN. REQUIRED [ASSURE 1 INCH MINIMUM CLEARANCE FROM BODY OF TERMINATING LUG (WHEN IN PLACE TO FRONT PANEL]

EXCEPTION: SEE NOTES 4 AND 5

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
11	Revised Note 11 – Project#061107	07/07

	Latest Revision		Revised		Information Edited		Information Removed

2023 EUSERC MANUAL

SHEET 1 OF 3

UNDERGROUND SERVICE TERMINATING FACILITIES IN PULL BOXES OR PULL SECTIONS, 0-600 VOLTS

SECTION 300 DRAWING 347

NOTES:

1. One landing position is required for each 400 amperes of service ampacity or fraction thereof (i.e., one position for up to 400 amperes, two positions for 401 through 800 amperes, three positions for 801 through 1,200 amperes, etc.). Each landing position shall consist of two 1/2 inch steel bolts. The bolts shall extend from 2–inches to 2–1/2 inches from the mounting surface and be spaced on 1–3/4 inch vertical centers. When multiple landing positions per phase are required, the horizontal spacing between the bolt positions shall be 2 inches (minimum).

   EXCEPTION: Edgewise terminating facilities may consist of 9/16 inch holes having the same spacing as specified for the 1/2 inch bolts as specified above and in Figure 1. The unobstructed working space shall be provided on both sides of the termination bus (see figure 3).

2. Each terminating bolt shall be provided with a spring washer and a nut. The spring washer may be either a cone–type (Belleville) washer or a split–ring washer and a flat washer. All parts shall be plated to prevent corrosion.

   NOTE: When Belleville washers are used, the manufacturer shall provide a label with the required torque settings. This label shall be in a readily visible location within the compartment that the washers are being utilized.

3. Terminating bolts must be secured in place. "Secured in place" shall mean that the studs will not turn, back out, or loosen in any manner when tightening or loosening terminal nuts (including cross–threaded situations). Terminating bolts shall not be used to secure the termination bus in place.

4. In the terminal mounting area, which is defined as the area of the terminating facilities shown in Figure 1, a clear space (barrel of proximity) of 1–1/2 inches minimum is required around any terminating facility including its bolts and bolt heads, any other bus, any other terminating facility, or any grounded surface, except:

   a. The minimum clearance to the back of the pull section may be reduced to 1 inch.

   b. The minimum clearance to any fully insulated horizontal bus behind the terminating facility may be reduced to 1 inch.

   c. The neutral terminating facility may have a minimum clearance of 1 inch from any grounded surface.

5. Each terminating facility shall have an unobstructed working space, accessible from the front of the pull section as viewed from the access compartment opening, in front of the entire mounting surface as shown in figure 4.

   EXCEPTION: For terminating facilities with bolts facing the access opening as shown in figure 2, the required 1–1/2 inch side clearance (bus to access opening return flange) may be reduced to 3/4 inch.

6. The clearance directly above and measured from the center of the top termination bolt may be reduced to 1 inch to either an insulated surface or bus of the same potential.

7. No more than one termination facility may be mounted along any sidewall.

8. See Drawings 302, 303, 342, 343, and 345 for the minimum distance from the lowest bolt on the termination facility to the bottom of the termination enclosure.

REV	DESCRIPTION	DATE
11	Revised Note 11 – Project#061107	07/07

9. Terminating facilities shall be secured to prevent turning or bus misalignment when the cables are installed.

10. The neutral terminating facility shall be permanently identified in clearly visible block lettering reading either "neutral" or "N".

11. For 120/240 volt 3ø 4–wire delta services, the power leg (measuring 208–volts–to–ground) shall be identified with an orange color.

12. Cross–bussing of a different phase or potential installed behind or below any terminating position shall be fully insulated or barriered. Insulating barriers shall be rigid, non–flammable, rated for the serving voltage, resistant to ARC tracking, resistant to puncture or damage by impact and attached with non–conductive fasteners.

