

**COUNTY OF EL DORADO, CALIFORNIA  
CHIEF ADMINISTRATIVE OFFICE  
FACILITIES DIVISION**

**CONTRACT DOCUMENTS**

INCLUDING

**NOTICE TO BIDDERS,  
PROPOSAL, CONTRACT AND CONDITIONS OF THE CONTRACT**

FOR

**COUNTY OF EL DORADO  
GENERATOR REPLACEMENT  
PLACERVILLE, CALIFORNIA**

**BID #14-968-001**

**Bid Opening Date: TBD**

**COUNTY OF EL DORADO, CALIFORNIA  
CHIEF ADMINISTRATIVE OFFICE  
FACILITIES DIVISION**

**COUNTY OF EL DORADO  
GENERATOR REPLACEMENT  
PLACERVILLE, CALIFORNIA**

**BID #14-968-001**

The Architectural Improvement Plans and Technical Specifications of these Contract Documents have been prepared under the direction of the following licensed Architect.

  
\_\_\_\_\_  
**ARCHITECT:**

Charles D. Downs  
ANOVA Nexus Architects  
778 Pacific Street  
Placerville, California 95667

C-9717



  
\_\_\_\_\_  
**ELECTRICAL:**

Glumac Engineering  
910 Glenn Drive  
Folsom, California 95630

**COUNTY OF EL DORADO, STATE OF CALIFORNIA  
CHIEF ADMINISTRATIVE OFFICE  
FACILITIES DIVISION**

**COUNTY OF EL DORADO GENERATOR REPLACEMENT**

**BID #14-968-001**

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**COUNTY OF EL DORADO, CALIFORNIA  
CHIEF ADMINISTRATIVE OFFICE  
FACILITIES DIVISION**

**NOTICE TO BIDDERS**

**NOTICE IS HEREBY GIVEN** by the County of El Dorado, State of California, that sealed bids for work in accordance with the Project Plans (Plans) and Contract Documents designated:

**PLACERVILLE GENERATOR REPLACEMENT**

**BID #14-968-001**

will be received by the Chief Administrative Office, Procurement & Contracts Division, California, until **TBD**, at which time bids will be publicly opened and read by the Chief Administrative Office, Procurement & Contracts Division.

No Bid may be withdrawn after the time established for receiving bids or before the award and execution of the Contract, unless the award is delayed for a period exceeding sixty (60) calendar days. Bids shall be executed in accordance with the instructions given and on the forms provided in the bound Contract Documents furnished by the County of El Dorado, Chief Administrative Office, Procurement & Contracts Division. The proposal shall **NOT** be detached from the Contract Documents. All bids must be clearly marked on the envelope:

**“BID FOR PLACERVILLE GENERATOR REPLACEMENT”**

**BID #14-968-001**

**TO BE OPENED AT 3:00 P.M. -- TBD**

**LOCATION/DESCRIPTION OF THE WORK:** The project is located at 360 Fair Lane, Placerville California in El Dorado County. The Work to be done as shown on the Plans, generally consists of, but is not limited to:

- A. Bids are required for the entire work described herein. The work to be performed under this contract includes the furnishing of all labor, materials and equipment for construction of improvements to the emergency back-up power system at the main government center. Improvements include but are not limited to installation of two packaged, generator systems, associated conduits, switch gear, load banks, controls and mechanical screening.
- B. The contract time shall be 150 CALENDAR DAYS.
- C. For bonding purposes the estimated project cost is between **TBD**.
- D. A Pre-Bid / Site Visit Meeting is scheduled for this project at **TBD**. **ATTENDANCE AT THE PRE-BID MEETING IS MANDATORY AND ONLY THE BIDS OF FIRMS WITH REPRESENTATIVES IN ATTENDANCE WILL BE CONSIDERED FOR EVALUATION AND AWARD.** In order to limit the disruption to the conduct of business, the meeting date listed will be the only opportunity for bidders to visit the site. The Bidder's representative will be required to sign an attendance sheet and provide the name of the firm being represented. The County will post on the Procurement & Contract's website such Addenda as the County in its discretion considers necessary in response to questions arising and information presented at the Pre-Bid / Site Visit Meeting. Oral statements shall not be relied upon and will not be binding or legally effective. Addenda issued as a result of the Pre-Bid / Site Visit Meeting shall constitute the sole and exclusive record and statement of the results of the Pre-Bid / Site Visit Meeting.

**OBTAINING OR INSPECTING CONTRACT DOCUMENTS:** The Contract Documents including Plans may be examined:

- Online at <http://edcapps.edcgov.us/contracts/invite.asp>
- At the County of El Dorado, Chief Administrative Office, Procurement & Contract Division located at 360 Fair Lane, Placerville, California, 95667
- Distributed at Pre-Bid Meeting

**ONLY CONTRACT DOCUMENTS DISTRIBUTED AT THE MANDATORY PRE-BID MEETING ON **TBD** WILL BE ACCEPTABLE FOR BID SUBMITTAL.**

**CONTRACTORS LICENSE CLASSIFICATION:** Bidders shall be properly license to perform the Work pursuant to the Contractors' State License Law (Business and Professions Code Section 7000 et seq.) and shall possess a **Class A General Engineering Contractor's** license or equivalent combination of Classes required by the categories and type of Work included in the Contract Plans at the time bids are submitted, and shall maintain a valid license through completion and acceptance of the Work, including the guarantee and acceptance period. Failure of the successful Bidder to obtain proper adequate licensing shall constitute a failure to execute the Contract and shall result in the forfeiture of the Bidder's security.

**BUSINESS LICENSE:** The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. The Bidder to whom an award is made shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

**REQUIRED LISTING OF PROPOSED SUBCONTRACTORS:** Each Proposal shall have listed therein the name and address of each subcontractor, to whom the Bidder proposes to subcontract portions of the work in an amount in excess of 1/2 of one percent of its total bid in accordance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code. The Bidder shall also describe in the Subcontractor Listing the work to be performed by each subcontractor listed. The work to be performed by the subcontractor shall be shown by listing the description of the work, and portion of the work to be performed by the subcontractor in the form of a percentage calculated by dividing the work to be performed by the subcontractor by the lump sum bid price. At the time the bids are submitted all listed subcontractors shall be properly licensed to perform their designated portion of the work. The Bidder's attention is invited to other provisions of the Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.

**NONDISCRIMINATION:** 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  
(GOVERNMENT CODE SECTION 12990)**

**PREVAILING WAGE REQUIREMENTS:** In accordance with the provisions of California Labor Code Sections 1770 et seq., the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, P.O. Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the county in which the Work is to be done are also on file at the Chief Administrative Office, Facilities Division, and are available upon request.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

**BID SECURITY:** A bid security shall be provided with each bid. Bid security shall be in an amount of not less than ten percent (10%) of the total amount bid for the Work and shall be cash, a certified check or cashier's check drawn to the order of the County of El Dorado or a Bidder's Bond executed by a surety satisfactory to the County of El Dorado on the **form provided in the Proposal section of these Contract Documents (do not detach the form)**.

**AWARD OF CONTRACT:** Bids will be considered for award by the Board of Supervisors. The County of El Dorado reserves the right after opening bids to reject any or all bids, to waive any irregularity in a bid, or to make award to the lowest responsive, responsible Bidder and reject all other bids, as it may best serve the interests of the County.

As a condition of award, the successful Bidder will be required to submit bonds and evidence of insurance prior to execution of the Agreement by the County. Failure to meet this requirement shall constitute abandonment of the Bid by the Bidder and forfeiture of the Bidder's security. Award will then be made to the next lowest responsible Bidder.

**PAYMENTS:** Attention is directed to section 6.2 – PAYMENT of the Conditions of the Contract.

**RETAINAGE FROM PAYMENTS:** The Contractor may elect to receive one hundred percent (100%) of payments due under the Contract from time to time, without retention of any portion of the payment by the County, by depositing securities of equivalent value with the County in accordance with the provisions of Section 22300 of the Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

**PROJECT ADMINISTRATION:** All communications relative to the Contract Documents and Plans shall be directed to Sue Hennike in the County of El Dorado Chief Administrative Office, Procurement & Contracts Division, 360 Fair Lane, Placerville, CA 95667, telephone: (530) 621-5577. No oral responses to any questions concerning the content of the Plans and Contract Documents will be given. All responses will be in the form of written addenda to the Plans and/or Contract Documents.

**BY ORDER OF** the Purchasing Agent, County of El Dorado, State of California.

Authorized by the Chief Administrative Office, Procurement & Contracts Division on TBD at Placerville, California.

By \_\_\_\_\_  
Terri Daly  
Purchasing Agent

**THESE INSTRUCTIONS SUPPLEMENT THE NOTICE TO BIDDERS, PROPOSAL, DRAFT AGREEMENT, AND CONDITIONS OF THE CONTRACT**

**PLACERVILLE GENERATOR REPLACEMENT  
BID #14-968-001**

**INSTRUCTIONS TO BIDDERS**

1. The County of El Dorado will receive sealed bids from Bidders as stipulated in the Notice to Bidders.
2. The County of El Dorado reserves the right after opening bids to reject any or all bids, to waive any irregularity in a bid, or to make award to the lowest responsive, responsible Bidder and reject all other bids, as it may best serve the interests of the County.
3. Bidders must submit bids only on forms provided in the Contract Documents, and shall be accompanied by all documents and information required to be submitted by these Instructions to Bidders, the Notice to Bidders, and by law. Bids not submitted on the required forms shall be deemed nonresponsive and shall not be considered. The Proposal form is bound together with the Notice to Bidders, Instructions to Bidders, Agreement, and attendant documents. A Proposal shall be deemed "Non-Responsive" if the proposal is submitted without the entire Contract Document package attached.
4. Bidders must submit Non-Collusion Affidavit form with their bids. Bids submitted without the affidavit will be deemed nonresponsive and will not be considered.
5. Bidders must supply all information required by Contract Documents and specifications. Bids must be full and complete. The County reserves the right at its sole discretion to reject any bid as nonresponsive as a result of any error or omission in the bid.
6. Bidders may not modify Proposal Document or qualify their bids.
7. Submission of a bid signifies that the Bidder has done a careful examination of the Contract Documents and has a complete understanding of the nature, extent and location of Work to be performed. Bidder must complete the tasks listed below in subsections "a" and "b" as a condition to bidding, and submission of bid shall constitute the Bidder's express representation to the County that Bidder has fully completed the following:
  - a. Bidder has attended the mandatory pre-bid meeting and has examined thoroughly and understands the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as-built conditions, and all local conditions and federal, state and local laws and regulations that in any manner may affect cost, progress, performance or furnishing of Work or which relate to any aspect of the means, methods, techniques, sequences or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto;
  - b. Bidder has given the County representative during the bid period prompt written notice of all conflicts, errors, ambiguities or discrepancies that it has discovered in or among the Contract Documents and as built and actual conditions and the written resolution thereof by County is acceptable to Bidder.
8. Substitutions: If the Bidder lists a manufacturer in its Proposal that is a substitute (i.e. "or equal"), such listing shall be considered a substitution request by the Bidder. If the Bidder is the apparent low Bidder, the Bidder shall, within two (2) business days following the bid opening, submit data substantiating the request for the substitution with the "or equal" item. Failure to submit such substantiating data within two

(2) business days following the bid opening may result in the County deeming the apparent low Bidder non-responsive. If no substitute manufacturer is listed in its Proposal, the Bidder shall supply all materials as specified in the Technical Specifications. NO substitution request will be considered after bid opening.