13. For switchboard pull sections, the minimum clearance from any energized part to a removable access cover panel shall be 4 inches. This clearance may be reduced to 1–1/2 inches when a safety barrier is provided by the manufacturer. The safety barrier shall:

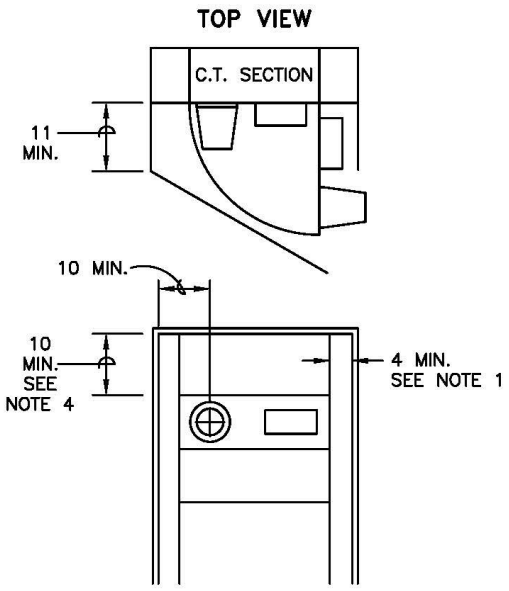
    a. Be constructed of a rigid insulating material, resistant to damage by impact or puncture, with a minimum thickness of 1/8 inch.

    b. Extend a minimum of 10 inches below terminating bus and extend upward to cover all energized parts that infringe into the 4 inch minimum clearance dimension, and be removable.

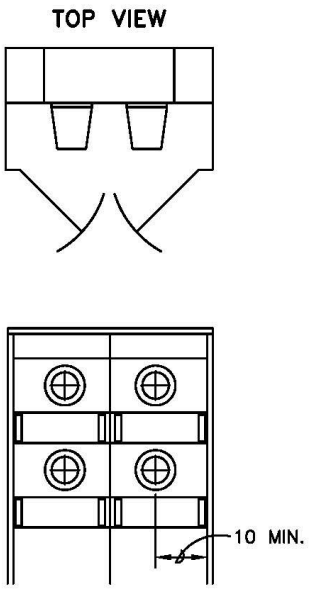
       Note: Brackets and associated hardware used to mount the safety barrier shall not extend into the provided access opening.

    c. Have a caution sign affixed to the barrier reading "WARNING: THE BARRIER MUST BE INSTALLED BEFORE REPLACING PULL SECTION COVERS". Additional caution signs shall be affixed to exterior of each section access cover reading "DO NOT REPLACE PULL SECTION COVERS UNTIL SAFETY BARRIER IS IN PLACE".

    d. Screws or bolts requiring special tools for installation or removal are not acceptable.



FRONT VIEW
FIGURE 1



FRONT VIEW
FIGURE 2

NOTES:

1. Hinged meter panel shall be capable of being opened 90–degrees with meter and test facilities in place, and provide the following clearances to any obstruction: 11 inches at the meter socket and 4 inches at the test–switch slotted opening. See Drawing 332 and 333 for hinged meter panels construction details.

2. Meter panels, either socket or blank, shall not be hinged to a hinged filler panel. Non–hinged filler panels shall not extend into the required instrument–transformer compartment access opening.

3. Enclosure doors providing access to utility compartments (i.e., metering sections and pull sections) shall be:

   a. Equipped with a device to secure the doors in the open position at 90–degrees or more.

   b. Secured in the closed position with a single, handle–operated, latching system. When provided with a locking means, each door, or set of doors, shall be equipped with an approved double–locking device, accepting padlocks with a 5/16 inch lock shaft, to allow access by both the serving utility and the customer.

4. Dimension may be reduced if the service section is supplied from horizontal cross–bussing or bus duct.

ALL DIMENSIONS SHOWN ARE IN INCHES

REV	DESCRIPTION	DATE
4	Deleted Figure 1 & 2 and Note 4 – Project#010808	12/02

	Latest Revision		Revised		Information Edited		Information Removed

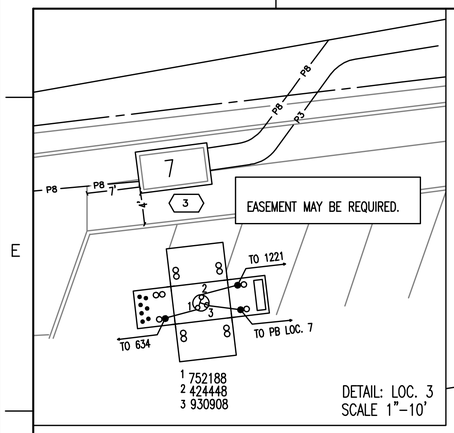
2023 EUSERC MANUAL

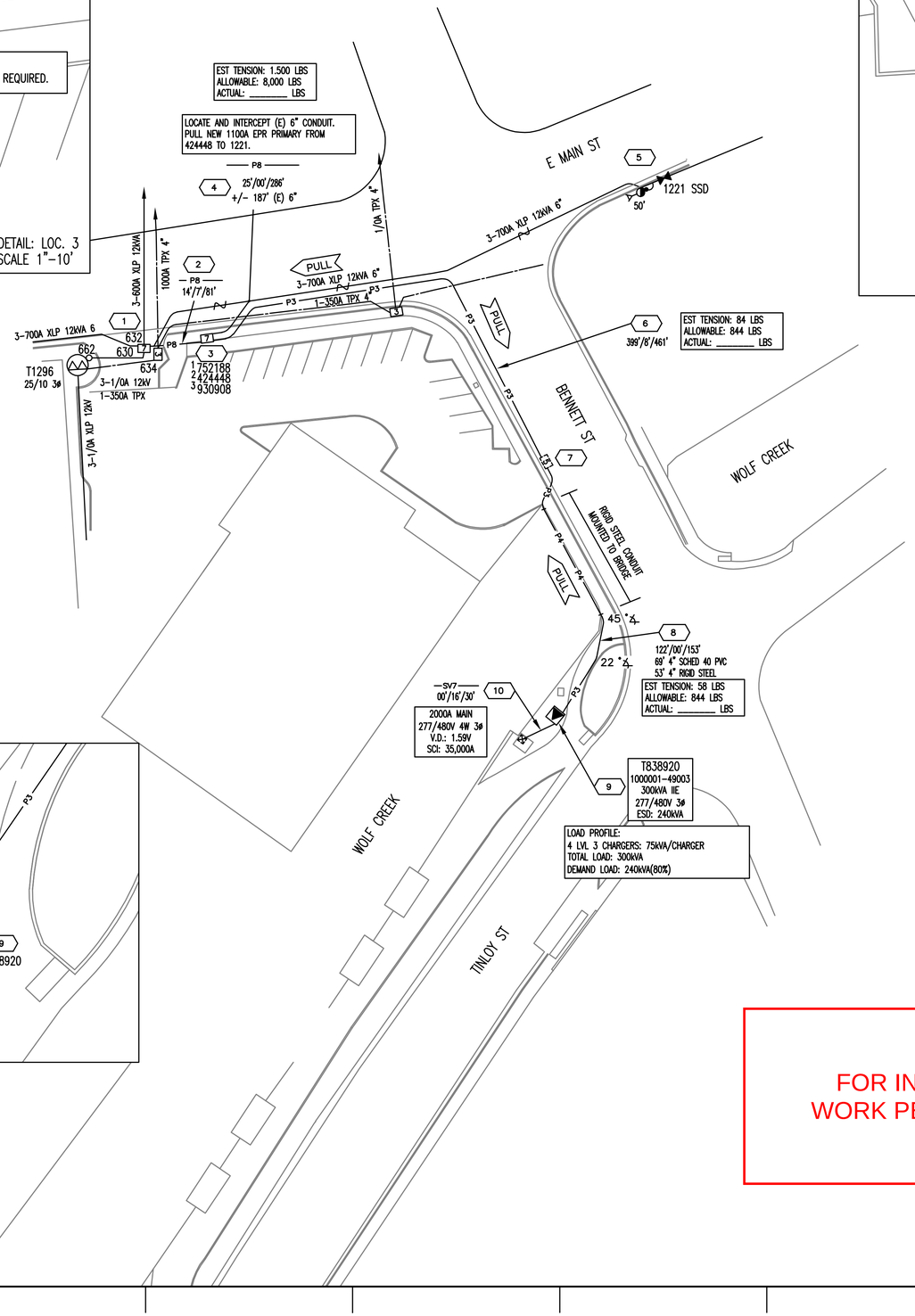
SHEET
1 OF 1

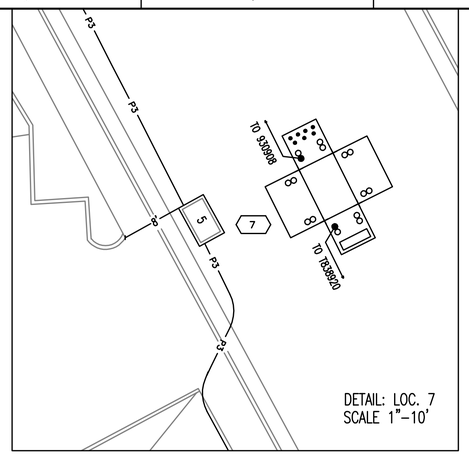
OUTDOOR OR RAINTIGHT ENCLOSURES FOR SWITCHBOARDS, 0-600 VOLTS

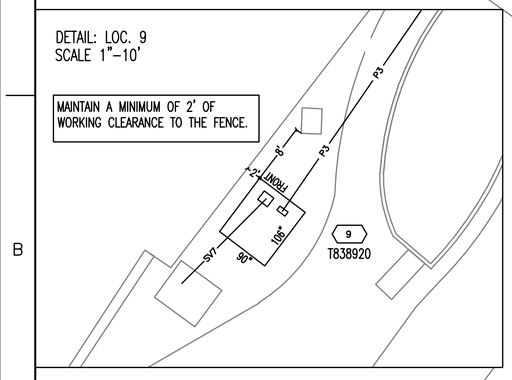
SECTION
300
DRAWING
354

ATTACHMENT 5: PG&E CONSTRUCTION SKETCH









NOTES: 09-18-18

REFER TO ELECTRIC & GAS SERVICE REQUIREMENTS (GREEN BOOK) OR SEPARATE PG&E STANDARD DRAWINGS. CONTACT YOUR PG&E REPRESENTATIVE FOR COPIES, OR ACCESS www.pge.com/greenbook

CONDUIT, TRENCHING, AND BACKFILL:

1) ALL DIMENSIONS AND LOCATIONS ARE ESTIMATED, APPROXIMATE AND MAY BE SUPERSEDED BY A JOINT TRENCH DRAWING. REFER TO THE JOINT TRENCH COMPOSITE DRAWING FOR EXACT TRENCH LOCATION

2) MAINTAIN MAXIMUM PRACTICABLE HORIZONTAL CLEARANCE BETWEEN PG&E FACILITIES AND "WET" UTILITIES (WATER, SEWER, STORM DRAIN, ETC.). THE MIN. ALLOWABLE SEPARATION BETWEEN PG&E FACILITIES AND ANY PARALLEL "WET" UTILITY IS 3/FT. WITH A PRESENCE OF 1/FT OF UNDISTURBED EARTH OR THE INSTALLATION OF A SUITABLE BARRIER. THIS MEASUREMENT IS BETWEEN THE OUTER EDGE OF THE PG&E FACILITY AND THE OUTER EDGE OF THE PARALLEL "WET" FACILITY. IF 3/FT. CANNOT BE MAINTAINED, A FORMAL VARIANCE MUST BE OBTAINED FROM PG&E WORK WITH THE PG&E INSPECTOR (REFERENCE PG&E UO STANDARD SS453).

3) BOX, PAD, AND CONDUIT SIZES AND LOCATIONS SHALL CONFORM TO THE PG&E ELECTRIC CONSTRUCTION DRAWING.