9. The following documents are to be executed and submitted by the apparent low Bidder after bids have been opened and duly inspected, the Contract has been awarded by the Chief Administrative Office Facilities Manager, and the County transmits the Notice of Award package to the successful Bidder. Failure to properly and timely submit these documents entitles the County to determine that the Bidder has abandoned the contract.

Submit the following documents to Sue Hennike, 360 Fair Lane, Placerville, CA 95667 by 5:00 p.m. of the TENTH calendar day, following the date of the NOTICE OF AWARD OF CONTRACT letter. Execution of Contracts by the County depends upon approval of Insurance Certificates and Bonds, and associated contract documents.

- i. Contracts: The successful Bidder shall execute and submit the Agreements for the work associated with the Proposal Lump Sum Bid Price Schedule (See Draft Agreement). Submit two (2) originals of Agreement, each bearing an original signature.
- ii. County of El Dorado Performance Bond: To be executed by successful Bidder and surety each with notary acknowledgement.
- iii. County of El Dorado Payment Bond: To be executed by successful Bidder and surety each with notary acknowledgement.
- iv. Insurance certificates required by Contract Conditions and Article 8.
- v. California Form 590 – Withholding Exemption and County Payee Data Record Form

**\* END OF DOCUMENT \***

COMPLETING BID IN PENCIL, ERASURES, OVERWRITES, AND USE OF CORRECTION FLUID OR TAPE ARE NOT ACCEPTABLE. BID PROPOSALS WITH PENCIL, ERASURES, OVERWRITES, OR USE OF CORRECTION FLUID OR TAPE WILL BE REJECTED. ALL CHANGES MUST BE LINED OUT AND CORRECTIONS INSERTED ADJACENT TO THE CHANGE AND INITIALED BY THE BIDDER'S AUTHORIZED REPRESENTATIVE

**PROPOSAL**

**(to be attached to and submitted with this bound Contract Document bid package)**

**TO: CHIEF ADMINISTRATIVE OFFICE, FACILITIES DIVISION  
COUNTY OF EL DORADO,  
STATE OF CALIFORNIA**

for the construction of

**PLACERVILLE GENERATOR REPLACEMENT**

**BID #14-968-001**

NAME OF BIDDER: \_\_\_\_\_

BUSINESS MAILING ADDRESS: \_\_\_\_\_

CITY, STATE, ZIP: \_\_\_\_\_

BUSINESS STREET ADDRESS: \_\_\_\_\_

*(Please include even if P.O. Box used)*

CITY, STATE, ZIP: \_\_\_\_\_

TELEPHONE NO:      AREA CODE (      ) \_\_\_\_\_

FAX NO:              AREA CODE (      ) \_\_\_\_\_

The work for which this Proposal is submitted is for the construction in accordance with these Contract Documents (including the payment of not less than the State general prevailing wage rates set forth herein), the Project Plans described below, including any addenda thereto, the Contract annexed hereto, and also in accordance with the Labor Surcharge and Equipment Rental Rates in effect on the date the work is accomplished, and in accordance with the General Prevailing Wage rates. The Project Plans and other Contract Documents for the work to be done are entitled:

## **PLACERVILLE GENERATOR REPLACEMENT**

### **BID #14-968-001**

Bids are to be submitted for the entire work. The work includes LUMP SUM BID. Failure to submit a bid for the entire work will result in the bid being deemed non-responsive.

The Bidder shall set forth a lump sum total for the BID, in clearly legible figures in the respective space provided for this purpose.

If the item total for the lump sum is unreadable or otherwise unclear, or is omitted, the bid may be deemed irregular.

Symbols such as commas and dollar signs will be ignored and have no mathematical significance in establishing lump sums. The written lump sum in numbers will be interpreted according to the number of digits and, if applicable, decimal placement. In the event of a discrepancy, the written lump sum in words will govern over the written lump sum in numbers.

The foregoing provisions for the resolution of specific irregularities cannot be so comprehensive as to cover every omission, inconsistency, error or other irregularity which may occur in a bid. Any situation not specifically provided for will be determined in the discretion of the County of El Dorado, and that discretion will be exercised in the manner deemed by the County of El Dorado to best protect the public interest in the prompt and economical completion of the work. The decision of the County of El Dorado respecting the amount of a bid, or the existence or treatment of any irregularity in a bid, shall be final.

If this Proposal is accepted and the undersigned Bidder shall fail to enter into the Contract and furnish the two bonds in the sums required by the State Contract Act, with surety satisfaction to the County of El Dorado in accordance with the Special Provisions within ten (10) days, not including Saturdays, Sundays, and legal holidays, of the date of the letter notice from the County of El Dorado that the Contract has been awarded, the County of El Dorado may, at its option, determine that the Bidder has abandoned the Contract, and thereupon this Proposal and the acceptance thereof shall be null and void and the forfeiture of such security accompanying this Proposal shall operate and the same shall be the property of the County of El Dorado.

**Attention!** The undersigned Bidder acknowledges that a bid security must be submitted in amount of not less than ten (10) percent of the Lump Sum Bid.

The undersigned, as Bidder, declares under penalty of perjury under the laws of the State of California that the only persons or parties interested in this Proposal, as principals, are those named herein; that this Proposal is made without collusion with any other person, firm, or corporation; that it has carefully examined the location of the proposed work, the annexed proposed form of Contract, and the Plans therein referred to; and that it proposes, and agrees if this Proposal is accepted, that it will contract with the County of El Dorado, in the form of the copy of the Draft Agreement 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 the Engineer as therein set forth, and that it will take in full payment therefore the following item prices, to wit:

**PROPOSAL BID PRICE SCHEDULE  
PLACERVILLE GENERATOR REPLACEMENT  
BID #14-968-001**

**Note: Bid will be awarded on the basis of the lowest responsive, responsible bidder based upon the total of the LUMP SUM bid and meeting all other requirements.**

LUMP SUM BID: (Figure) \$ \_\_\_\_\_

LUMP SUM BID (Words):  
\_\_\_\_\_  
\_\_\_\_\_

NOTICE: Bidder's failure to execute the questionnaire and statements contained in this Bid as required by applicable laws and regulations, or the determinations by El Dorado County based upon those questionnaires and statements, may prohibit award of the subject Contract to the Bidder.



**PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT**

In accordance 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 check mark after "has" or "has not" in one of the blank spaces provided.

The above Statement is part of the Proposal. Signing this Proposal 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 accordance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury under the laws of the State of California, 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 SECTION 10232 STATEMENT**

In accordance with Public Contract Code Section 10232, the Bidder hereby states under penalty of perjury under the laws of the State of California, that no more than one final unappealable finding of contempt of court by a Federal Court has been issued against the Bidder within the immediate preceding two year period because of the Bidder's failure to comply with an order of a Federal Court which orders the Bidder to comply with an order of the National Labor Relations Board.

**NOTE:**

The above Questionnaire and Statement are part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Questionnaire and Statement.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

**NONCOLLUSION AFFIDAVIT**  
(Title 23 United States Code Section 112 and  
Public Contract Code Section 7106)

In accordance with Title 23 United States Code, Section 112 and Public Contract Code Section 7106, the Bidder declares 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 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.

**NOTE:**

The above Noncollusion Affidavit is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Noncollusion Affidavit.

Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

Accompanying this proposal is \_\_\_\_\_

(NOTICE: INSERT THE WORDS "CASH (\$\_\_\_\_)," "CASHIER'S CHECKS," "CERTIFIED CHECKS," OR "BIDDERS BONDS," AS THE CASE MAY BE)

in amount equal to at least ten percent of the total **amount of the Lump Sum Bid.**

**The names of all persons interested in the forgoing Proposal as principals are as follows:**

**IMPORTANT NOTICE:** If the Bidder or other interested person is a corporation, state legal name of corporation and place of incorporation, also names of the president, secretary, treasurer, and executive officer thereof; if a partnership, state name of partnership, also names of all individual partners; if Bidder or other interested person is an individual, state first and last names in full.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Licensed in accordance with an act providing for the registration of Contractors,

License No. \_\_\_\_\_ Classification(s) \_\_\_\_\_

**A copy of the afore-referenced license must be attached hereto.**

**ADDENDA:** This Proposal is submitted with respect to the changes to the Contract included in addenda number(s)

\_\_\_\_\_  
(Fill in addenda numbers if addenda have been received and insert, in this Proposal, any Proposal Pay Items and Bid Price Schedules that were received as part of the addenda)

By my signature on this Proposal I certify, under penalty of perjury under the laws of the State of California, that the foregoing questionnaire and statements of Public Contract Code Sections 10162, 10232, and 10285.1 are true and correct and that I have complied with the requirements of Section 8103 of the Fair Employment and Housing Commission Regulations (Chapter 5 of Division 4 of Title 2 of the California Code of Regulations). By my signature on this Proposal I further certify, under penalty of perjury under the laws of the State of California and the United States of America that the Noncollusion Affidavit required by Title 23 United States Code, Section 112 and Public Contract Code Section 7106 is true and correct.

The person or persons executing this Proposal on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise, that such person is or that such persons are appropriately authorized to act in these regards for such corporation or partnership. Such authority shall be demonstrated to the satisfaction of the County of El Dorado.

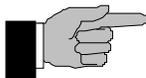
If the signature is by an agent other than an officer of a corporation or a member of a partnership, a power of attorney authorizing said act by the agent on behalf of his principal shall be submitted with the bid forms; otherwise, the bid may be disregarded as irregular and unauthorized.

The Bidder's execution on the signature portion of this Proposal shall constitute an endorsement and execution of those affidavits, declarations and certifications which are part of this Proposal.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_

at: \_\_\_\_\_ County, State of \_\_\_\_\_

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



**SIGN HERE:** \_\_\_\_\_

Name and Title of Bidder: \_\_\_\_\_

Name of Firm: \_\_\_\_\_

**END OF PROPOSAL**

**COUNTY OF EL DORADO**

**BIDDER'S BOND**

**this form MUST be used**

**KNOW ALL PEOPLE BY THESE PRESENTS, THAT WE** \_\_\_\_\_  
\_\_\_\_\_, as **PRINCIPAL**, and  
\_\_\_\_\_

as Surety are held and firmly bound unto the County of El Dorado (Obligee), in the penal sum of **TEN (10) PERCENT OF THE AMOUNT OF THE TOTAL LUMP SUM BID PRICE** of the Principal above named, submitted by said Principal to the Obligee 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 Obligee, we the Principal and Surety 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

**TEN PERCENT (10%) OF THE AMOUNT OF THE TOTAL LUMP SUM BID PRICE**

**THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:**

**WHEREAS**, the Principal has submitted the above-mentioned Bid to the Obligee, as aforesaid, for certain construction specifically described as follows, for which bids are to be opened at Placerville, El Dorado County, California, for the construction of the:

**PLACERVILLE GENERATOR REPLACEMENT**  
**BID #14-968-001**

**NOW, THEREFORE**, if the aforesaid Principal is awarded the Contract and, within the time and manner required under the Contract Documents, after the prescribed forms are presented to it for signature, enters into a written contract, in the prescribed form, in accordance with the Bid, and files two bonds with the County of El Dorado, 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 remain in full force and virtue.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the Court.

IN WITNESS WHEREOF, we have set our hands and seals on this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_

(seal) \_\_\_\_\_  
Principal

(seal) \_\_\_\_\_  
Surety

Address: \_\_\_\_\_  
\_\_\_\_\_

(NOTE: Signature of those executing for the Surety shall be properly acknowledged, and accompanied by a Certificate of Acknowledgment.)

# SURETY

## ACKNOWLEDGMENT

State of California

County of \_\_\_\_\_

On \_\_\_\_\_ before me, \_\_\_\_\_,  
(here insert name and title of the officer)

personally appeared \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature \_\_\_\_\_

(Seal)

**APPLICATION AND CERTIFICATE FOR PAYMENT - EXHIBIT A**

TO OWNER:  
 El Dorado County  
 360 Fair Lane  
 Placerville, CA 95667  
 FROM CONTRACTOR:

PROJECT:

APPLICATION #: 1  
 PERIOD TO:  
 PROJECT NOS:  
 CONTRACT DATE:

Distribution to:

<input type="checkbox"/>	County
<input type="checkbox"/>	Cont Adm
<input type="checkbox"/>	Contractor
<input type="checkbox"/>	

**CONTRACTOR'S APPLICATION FOR PAYMENT**

Application is made for payment, as shown below, in connection with the Contract.  
 Continuation Sheet is attached.

1. ORIGINAL CONTRACT SUM----- \$

2. Net change by Change Orders-----\$

3. CONTRACT SUM TO DATE (Line 1 +/- 2)

4. TOTAL COMPLETED & STORED TO DATE-\$   
 (Column G on Continuation Sheet)

5. RETAINAGE:

a. \_\_\_\_\_ of Completed Work \$   
 (Columns D+E on Continuation Sheet)

b. \_\_\_\_\_ of Stored Material \$   
 (Column F on Continuation Sheet)

Total Retainage (Line 5a + 5b or  
 Total in Column 1 of Continuation Sheet----- \$

6. TOTAL EARNED LESS RETAINAGE----- \$   
 (Line 4 less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT  
 (Line 6 from prior Certificate)----- \$

8. CURRENT PAYMENT DUE----- \$

9. BALANCE TO FINISH, INCLUDING RETAINAGE  
 (Line 3 less Line 6) \$

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Contract Administrator		
Total approved this Month		
TOTALS		
NET CHANGES by Change Order		

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown therein is now due.

CONTRACTOR:

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

State of: California  
 County of: El Dorado

**CERTIFICATE FOR PAYMENT**

In accordance with Contract Documents, based on on-site observations and the data comprising application, the Contract Administrator certifies to El Dorado County that to the best of the Contract Administrator's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ----- \$ \_\_\_\_\_  
 (Attach explanation if amount certified differs from the amount applied for. Initial all figures on this application and on the Continuation Sheet that are changed to conform to the amount certified.)

CONTRACT ADMINISTRATOR

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

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner of Contractor under this Contract.

**CONTINUATION SHEET**

ATTACHMENT TO PAY APPLICATION  
PROJECT:

APPLICATION NUMBER: 1  
APPLICATION DATE:  
PERIOD TO:  
CONTRACTOR'S PROJECT NO:

A Item No.	B Description of Work	C Scheduled Value	D Work Completed		F Materials Presently Stored (Not In D or E)	G		H Balance To Finish (C - G)	I Retainage
			From Previous Application (D + E)	This Period		Total Completed And Stored To Date (D + E + F)	% (G/C)		
1									
2									
3									
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27									
28									
SUBTOTALS PAGE 2									

# County of El Dorado, State of California

BID #14-968-001

## PLACERVILLE GENERATOR REPLACEMENT

**THIS AGREEMENT** ("Agreement") approved by the County of El Dorado Purchasing Agent, this \_\_\_\_\_ day of \_\_\_\_\_, in the year of \_\_\_\_\_, made and concluded, in duplicate, between the COUNTY OF EL DORADO, a political subdivision of the State of California, by the Chief Administrative Office, Facilities Division thereof, the party of the first part hereinafter called "County," and \_\_\_\_\_ (Contractor) party of the second part hereinafter called "Contractor."

### RECITALS:

**WHEREAS**, County has caused the above-captioned project to be let to formal bidding process; and

**WHEREAS**, Contractor has duly submitted a bid response for the captioned project upon which County has awarded this Contract;

**NOW, THEREFORE**, the parties hereto have mutually covenanted and agreed, and by these presents do covenant and agree, each with the other, as follows:

### Article 1. THE WORK

The improvement contemplated in the performance of this Contract is an improvement over which the County of El Dorado shall exercise general supervision. The County therefore, shall have the right, but not the duty to assume full and direct control over this Contract whenever the County at its sole discretion, shall determine that its responsibility is so required.

The Contractor shall complete the Work as specified or indicated under the County's Contract Documents entitled:

## PLACERVILLE GENERATOR REPLACEMENT

The project is located at 360 Fair Lane Drive, Placerville, CA 95667 in El Dorado County. The Work to be done is shown on the Plans, and generally consists of furnishing of all labor, materials and equipment for construction of improvements to the emergency back-up power system at the main government center. Improvements include but are not limited to installation of two packaged generator systems, associated conduits, switch gear, load banks, controls and mechanical screening.

### Article 2. CONTRACT DOCUMENTS

The Contract Documents consist of: the Notice to Bidders; the bid forms which include the accepted Proposal, Proposal Bid Price Schedule, Subcontractors Listing, Section 10285.1 Statement, Section 10162 Questionnaire, Section 10232 Statement, and the Noncollusion Affidavit; the Contract which includes this Agreement with all Exhibits thereto, the Performance Bond and Payment Bond; Conditions of the Contract; the drawings listed and identified as the Project Plans; the Technical Specifications; all Addenda incorporated in those documents before their execution, all Contract Change Orders, Architect's Supplemental Instructions, and Construction Change Directives issued in accordance with the Contract Documents which may be delivered or issued after the Effective Date of this Agreement and are not attached hereto; the prevailing Labor Surcharge And Equipment Rental Rates (when required) as determined by the Department of Industrial Relations to be in effect on the date the Work is accomplished; all the obligations of County and of Contractor which are fully set forth and described therein; and all Contract Documents which are hereby specifically referred to and by such reference made a part hereof. All Contract Documents are intended to cooperate so that any work called for in one and not mentioned in the other is to be executed the same as if mentioned in all Contract Documents. Contractor agrees to perform all of its promises, covenants, and conditions set forth in the Contract Documents, and to abide by and perform all terms and conditions set forth therein. In case of conflict between this Agreement and any other contract document, this Agreement shall take precedence.

**Article 4. CONTRACT PRICE**

As compensation agreed upon for said Work, County shall pay or cause to be paid to Contractor, in full, and for the full contract price and compensation for said completion of the Work, including without limitation, all bonds and insurance, THE NOT TO EXCEED SUM OF (insert dollar amount in words) DOLLARS (\$(insert dollar amount in numbers)) which sum constitutes the Contract Price for the complete Project (the "Contract Price").

**Article 5. COMMENCEMENT AND COMPLETION**

The Work to be performed under this Contract shall commence on the date specified in the Notice to Proceed issued by County. The work shall be diligently prosecuted to completion within **150 Calendar days** commencing from the date shown on the Contractor Notice To Proceed.

County and Contractor recognize that time is of the essence of the Agreement and that County will suffer financial loss if the Work is not completed within the time specified in the above paragraph, plus any extensions thereof allowed in accordance with Article 4.3.5 of the Conditions of the Contract. They also recognize the delays, expense, and difficulties involved with proving in a legal proceeding the actual loss suffered by County if the Work is not completed on time. Accordingly, instead of requiring any such proof, County and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay County the sum of One Thousand dollars (\$1,500.00) per day, as liquidated damages and not as a penalty, for each and every calendar day's delay in finishing the Work in excess of the contract time prescribed herein.