4) PROVIDE LONG CONDUIT SWEEPS WHERE INDICATED. RECOMMENDED SWEEP RADIUS (10' OF RADIUS PER INCH OF CONDUIT DIAMETER) EXAMPLE: 4" CONDUIT = 40' RADIUS

5) DO NOT EXCEED 300 DEGREES OF BENDS IN ANY CONDUIT RUN (INCLUDING FEED LOCATION). NOTE: SECONDARY AND SERVICE RUNS OF 200 FEET OR LESS MAY HAVE UP TO 315 DEGREES OF BENDS (REFERENCE PG&E DOCUMENT 038193).

6) MANUFACTURED BENDS OR APPLICATION OF HEAT SHALL NOT BE USED TO OBTAIN LONG CONDUIT SWEEPS.

7) ALL CONDUITS SHALL BE PROVEN AND A POLYESTER PULLING TAPE INSTALLED.

8) MANUFACTURED BENDS ARE NOT TO BE CUT, SHORTENED, OR ALTERED IN ANY WAY.

9) IDENTIFY ENDS OF BURIED CONDUIT WITH AN ELECTRONIC MARKER AND A VERTICAL CONDUIT SCRAP INSTALLED FROM RIGID CAP TO GROUND LEVEL.

10) CONDUITS ENTERING PRIMARY BOXES SHALL BE AT A RIGHT ANGLE TO THE WINDOW OR WALL.

11) STUB CONDUITS AT RISER POLES IN QUADRANTS AS SHOWN. AT IDENTIFIED POLE LOCATIONS, THE TRENCHING AGENT IS TO EXCAVATE TO TRENCH DEPTH AND INSTALL A 20" DIAMETER CARDBOARD TUBE. THE RISER CONDUIT BEND IS TO BE PLACED OUTSIDE AND ADJACENT TO THE TUBE AT THE POLE QUADRANT INDICATED. BACKFILL AROUND AND INSIDE TUBE WITH CLEAN NATIVE FILL.

12) LS2 STREET LIGHT CONDUIT GOING TO PG&E BOXES OR PEDESTALS NOT DESIGNATED AS P.O.S. (INCLUDING TRANSFORMERS) WILL NOT BE ACCEPTED OR CONNECTED.

13) ONLY ONE LS2 STREET LIGHT (P.O.S.) CONNECTION PER BOX OR PEDESTAL.

LAND RIGHTS AND EASMENTS:

14) APPLICANT TO PROVIDE ADEQUATE FEE LOT'S AND/OR ROW'S FOR PG&E FACILITIES. ANY ADDITIONAL REQUIRED RIGHTS OF WAY ARE TO BE SURVEYED AND DOCUMENTED BY PG&E AT THE APPLICANT'S EXPENSE.

SAFETY AND WORKMANSHIP:

15) CALL 811 (UNDERGROUND SERVICE ALERT) 48 HOURS PRIOR TO EXCAVATION FOR UNDERGROUND UTILITY LOCATION MARKING.

16) 48 HOUR NOTICE REQUIRED FOR UNDERGROUND INSPECTION.

17) MATERIALS AND WORKMANSHIP SHALL BE FIRST QUALITY IN EVERY RESPECT, PLUMB AND TRUE, AND ACCORDING TO THE SPECIFIC REQUIREMENTS OF THE DRAWINGS AND THE ABOVE APPLICABLE NOTES AND SPECIFICATIONS.

18) THE APPLICANT IS TO VERIFY ALL PROPOSED INSTALLATIONS, CONDITIONS & SPECIFICATIONS PRIOR TO COMMENCING WITH ANY PORTION OF WORK. ANY DISCREPANCIES, DELETIONS OR INCONSISTENCIES ARE TO BE REPORTED TO THE PG&E REPRESENTATIVE IMMEDIATELY. THE APPLICANT SHALL COMPLY WITH ALL APPLICABLE SPECIFICATIONS. ANY VARIATIONS FROM PLANS OR SPECIFICATIONS RELIEVES PG&E OF ALL RESPONSIBILITY FOR THE SUBSTRUCTURE OR DESIGN.