**Article 6. PAYMENT**

Payment shall be made to Contractor as follows:

Progress payments are to be made semi-monthly based on the percentage of completion method reached by the Contractor and invoiced using Exhibit "A", marked "Application and Certificate for Payment" incorporated herein and made by reference a part hereof.

Retention of 5% of the total Contract price will be held at the option of County. Payment by County as herein provided shall not be construed as an absolute acceptance of defects in the work or improper materials.

**Article 7. INDEMNITY**

To the fullest extent allowed by law, Contractor shall defend, indemnify, and hold the County and its officers, directors, and employees harmless against and from any and all claims, suits, losses, damages, and liability for damages, including attorney's fees and other costs of defense brought for or on account of injuries to or death of any person, including but not limited to, workers and the public, or on account of injuries to or death of County employees, or damage to property, or any economic, consequential or special damages which are claimed or which shall in any way arise out of or be connected with Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the Contractor, subcontractors or employees of any of these, except for the active, or sole negligence of the County, its officers and employees, or where expressly prescribed by statute.

The duty to indemnify and hold harmless the County specifically includes the duties to defend set forth in Section 2778 of the Civil Code. The insurance obligations of the Contractor are separate, independent obligations under the Contract Documents, and the provisions of this defense and indemnity are not intended to modify nor should they be construed as modifying or in any way limiting the insurance obligations set forth in the Contract Documents.

**Article 8. NOTICE OF DISCOVERY OF HAZARDOUS WASTE OR UNUSUAL CONDITIONS**

- A. Contractor shall promptly, and before the following conditions are disturbed, notify County in writing, in the event Contractor encounters, after excavating to a depth of greater than four (4) feet, any of the following:
1. Material that Contractor believes may be hazardous waste, as defined in section 25117 of the Health and Safety Code, which is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law; or
  2. Subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or
  3. Unknown physical conditions at the site of any unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the Work provided for in the Contract.
- B. County shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, or cause a decrease or increase in Contractor's cost of, or time required for performance of any part of the Work, an adjustment, excluding loss of anticipated profits, will be made and the Contract will be modified by a Change Order. County will notify Contractor of County's determination as to whether or not an adjustment of the Contract is warranted.

C. In the event 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 Contractor's cost of, or time required for, performance of any part of the Work, Contractor shall not be excused from any scheduled completion date provided for by the Contract, but shall proceed with all Work to be performed under the Contract. Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between Contractor and County.

#### **Article 9. GUARANTEES**

Contractor shall repair or replace any or all work provided hereunder which is defective due to faulty materials, poor workmanship, or defective equipment at no expense to County, ordinary wear or tear and unusual abuse or neglect excepted, during the term of the Contract and for a period of one (1) year after contract Acceptance. Contractor shall be required to repair or replace any and all adjacent facilities or areas which have been damaged or displaced due to Contractor work performed under this Agreement at no expense to County during the term of this Contract and for a period of one (1) year after Contract Acceptance.

If a warranty or guarantee exceeding one (1) year is provided by the supplier or manufacturer of any equipment or materials used in this Project, or if a warranty or guarantee exceeding one (1) year is required elsewhere in these Contract Documents, then the guarantee for such equipment or materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and Contractor shall supply County with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by its suppliers or manufacturers.

The parties agree that this guarantee and the rights and obligations accruing therefrom shall be in addition to, and not by way of limitation in any manner whatsoever to, the rights, obligations, warranties or remedies otherwise provided for by law.

In the event of Contractor's failure to comply with the above mentioned conditions within ten (10) calendar days after being notified in writing by County, Contractor hereby authorizes County to proceed to have said defects repaired and made good at Contractor's expense, and Contractor will honor and pay all costs and charges therefore upon written demand.

#### **Article 10. NOTICE**

Any notice or other correspondence required to be given under this Agreement by either party to the other may be affected by personal delivery in writing or by mail, postage prepaid. Notices personally delivered during normal business hours shall be deemed received on the actual date of delivery; mailed notices shall be deemed received one (1) day after affixed postmark. Notices and correspondence to County shall be in duplicate and shall be delivered to it as follows:

To County:

County of El Dorado  
Chief Administrative Office  
3000 Fairlane Court, Suite One

Attn.: Russ Fackrell  
Facilities Manager

Notices and correspondence to Contractor shall be delivered when personally delivered to, or if mailed, addressed to Contractor at:

Contractor's Business Name

Street Address  
City, State Zip

Attn.: Name of Notices Recipient  
Title of Notices Recipient

Either party may change its address for notices by giving written notice pursuant to this Article.

**Article 11. VENUE**

Any litigation arising out of this Contract shall be brought in El Dorado County.

**Article 12. NOTIFICATION OF SURETY COMPANY**

The surety company shall familiarize itself with all of the conditions and provisions of this Contract, and shall waive the right of special notification of any change or modifications of this Contract or extension of time, or of decreased or increased work, or of the cancellation of the Contract, or of any other act or acts by County or its authorized agents, under the terms of this Contract; and failure to so notify the aforesaid surety company of changes shall in no way relieve the surety company of its obligation under this Contract.

**Article 13. ASSIGNMENT OF ANTITRUST ACTIONS**

In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, the Contractor offers and agrees and will require all of its subcontractors and suppliers to agree to assign to the awarding body all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to Contractor, without further acknowledgment by the parties.

If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

**Article 14. TERMINATION BY COUNTY FOR CONVENIENCE**

County reserves the right to terminate the Contract at any time upon determination by County's representative that termination of the Contract is in the best interest of County. County shall issue Contractor a written notice specifying that the Contract is to be terminated.

Upon receipt of said written notice, Contractor shall stop all work under the Contract except: (1) work specifically directed to be completed prior to termination, (2) work the Inspector deems necessary to secure the project for termination, (3) removal of equipment and plant from the site of the Work, (4) action that is necessary to protect materials from damage, (5) disposal of materials not yet used in the Work as directed by County, and (6) clean up of the site.

If the Contract is terminated for County's convenience as provided herein, all finished or unfinished work and materials previously paid for shall, at the option of County, become its property. Contractor shall be paid an amount which reflects costs incurred for work provided to the date of notification of termination. In addition, Contractor shall be paid the reasonable cost, as solely judged by County, and without profit, for all work performed to secure the project for termination.

**Article 15. TERMINATION BY COUNTY FOR CAUSE**

If Contractor is adjudged as bankrupt or insolvent, or makes a general assignment for the benefit of its creditors or if a trustee or receiver is appointed for Contractor or for any of its property, or if Contractor files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or on more than one occasion fails to supply sufficient skilled workmen or suitable material or equipment, or on more than one occasion fails to make prompt payments to subcontractors for labor, materials, or equipment, or disregards the authority of the County's representative, or the Engineer, if one is appointed, or otherwise violates any provision of the Contract Documents, then County may, without prejudice to any other right or remedy and after giving Contractor and its Surety a minimum of ten (10) days from delivery of a written termination notice, terminate the services of Contractor and take equipment and machinery thereon owned by Contractor and finish the Work by whatever method County may deem expedient. In such case, Contractor shall not be entitled to receive any further payment until the Work is finished.

Without prejudice to other rights or remedies County may have, if Contractor fails to begin delivery of materials and equipment, to commence Work within the time specified, to maintain the rate of delivery of material, to execute the Work in the manner and at such locations as specified, or fails to maintain a work program which will ensure County's interest, or, if Contractor is not carrying out the intent of the Contract, an Inspector's written notice may be served upon Contractor and the Surety on its faithful performance bond demanding satisfactory compliance with the Contract. If Contractor or its Surety does not comply with such notice within five (5) days after receiving it, or after starting to comply, fails to continue, County may exclude it from the premises and take possession of all material and equipment, and complete the Work by County's own forces, by letting the unfinished Work to another Contractor, or by a combination of such methods.

Where Contractor's services have been so terminated by County, said termination shall not affect any right of County against Contractor then existing or which may thereafter accrue. Any retention or payment of monies by County due Contractor will not release Contractor from compliance with the Contract Documents.

If the unpaid balance of the Contract price exceeds the direct and indirect costs of completing the Work, including compensation for additional professional services, such excess shall be paid to Contractor. If the sums under the Contract are insufficient for completion, Contractor or Surety shall pay to County within five (5) days after the completion, all costs in excess of the Contract price. In any event, the cost of completing the Work shall be charged against Contractor and its Surety and may be deducted from any money due or becoming due from County.

The provisions of this Article shall be in addition to all other rights and remedies available to County under law.

If after notice of termination, it is determined for any reason that Contractor was not in default, the rights and obligations of the parties shall be the same as if the notice of termination had not been issued. The Contract shall be equitably adjusted to compensate for such termination.

**Article 16. SUCCESSORS AND ASSIGNS**

This Agreement shall bind and inure to the heirs, devisees, assignees, and successors in interest of Contractor and to the successors in interest of County in the same manner as if such parties had been expressly named herein.

**Article 17. REPORTING ACCIDENTS**

Contractor shall prepare and submit (within 24 hours of such incidents) reports of accidents at the site and anywhere else the work is in progress in which bodily injury is sustained or property loss in excess of Five Hundred Dollars (\$500.00) occurs.

**Article 18. WORKERS' COMPENSATION CERTIFICATION**

Contractor shall comply with Labor Code Sections 3700 et seq., requiring it to obtain Workers' Compensation Insurance, and sign a certificate of knowledge thereof.

**CERTIFICATE OF KNOWLEDGE - LABOR CODE SECTION 3700**

I am aware of the provisions of Section 3700 of the Labor Code, which require every employer to be insured against liability for workers' 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 work of this Contract.

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

**Article 19. WARRANTY**

Contractor warrants to County that materials and equipment furnished for the Work will be of good quality and new, unless otherwise required or permitted under the Contract Documents, that the Work will be free from defects or flaws and is of the highest quality of workmanship and that the Work will conform with the requirements herein. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

**Article 20. RETAINAGE**

The retainage from payments is set forth in Section 6.4 "WITHHOLDINGS FROM PAYMENTS" of the Conditions of the Contract. Contractor may elect to receive one hundred percent (100%) of payments due as set forth in the Contract Documents, without retention, by depositing securities of equivalent value with County, in accordance with, and as set forth in Section 22300 of the Public Contract Code. Securities eligible for deposit hereunder shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit.

**Article 21. PREVAILING WAGE REQUIREMENTS**

In accordance with the provisions of California Labor Code Sections 1770 et seq., the general prevailing rate of wages in the county in which the Work is to be done has been determined by the Director of the California Department of Industrial Relations. These wage rates appear in the California Department of Transportation publication entitled General Prevailing Wage Rates. Interested parties can obtain the current wage information by submitting their requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.

Copies of the general prevailing rate of wages in the county in which the Work is to be done are also on file at the Chief Administrative Office, Facilities Division, and are available upon request.

In accordance with the provisions of Labor Code 1810, eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and Contractor and any subcontractor employed under this Contract shall conform to and be bound by the provisions of Labor Code Sections 1810 through 1815.

**Article 22. BUSINESS LICENSE**

The County Business License Ordinance provides that it is unlawful for any person to furnish supplies or services, or transact any kind of business in the unincorporated territory of El Dorado County without possessing a County business license unless exempt under County Ordinance Code Section 5.08.070. Contractor warrants and represents that it shall comply with all of the requirements of the County Business License Ordinance, where applicable, prior to beginning work under this Contract and at all times during the term of this Contract.

**Article 23. CONTRACT ADMINISTRATOR**

The County Officer or employee with responsibility for administering this Agreement is Russ Fackrell, Facilities Manager, 3000 Fairlane Court, Suite 1, Placerville, CA, Chief Administrative Office, or successor.

**Article 24. AUTHORIZED SIGNATURES**

The parties hereto represent that the undersigned individuals executing this Agreement on their behalf are fully authorized to do so by law or other appropriate instrument and to bind upon said parties the obligations set forth herein.

**Article 25. PARTIAL INVALIDITY**

If any provision of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions will continue in full force and effect without being impaired or invalidated in any way.

**Article 26. ENTIRE AGREEMENT**

This document and the documents referred to herein or exhibits hereto are the entire Agreement between the parties and they incorporate or supersede all prior written or oral agreements or understandings.

**IN WITNESS WHEREOF**, the said Chief Administration Office, Facilities Division of the County of El Dorado, State of California, has caused this Agreement to be executed by County's Purchasing Agent, on its behalf, and the said Contractor has signed this Agreement the day and year written below.

**COUNTY OF EL DORADO**

Dated: \_\_\_\_\_

Terri Daly

Purchasing Agent  
County of El Dorado

**CONTRACTOR**

Dated: \_\_\_\_\_  
Name of Company

By: \_\_\_\_\_  
Authorized Representative License No. Federal Employer Identification No.

NOTE: If Contractor 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 Contractor 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 Contractor is an individual, his/her signature shall be placed above. Contractor executing this document on behalf of a corporation or partnership shall be prepared to demonstrate by resolution, article, or otherwise that it is appropriately authorized to act in these regards. For such corporation or partnership, such authority shall be demonstrated to the satisfaction of County. If signature is by an agent, other than officer of a corporation or a member of a partnership, an appropriate Power of Attorney shall be on file with the Department prior to signing this document.

Mailing Address: \_\_\_\_\_

Business Address: \_\_\_\_\_

City, Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

**END OF CONTRACT**

**COUNTY OF EL DORADO**

**PAYMENT BOND**

(Section 3247, Civil Code)

Bond No. \_\_\_\_\_

WHEREAS, the County of El Dorado, a political subdivision of the State of California, hereafter referred to as "Obligee", has awarded to Contractor

\_\_\_\_\_ hereafter referred to as "Principal", a contract for the work described as follows:

**PLACERVILLE GENERATOR REPLACEMENT  
 BID #14-968-001**

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

NOW, THEREFORE, we the undersigned Principal and Surety are held and firmly bound unto the Obligee, in the sum of \_\_\_\_\_ Dollars, (\$ \_\_\_\_\_) to be paid to the Obligee, for which payment we bind ourselves, jointly and severally.

**THE CONDITION OF THIS OBLIGATION IS SUCH,**

That if said Principal 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 from the wages of employees of the Principal 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: \_\_\_\_\_

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

\_\_\_\_\_  
 PRINCIPAL  
 \_\_\_\_\_  
 SURETY  
 \_\_\_\_\_  
 ATTORNEY-IN-FACT

NOTE: Signatures of those executing for the Principal and for the Surety must be properly acknowledged, and a Power of Attorney attached for the Surety.

**NOTARY ACKNOWLEDGMENTS ATTACHED**

# PRINCIPAL

## ACKNOWLEDGMENT

State of California

County of \_\_\_\_\_

On \_\_\_\_\_ before me, \_\_\_\_\_,  
(here insert name and title of the officer)

personally appeared \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature \_\_\_\_\_

(Seal)

# SURETY

## ACKNOWLEDGMENT

State of California

County of \_\_\_\_\_

On \_\_\_\_\_ before me, \_\_\_\_\_,  
(here insert name and title of the officer)

personally appeared \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature \_\_\_\_\_

(Seal)

**COUNTY OF EL DORADO**

**PERFORMANCE BOND**

Bond No. \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that we \_\_\_\_\_  
the Contractor in the Contract hereto annexed, as Principal, and \_\_\_\_\_  
as Surety, are held firmly bound unto the County of El Dorado, a political subdivision of the State of California, hereinafter  
called the "Obligee" in the sum of \_\_\_\_\_ DOLLARS,  
(\$ \_\_\_\_\_ ) lawful money of the United States, for which payment, well and truly to be made, we  
bind ourselves, jointly and severally, firmly by these presents.

Signed, sealed and dated: \_\_\_\_\_

The condition of the above obligation is such that if said Principal as Contractor in the Contract hereto annexed shall faithfully perform each and all of the conditions of said Contract to be performed by him, and shall furnish all tools, equipment, apparatus, facilities, transportation, labor and material, other than material, if any, agreed to be furnished by the Obligee, necessary to perform and complete, and to perform and complete in a good and workmanlike manner, the work of **BID #14-968-001 for the PLACERVILLE GENERATOR REPLACEMENT** in strict conformity with the terms and conditions set forth in the Contract hereto annexed, then this obligation shall be null and void; otherwise this bond shall remain in full force and effect and the said Surety will complete the Contract work under its own supervision, by Contract or otherwise, and pay all costs thereof for the balance due under terms of the Contract, and the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

This guarantee shall insure the Obligee during the work required by any Contract and for a period of one (1) year from the date of acceptance of the work against faulty or improper materials or workmanship that may be discovered during that time.

No right of action shall accrue under this bond to or for the use of any person other than the Obligee named herein.

Dated: \_\_\_\_\_, 20\_\_\_\_\_.

Correspondence or Claims relating to this bond should be sent to the Surety at the following address:

_____	_____
_____	PRINCIPAL
_____	_____
_____	SURETY
_____	_____
	ATTORNEY-IN-FACT

NOTE: Signatures of those executing for the Principal and the Surety must be properly acknowledged, and a Power of Attorney attached for the Surety.

**NOTARY ACKNOWLEDGMENTS ATTACHED**

**PRINCIPAL**

**ACKNOWLEDGMENT**

State of California

County of \_\_\_\_\_

On \_\_\_\_\_ before me, \_\_\_\_\_,  
(here insert name and title of the officer)

personally appeared \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature \_\_\_\_\_

(Seal)

**SURETY**

**ACKNOWLEDGMENT**

State of California

County of \_\_\_\_\_

On \_\_\_\_\_ before me, \_\_\_\_\_,  
(here insert name and title of the officer)

personally appeared \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ ,

who proved to me on the basis of satisfactory evidence to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

I certify under PENALTY OF PERJURY under the laws of the State of California that the foregoing paragraph is true and correct.

WITNESS my hand and official seal.

Signature \_\_\_\_\_

(Seal)

# Withholding Exemption Certificate

**2012**

(This form can only be used to certify exemption from nonresident withholding under California Revenue and Taxation Code (R&TC) Section 18662. Do not use this form for exemption from wage withholding.)

**590**

File this form with your withholding agent. (Please type or print)

Withholding agent's name \_\_\_\_\_

Payee's name \_\_\_\_\_

Payee's  SOS file no.  SSN or ITIN  CA corp. no.  FEIN

Address (number and street, PO Box, or PMB no.) \_\_\_\_\_

Apt. no./ Ste. no. \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

ZIP Code \_\_\_\_\_

Read the following carefully and check the box that applies to the payee.

I certify that for the reasons checked below, the payee named on this form is exempt from the California income tax withholding requirement on payment(s) made to the entity or individual.

**Individuals — Certification of Residency:**

I am a resident of California and I reside at the address shown above. If I become a nonresident at any time, I will promptly notify the withholding agent. See instructions for General Information D, Who is a Resident, for the definition of a resident.

**Corporations:**

The above-named corporation has a permanent place of business in California at the address shown above or is qualified through the California Secretary of State (SOS) to do business in California. The corporation will file a California tax return and withhold on payments of California source income to nonresidents when required. If this corporation ceases to have a permanent place of business in California or ceases to do any of the above, I will promptly notify the withholding agent. See instructions for General Information F, What is a Permanent Place of Business, for the definition of permanent place of business.

**Partnerships or limited liability companies (LLC):**

The above-named partnership or LLC has a permanent place of business in California at the address shown above or is registered with the California SOS, and is subject to the laws of California. The partnership or LLC will file a California tax return and will withhold on foreign and domestic nonresident partners or members when required. If the partnership or LLC ceases to do any of the above, I will promptly inform the withholding agent. For withholding purposes, a limited liability partnership (LLP) is treated like any other partnership.

**Tax-Exempt Entities:**

The above-named entity is exempt from tax under California Revenue and Taxation Code (R&TC) Section 23701 \_\_\_\_\_ (insert letter) or Internal Revenue Code Section 501(c) \_\_\_\_\_ (insert number). The tax-exempt entity will withhold on payments of California source income to nonresidents when required. If this entity ceases to be exempt from tax, I will promptly notify the withholding agent. Individuals cannot be tax-exempt entities.