LEGEND

INSTALL	EXISTING	DESCRIPTION
— P8 —		PRIMARY CABLE: 3–1100A EPR 25KV IN 1–6" CONDUIT
— P3 —		PRIMARY CABLE: 3–1/0A EPR 25KV IN 1–4" CONDUIT
— P4 —		PRIMARY CABLE: 3–1/0A EPR 25KV IN 1–4" CONDUIT RIGID STEEL CONDUIT
—SV7—		SERVICE CABLE: 1 RUN 3–1000A & 1–350A IN 1 OF 7–5"
▲		PAD MOUNT TRANSFORMER – IIE – SIZE AS SHOWN 106" x 90" PAD
⊛		SS SW–INT–SW
⊠		MAIN SERVICE PANEL
[7]	[7]	4'6" x 8'6" x 6' PRIMARY ENCLOSURE
[6]	[6]	4' x 6'6" x 5' PRIMARY ENCLOSURE
[5]	[5]	3' x 5' x 3'6" PRIMARY ENCLOSURE
		3ø PRIMARY CABLECONDUCTOR – SIZE AS SHOWN
		1ø SECONDARY CABLE/CONDUCTOR – SIZE AS SHOWN
XX'/XX'/XX'		CONDUIT IN FRANCHISE/CONDUIT ON PVT PROP/CABLE LENGTH

WORK AGENT RESPONSIBILITIES

PG&E TO COMPLETE ALL BETTERMENT WORK
ALL ELECTRIC RULE 29 WORK TO EDGE OF APPLICANT'S SWITCHGEAR PAD INCLUDING SERVICE TRENCH/EXCAVATION CONDUIT(S) AND SUBSTRUCTURE(S) TO BE COMPLETED BY PG&E.

PER ELECTRIC RULE 29.E.1.c, APPLICANT TO INSTALL CONDUIT SWEEPS AND STUB CONDUIT TO EDGE OF SWITCHGEAR. SWEEPS AND STUBS TO BE INSPECTED BY PG&E INSPECTOR.

REQUIRED PERMITS
☐ COUNTY ☒ CITY
☒ TRAFFIC CONTROL

CALTRANS PERMIT REQUIRED

FOR INFORMATION ONLY
WORK PERFORMED BY PG&E

REVISIONS		
NO.	DATE	DESCRIPTION
1	6/27/2023	SWITCH BOARD RATING CHANGED TO 2000A

PRIMARY VOLTAGE: 12 kV | VOLTAGE AREA: 2
LATITUDE: 39.219 | LONGITUDE: -121.0591
SOURCE SIDE DEVICE: 1221
SUB & CIRCUIT: BRUNSWICK 1107
DSGN SAG: N/A | RAPTOR ZONE: NO
LOADING AREA: INTERMEDIATE | ARRESTER DIST: 1
CORROSION AREA: NON | INSULATION DIST: D
EXEMPT EQUIP INST.: N/A | FIRE AREA: LRA–TIER 1

ENGINEERING AND PLANNING DEPT.
8 E RIVER PARK PLACE E
FRESNO, CA 93720

811 Know what's below. Call before you dig.
ENVIRONMENTAL ISSUES
NEAR LOC:
GAS CONFLICT: NO

EST: NYSON THAO	559–446–7774
ADE: CHRIS WILTSIE	559–825–3450
SUPV: CORY HENDRICKS	805–302–3987
REP: AARON FINATO	530–559–7849
PLNR: MASOOD AFZAL	916–926–8500
NOTIF: 124703479	JPA#: N/A
SCALE: 1"=30'	DATE: 6/27/2023
PM: 3544005500	SHEET: 1 OF 1 REV: 1

CONSTRUCTION SKETCH
118 TINLOY ST EV
GRASS VALLEY

PACIFIC GAS & ELECTRIC COMPANY

N

6 5 4 3 2 1 INCH 0