**Insurance Companies, Individual Retirement Arrangements (IRAs), or Qualified Pension/Profit Sharing Plans:**

The above-named entity is an insurance company, IRA, or a federally qualified pension or profit-sharing plan.

**California Trusts:**

At least one trustee and one noncontingent beneficiary of the above-named trust is a California resident. The trust will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required. If the trustee becomes a nonresident at any time, I will promptly notify the withholding agent.

**Estates — Certification of Residency of Deceased Person:**

I am the executor of the above-named person's estate. The decedent was a California resident at the time of death. The estate will file a California fiduciary tax return and will withhold on foreign and domestic nonresident beneficiaries when required.

**Nonmilitary Spouse of a Military Servicemember:**

I am a nonmilitary spouse of a military servicemember and I meet the Military Spouse Residency Relief Act (MSRRA) requirements. See instructions for General Information E, MSRRA.

**CERTIFICATE:** Please complete and sign below.

Under penalties of perjury, I hereby certify that the information provided in this document is, to the best of my knowledge, true and correct. If conditions change, I will promptly notify the withholding agent.

Payee's name and title (type or print) \_\_\_\_\_ Daytime telephone no. \_\_\_\_\_

Payee's signature ► \_\_\_\_\_ Date \_\_\_\_\_

# Instructions for Form 590

## Withholding Exemption Certificate

References in these instructions are to the California Revenue and Taxation Code (R&TC).

### General Information

For purposes of California income tax, references to a spouse, husband, or wife also refer to a Registered Domestic Partner (RDP) unless otherwise specified. For more information on RDPs, get FTB Pub. 737, Tax Information for Registered Domestic Partners.

**Private Mail Box (PMB)** – Include the PMB in the address field. Write “PMB” first, then the box number. Example: 111 Main Street PMB 123.

**Foreign Address** – Enter the information in the following order: City, Country, Province/Region, and Postal Code. Follow the country's practice for entering the postal code. **Do not** abbreviate the country's name.

### A Purpose

Use Form 590, Withholding Exemption Certificate, to certify an exemption from nonresident withholding. California residents or entities should complete and present Form 590 to the withholding agent. The withholding agent is then relieved of the withholding requirements if the agent relies in good faith on a completed and signed Form 590 unless told by the FTB that the form should not be relied upon.

The following are excluded from withholding and completing this form:

- The United States and any of its agencies or instrumentalities
- A state, a possession of the United States, the District of Columbia, or any of its political subdivisions or instrumentalities
- A foreign government or any of its political subdivisions, agencies, or instrumentalities

**Important – This form cannot be used for exemption from wage and real estate withholding.**

- If you are an employee, any wage withholding questions should be directed to the FTB General Information number, 800.852.5711. Employers should call **888.745.3886** or go to **edd.ca.gov**.
- Sellers of California real estate use Form 593-C, Real Estate Withholding Certificate, to claim an exemption from real estate withholding.

### B Requirement

R&TC Section 18662 requires withholding of income or franchise tax on payments of California source income made to nonresidents of California.

Withholding is required on the following, but is not limited to:

- Payments to nonresidents for services rendered in California.
- Distributions of California source income made to domestic nonresident S corporation

shareholders, partners and members and allocations of California source income made to foreign partners and members.

- Payments to nonresidents for rents if the payments are made in the course of the withholding agent's business.
- Payments to nonresidents for royalties with activities in California.
- Distributions of California source income to nonresident beneficiaries from an estate or trust.
- Prizes and winnings received by nonresidents for contests in California.

However, withholding is optional if the total payments of California source income are \$1,500 or less during the calendar year.

For more information on withholding get FTB Pub. 1017, Resident and Nonresident Withholding Guidelines. To get a withholding publication see General Information H, Publications, Forms, and Additional Information.

**Backup Withholding** – Beginning on or after January 1, 2010, with certain limited exceptions, payers that are required to withhold and remit backup withholding to the Internal Revenue Service (IRS) are also required to withhold and remit to the Franchise Tax Board (FTB). The California backup withholding rate is 7% of the payment. For California purposes, dividends, interests, and any financial institutions release of loan funds made in the normal course of business are exempt from backup withholding. For additional information on California backup withholding, go to **ftb.ca.gov** and search for **backup withholding**.

If a payee has backup withholding, the payee must contact the FTB to provide a valid Taxpayer Identification Number (TIN) before filing a tax return. The following are acceptable TINs: social security number (SSN); individual taxpayer identification number (ITIN); federal employer identification number (FEIN); California corporation number (CA Corp No.); or Secretary of State (SOS) file number. Failure to provide a valid TIN will result in the denial of the backup withholding credit. For more information go to **ftb.ca.gov** and search for **backup withholding**.

### C Who Certifies this Form

Form 590 is certified by the payee. An incomplete certificate is invalid and the withholding agent should not accept it. If the withholding agent receives an incomplete certificate, the withholding agent is required to withhold tax on payments made to the payee until a valid certificate is received. In lieu of a completed certificate on the preprinted form, the withholding agent may accept as a substitute certificate a letter from the payee explaining

why the payee is not subject to withholding. The letter must contain all the information required on the certificate in similar language, including the under penalty of perjury statement and the payee's taxpayer identification number. The withholding agent must retain a copy of the certificate or substitute for at least four years after the last payment to which the certificate applies, and provide it upon request to the Franchise Tax Board.

For example, if an entertainer (or the entertainer's business entity) is paid for a performance, the entertainer's information must be provided. **Do not** submit the entertainer's agent or promoter information.

The grantor of a grantor trust shall be treated as the payee for withholding purposes. Therefore, if the payee is a grantor trust and one or more of the grantors is a nonresident, withholding is required. If all of the grantors on the trust are residents, no withholding is required. Resident grantors can check the box on Form 590 labeled “Individuals — Certification of Residency.”

### D Who is a Resident

A California resident is any individual who is in California for other than a temporary or transitory purpose or any individual domiciled in California who is absent for a temporary or transitory purpose.

An individual domiciled in California who is absent from California for an uninterrupted period of at least 546 consecutive days under an employment-related contract is considered outside California for other than a temporary or transitory purpose.

An individual is still considered outside California for other than a temporary or transitory purpose if return visits to California do not total more than 45 days during any taxable year covered by an employment contract.

This provision does not apply if an individual has income from stocks, bonds, notes, or other intangible personal property in excess of \$200,000 in any taxable year in which the employment-related contract is in effect.

A spouse/RDP absent from California for an uninterrupted period of at least 546 days to accompany a spouse/RDP under an employment-related contract is considered outside of California for other than a temporary or transitory purpose.

Generally, an individual who comes to California for a purpose which will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.

For assistance in determining resident status,

get FTB Pub. 1031, Guidelines for Determining Resident Status, and FTB Pub. 1032, Tax Information for Military Personnel, or call the FTB at 800.852.5711 or 916.845.6500.

## E Military Spouse Residency Relief Act (MSRRA)

Generally, for tax purposes you are considered to maintain your existing residence or domicile. If a military servicemember and nonmilitary spouse have the same state of domicile, the MSRRA provides:

- A spouse shall not be deemed to have lost a residence or domicile in any state solely by reason of being absent to be with the servicemember serving in compliance with military orders.
- A spouse shall not be deemed to have acquired a residence or domicile in any other state solely by reason of being there to be with the servicemember serving in compliance with military orders.

**Domicile** is defined as the one place:

- Where you maintain a true, fixed, and permanent home
- To which you intend to return whenever you are absent

A military servicemember's nonmilitary spouse is considered a nonresident for tax purposes if the servicemember and spouse have the same domicile outside of California and the spouse is in California solely to be with the servicemember who is serving in compliance with Permanent Change of Station orders.

Note: California may require nonmilitary spouses of military servicemembers to provide proof that they meet the criteria for California personal income tax exemption as set forth in the MSRRA.

Income of a military servicemember's nonmilitary spouse for services performed in California is not California source income subject to state tax if the spouse is in California to be with the servicemember serving in compliance with military orders, and the servicemember and spouse have the same domicile in a state other than California.

For additional information or assistance in determining whether the applicant meets the MSRRA requirements, get FTB Pub. 1032.

## F What is a Permanent Place of Business

A corporation has a permanent place of business in California if it is organized and existing under the laws of California or if it is a foreign corporation qualified to transact intrastate business by the SOS. A corporation that has not qualified to transact intrastate business (e.g., a corporation engaged exclusively in interstate commerce) will be considered as having a permanent place of business in California only if it maintains a permanent office in California that is permanently staffed by its employees.

## G Withholding Agent

Keep Form 590 for your records. **Do not** send this form to the FTB unless it has been specifically requested.

For more information, contact Withholding Services and Compliance, see General Information H.

The payee must notify the withholding agent if any of the following situations occur:

- The individual payee becomes a nonresident.
- The corporation ceases to have a permanent place of business in California or ceases to be qualified to do business in California.
- The partnership ceases to have a permanent place of business in California.
- The LLC ceases to have a permanent place of business in California.
- The tax-exempt entity loses its tax-exempt status.

The withholding agent must then withhold and report the withholding using Form 592, Resident and Nonresident Withholding Statement, and remit the withholding using Form 592-V, Payment Voucher for Resident and Nonresident Withholding. Form 592-B, Resident and Nonresident Withholding Tax Statement, is retained by the withholding agent

and a copy is given to the payee.

## H Publications, Forms, and Additional Information

You can download, view, and print California tax forms and publications at [ftb.ca.gov](http://ftb.ca.gov).

To have publications or forms mailed to you or to get additional nonresident withholding information, contact the Withholding Services and Compliance.

WITHHOLDING SERVICES AND  
COMPLIANCE MS F182  
FRANCHISE TAX BOARD  
PO BOX 942867  
SACRAMENTO CA 94267-0651

Telephone: 888.792.4900  
916.845.4900  
Fax: 916.845.9512

OR to get forms by mail write to:

TAX FORMS REQUEST UNIT MS F284  
FRANCHISE TAX BOARD  
PO BOX 307  
RANCHO CORDOVA CA 95741-0307

For all other questions unrelated to withholding or to access the TTY/TDD numbers, see the information below.

### Internet and Telephone Assistance

Website: [ftb.ca.gov](http://ftb.ca.gov)  
Telephone: 800.852.5711 from within the  
United States  
916.845.6500 from outside the  
United States  
TTY/TDD: 800.822.6268 for persons with  
hearing or speech impairments

### Asistencia Por Internet y Teléfono

Sitio web: [ftb.ca.gov](http://ftb.ca.gov)  
Teléfono: 800.852.5711 dentro de los  
Estados Unidos  
916.845.6500 fuera de los Estados  
Unidos  
TTY/TDD: 800.822.6268 personas con  
discapacidades auditivas  
y del habla



# County of El Dorado

## OFFICE OF AUDITOR-CONTROLLER

360 FAIR LANE  
PLACERVILLE, CALIFORNIA 95667  
Phone: (530) 621-5487 FAX: (530) 295-2535

**JOE HARN, CPA**  
Auditor-Controller

**BOB TOSCANO**  
Assistant Auditor-Controller

### PAYEE DATA RECORD

(Required in lieu of IRS W-9 when receiving payment from the County of El Dorado)  
Version: June 2011

<b>1</b>	<b>INSTRUCTIONS:</b> Complete all information on this form. Sign, date, and return to the address shown at the bottom of this page. Prompt return of this <b>fully completed</b> form will prevent delays in processing payments. Information provided in this form will be used by the County of El Dorado to prepare Information Returns (1099), for withholding on payments to nonresident payees, and for reporting to the Employment Development Department (EDD). See reverse side for more information and Privacy Statement.		
<b>2</b>	<b>PAYEE'S LEGAL BUSINESS NAME</b> (Type or Print)		
	<b>INDIVIDUALS AND SOLE PROPRIETORS – ENTER NAME AS SHOWN ON SSN</b> (Last, First, M.I.)		<b>PHONE NUMBER:</b>
	<b>MAILING ADDRESS</b>		<b>BUSINESS ADDRESS</b>
	<b>CITY, STATE, ZIP CODE</b>		<b>CITY, STATE, ZIP CODE</b>
<b>3</b>	<b>ENTER FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN):</b> <input type="text"/> <input type="text"/> - <input type="text"/>		<b>NOTE:</b> <b>Individuals and sole proprietors are required to provide their SSN (FEIN may be provided in addition to but not in lieu of the SSN)</b>
<b>PAYEE ENTITY TYPE</b>  <b>CHECK ONE BOX ONLY</b>	<input type="checkbox"/> <b>PARTNERSHIP</b> <b>CORPORATION:</b> <input type="checkbox"/> <b>ESTATE OR TRUST</b> <input type="checkbox"/> <b>MEDICAL</b> (e.g., dentistry, psychotherapy, chiropractic, etc.) <input type="checkbox"/> <b>LIMITED LIABILITY COMPANY</b> <input type="checkbox"/> <b>LEGAL</b> (e.g., attorney services) <input type="checkbox"/> <b>EXEMPT</b> (nonprofit) <input type="checkbox"/> <b>ALL OTHER</b>		
<input type="checkbox"/> <b>INDIVIDUAL OR SOLE PROPRIETOR</b> <b>ENTER SOCIAL SECURITY NUMBER:</b> <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> - <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>			
(SSN required by authority of California Revenue and Tax Code Section 18646)			
<b>4</b>	<b>Applicable <u>only</u> if the business address provided in Part 2 is <u>not</u> a physical California address</b> <b>NOTE:</b> If you are a California nonresident providing services to County of El Dorado in California, seven percent (7%) of the payment will be withheld and remitted to the California Franchise Tax Board (FTB) unless you are exempt or have obtained a waiver from FTB. Mark if any of the following apply: <input type="checkbox"/> Exempt from withholding of California income (attach California Form 590) <input type="checkbox"/> Obtained Franchise Tax Board waiver of State withholding (attach a copy) If you are a California nonresident and charge California sales tax, a valid California sales tax permit number is required: <input type="text"/> <input type="text"/>		
<b>5</b>	<b>I hereby certify under penalty of perjury that the information provided on this document is true and correct. Should my residency status change, I will promptly notify the County of El Dorado at the address listed below.</b>		
<b>AUTHORIZED PAYEE REPRESENTATIVE'S NAME</b> (Type or Print)		<b>TITLE</b>	
<b>SIGNATURE</b>		<b>DATE</b>	<b>TELEPHONE</b>
<b>6</b>	<b>Please return completed form to:</b> <b>Department/Office:</b> <u>County of El Dorado, Procurement &amp; Contracts</u> <b>Mailing Address:</b> <u>360 Fair Lane</u> <b>City/State/Zip:</b> <u>Placerville, CA 95667</u> <b>Telephone:</b> <u>530 621 5830</u> <b>Fax:</b> <u>530 295 2537</u>		

**PAYEE DATA RECORD**

(REVERSE)

<p><b>1</b></p>	<p><b>Requirement to Complete Payee Data Record</b></p> <p>A completed Payee Data Record is required for payments to all non-governmental entities and will be kept on file at the County of El Dorado Auditor-Controller's Office.</p> <p>Payees who do not wish to complete the Payee Data Record may elect to not do business with the County of El Dorado. If the payee does not complete the form and the required payee data is not otherwise provided, payment may be reduced for federal backup withholding and nonresident State income tax withholding. Amounts reported on Information Returns (1099) are in accordance with the Internal Revenue Code and the California Revenue and Taxation Code.</p>
<p><b>2</b></p>	<p>Enter the payee's legal business name. Sole proprietorships must also include the owner's full name. An individual must list his/her full name. The mailing address should be the address at which the payee chooses to receive correspondence. Do not enter payment address or lock box information here.</p>
<p><b>3</b></p>	<p>Check the box that corresponds to the payee business type. Check only one box. Corporations must check the box that identifies the type of corporation. The County of El Dorado requires that all parties entering into business transactions that may lead to payment(s) from the County provide their Taxpayer Identification Number (TIN). The TIN is required by the California Revenue and Taxation Code Section 18646 to facilitate tax compliance enforcement activities and the preparation of Form 1099 and other information returns as required by the Internal Revenue Code Section 6109(a).</p> <p>The TIN for individuals and sole proprietorships is the Social Security Number (SSN). Only partnerships, estates, trusts, limited liability corporations and corporations will enter their Federal Employer Identification Number (FEIN).</p> <p><b>4 Are you a California resident or nonresident?</b></p> <p>A corporation will be defined as a "resident" if it has a permanent place of business in California or is qualified through the Secretary of State to do business in California.</p> <p>A partnership is considered a resident partnership if it has a permanent place of business in California. An estate is a resident if the decedent was a California resident at time of death. A trust is a resident if at least one trustee is a California resident.</p> <p>For individuals and sole proprietors, the term "resident" includes every individual who is in California for other than a temporary or transitory purpose and any individual domiciled in California who is absent for a temporary or transitory purpose. Generally, an individual who comes to California for a purpose that will extend over a long or indefinite period will be considered a resident. However, an individual who comes to perform a particular contract of short duration will be considered a nonresident.</p> <p>Payments to all nonresidents may be subject to withholding. Nonresident payees performing services in California or receiving rent, lease, or royalty payments from property (real or personal) located in California will have 7% of their total payments withheld for State income taxes. However, no withholding is required if total payments to the payee are \$1,500 or less for the calendar year. Nonresidents who have been granted a waiver on payments of California source income from the California Franchise Tax Board must submit a copy of the waiver.</p> <p>For information on Nonresident Withholding, contact the Franchise Tax Board at the numbers listed below:                  Withholding Services and Compliance Section: 1-888-792-4900 E-mail address: wscs.gen@ftb.ca.gov                  For hearing impaired with TDD, call: 1-800-822-6268 Website: www.ftb.ca.gov</p> <p>California nonresidents charging California sales tax are required to provide their California sales tax number.</p>
<p><b>5</b></p>	<p>Provide the name, title, signature, and telephone number of the authorized individual completing this form. Provide the date the form was completed.</p>
<p><b>6</b></p>	<p>This section must be completed by the department/office requesting the information.</p>
	<p><b>Privacy Statement</b></p> <p>Section 7(b) of the Privacy Act of 1974 (Public Law 93-579) requires that any federal, State, or local governmental agency, which requests an individual to disclose their social security account number, shall inform that individual whether that disclosure is mandatory or voluntary, by which statutory or other authority such number is solicited, and what uses will be made of it.</p> <p>It is mandatory to furnish the information requested. Federal law requires that payment for which the requested information is not provided is subject to federal backup withholding and State law imposes noncompliance penalties of up to \$20,000.</p> <p>You have the right to access records containing your personal information, such as your SSN. To exercise that right, please contact the County of El Dorado Auditor-Controller's Office in writing.</p> <p>All questions should be referred to the County of El Dorado Auditor-Controller's Office.</p>

**CERTIFICATE OF INSURANCE FORM FOR CONTRACTORS, ARCHITECTS AND/OR ENGINEERS**

CERTIFICATE ISSUER  PHONE ( )	DATE EXECUTED:  THIS CERTIFICATE DOES NOT AMEND, EXTEND, OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. COMPANIES AFFORDING COVERAGE	
INSURED  PHONE ( )	COMPANY A LETTER  COMPANY B LETTER  COMPANY C LETTER  COMPANY D LETTER  COMPANY E LETTER	COMPANY RATING  COMPANY RATING  COMPANY RATING  COMPANY RATING  COMPANY RATING
PROJECT DESCRIPTION  PROJECT TITLE:  PROJECT NUMBER:  LOCATION:	COMPANY A LETTER  COMPANY B LETTER  COMPANY C LETTER  COMPANY D LETTER  COMPANY E LETTER	COMPANY RATING  COMPANY RATING  COMPANY RATING  COMPANY RATING

THIS IS TO CERTIFY that policies of insurance listed below have been issued to the insured named above for the policy period indicated. Notwithstanding any requirement, term or condition of any contract or other document with respect to which this certificate may be issued or may pertain, the insurance afforded by the policies described herein is subject to all the terms, exclusion and conditions of such policies.

CL	Type of Insurance Coverage	Policy Number	Policy Effective Date	Policy Expiration Date	Limits of Liability (in Thousands)
	GENERAL LIABILITY <input type="checkbox"/> Commercial General Liability <input type="checkbox"/> Occurrence <input type="checkbox"/> Claims Made <input type="checkbox"/> Owner's & Contractor's Protective <input type="checkbox"/> General Aggregate * <input type="checkbox"/> Per Project <input type="checkbox"/> Per Location				GENERAL AGGREGATE \$ PRODUCTS-COMP/OPS AGGREGATE \$ PERSONAL & ADVERTISING INJURY \$ EACH OCCURRENCE \$ FIRE DAMAGE (ANY ONE FIRE) \$ MEDICAL EXPENSES (ANY ONE PERSON) \$ DEDUCTIBLE \$
	ARCHITECT'S AND/OR ENGINEER'S PROFESSIONAL LIABILITY <input type="checkbox"/> Claims Made <input type="checkbox"/> Project				GENERAL AGGREGATE \$ EACH CLAIM \$  DEDUCTIBLE \$
	AUTOMOBILE LIABILITY <input type="checkbox"/> Any Auto <input type="checkbox"/> All Owned Autos <input type="checkbox"/> Scheduled Autos <input type="checkbox"/> Hired Autos <input type="checkbox"/> Non-Owned Autos <input type="checkbox"/> Garage Liability				COMBINED SINGLE LIMIT \$ BODILY INJURY (PER PERSON) \$ BODILY INJURY (PER ACCIDENT) \$ PROPERTY DAMAGE \$ DEDUCTIBLE \$
	EXCESS LIABILITY <input type="checkbox"/> Umbrella Form <input type="checkbox"/> Other Than Umbrella Form				EACH OCCURRENCE \$ AGGREGATE \$
	<input type="checkbox"/> WORKER'S COMPENSATION				-----STATUTORY-----
	EMPLOYER'S LIABILITY				(EACH ACCIDENT) \$ (DISEASE - POLICY LIMIT) \$ (DISEASE - EACH EMPLOYEE) \$
	OTHER <input type="checkbox"/> Installation Floater <input type="checkbox"/> Builder's Risk <input type="checkbox"/>				\$ \$ \$

\* The General Aggregate limit, under Limits of Insurance, applies separately to each of the projects away from premises owned by or rented by you.

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS/ADDITIONAL INSURED: The County of El Dorado its officers, officials, employees and volunteers are made additional insured, but only insofar as the operations under this contract are concerned. OTHER ADDITIONAL ISSURED:
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CERTIFICATE HOLDER	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED OR TERMINATED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL GIVE THIRTY (30) DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT, IN ADVANCE OF THE EFFECTIVE DATE OF SUCH CANCELLATION OR TERMINATION.  AUTHORIZED REPRESENTATIVE SIGNATURE, TITLE, TYPED NAME, SSN AND PHONE NUMBER:
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**CONTRACTOR'S GUARANTEE**

**COUNTY OF EL DORADO  
GENERATOR REPLACEMENT**

**BID #14-968-001**

As Contractor for the above referenced project, we hereby agree to repair or replace any or all work provided hereunder which is defective due to faulty materials, poor workmanship, or defective equipment at no expense to the County of El Dorado, ordinary wear and tear and unusual abuse or neglect excepted, during the term of the contract and provide the manufacturer one (1) year warranty period from the date of final acceptance of the work.

We further agree to repair or replace any and all adjacent areas which have been damaged or displaced due to our work performed under this contract at no expense to the County of El Dorado during the term of this contract for a period of one (1) year from the date of final acceptance of the work.

If a warranty or guarantee exceeding one (1) year is provided by the supplier or manufacturer of any equipment or materials used in this Project, or if a warranty or guarantee exceeding one (1) year is required elsewhere in these Contract Documents, then the guarantee for such equipment or materials shall be extended for such term. We expressly agrees to act as co-guarantor of such equipment and materials, and we shall supply County with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by its suppliers or manufacturers.

We agree that this guarantee and the rights and obligations accruing there from shall be in addition and not by way of limitation in any manner whatsoever to the rights, obligations, warranties or remedies otherwise provided for by law.

In the event of our failure to comply with the above mentioned conditions with (ten) 10 days after being notified in writing by the County of El Dorado, we hereby authorize the County of El Dorado to proceed to have said defects repaired and made good at our expense and we will honor and pay all costs and charges therefore upon written demand.

EXECUTED on this \_\_\_\_\_ day of \_\_\_\_\_, 2013.

CONTRACTOR

By \_\_\_\_\_

Title \_\_\_\_\_

By \_\_\_\_\_

Title \_\_\_\_\_

**COUNTY OF EL DORADO  
GENERATOR REPLACEMENT**

**BID #14-968-001**

**CONDITIONS OF THE CONTRACT**

**Article 1**

**GENERAL PROVISIONS**

**1.1 BASIC DEFINITIONS**

1.1.1 County: The County of El Dorado, a political subdivision of the State of California.

1.1.2 Owner: The County of El Dorado is the Owner and is identified as the Owner in the Contract and these Contract Conditions. The term Owner, and pronouns in place of the same shall mean the County of El Dorado acting by and through its duly authorized representative.

1.1.3 Owner's Representative: The Chief Administrative Office, Facilities Manager, or designated representative.

1.1.4 Architect: The person holding a valid California State Architect's license, whose firm has been designated within the Contract Documents as the Architect to provide services on the Project. When the Architect is referred to within the Contract Documents and no Architect has in fact been designated, then the matter shall be referred to the County and shall be interpreted as Owner's Representative.

1.1.5 Project Manager: Project Manager or such other designated representative of the Owner. The Project Manager has such duties and authority as may be set forth in the Contract Documents.

1.1.6 Contractor: The person or entity identified as such in the Contract and is referred to throughout the Contract Documents as if singular in number. The term Contractor refers to the Contractor or the Contractor's authorized representative.

1.1.7 Inspector: The individual designated by the Owner as the Inspector as set forth in Paragraph 2.1.2.

1.1.8 Subcontractor: Those contractors, of whatever tier, furnishing labor or material, or both, for the Work under the Contract with the Contractor.

1.1.9 Substantial Completion: The stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so the Owner can occupy or utilize the Work for its intended use.

1.1.10 Final Acceptance: Conditions upon which the County will accept Work as satisfactorily completed in accordance with the Contract Documents. Requirements include, but are not limited to:

1. All Systems having been tested and accepted as having met requirements of the Contract Documents.
2. All as-built drawings and 2 copies of the manufacturer's product data and installation instructions having been submitted by the Contractor, reviewed by the Architect, and accepted by the Owner.
3. All punch list work, as directed by the Owner, having been completed by the Contractor.
4. Acceptance of the Work by the Purchasing Agent.

- 1.1.11 Final Payment: The Final Payment shall be the only Payment made to Contractor and shall not be considered to be the payment of any or all of the retention.
- 1.1.12 Architect’s Supplemental Instructions/Instruction Bulletins: A written order of the Architect and reviewed by the Owner’s Representative directing the Contractor to provide supplemental instructions, interpretations, or conduct minor changes in work involving neither extra cost nor extra time and being consistent with the scope and functioning of the project.
- 1.1.13 Construction Change Directive: A written order issued by the Architect and signed by the Owner directing a change in the Work and stating a proposed basis for adjustment, if any, of Contract Time or Sum. The Owner may by Change Directive, without invalidating the Contract and without Contractor’s agreement, order changes in the Work. This procedure will be used in the absence of agreement between Owner and Contractor, for subsequent inclusion in a Change Order.
- 1.1.14 Change Order: A Change Directive signed by the Owner and Contractor stating their agreement upon all of the following: 1) a change in the Work, 2) the amount of the adjustment in the Contract Price, if any, and 3) the extent of the adjustment in the Contract Time, if any.
- 1.1.15 Contract Documents: The Contract Documents shall include the documents described in Article 2 of the Contract, including Architect’s Supplemental Instructions, Construction Change Directives, and Change Orders.
- 1.1.16 Work: The construction and services required by the Contract Documents, including all labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor’s obligations.
- 1.1.17 Project: The total construction of the Work performed under the Contract Documents.
- 1.1.18 Plans: The graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams, specifically the Plans entitled “County of El Dorado Generator Project”.
- 1.1.19 Technical Specifications: That portion of the Contract Documents Division 1 through 26 consisting of the technical written requirements for materials, equipment, construction systems, standards and workmanship for the Work, and performance of related services.
- 1.1.20 Claim: A demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time, or other relief with respect to the terms of the Contract. Claims must be made by written notice and shall include a demand for the Owner’s decision. The responsibility to substantiate claims and to resolve the claims of subcontractors of whatever tier shall rest with the Contractor.
- 1.1.21 Work Not Included: Except for such auxiliary work as shown or specified, or is necessary as part of the construction, the following is NOT included in this contract: Any work shown but marked “Not in Contract” (NIC) or otherwise designated to be done under another contract or by Owner.
- 1.1.22 Furnish (material): To supply and deliver to the project ready for installation and in operating condition.
- 1.1.23 Install (service or labor): To place in final position, complete, anchored, connected, and in operable condition with respect to required codes and/or governing agency requirements.
- 1.1.24 Provide: To furnish and install complete. When “Furnish”, “Install”, or “Provide” is stated, “Provide” is implied.
- 1.1.25 Construct: To “Furnish” materials to “Install” in final position, complete, anchored, and connected with respect to required codes, requirements, Contract Documents, and details.

1.1.26 Day(s): All references to “day” or “days” in these Contract Documents shall be defined as calendar-day or calendar-days.

## **1.2 CONTRACT DOCUMENTS**

1.2.1 One Document: The Contract Documents are one document and any work shown or mentioned shall be performed or furnished. The Contractor admits and agrees that the Contract Documents exhibit the intent and purpose of the Owner in regard to the Work, and that they are not complete in every detail and are to be considered as showing the purpose and intent only; and he further agrees to furnish all labor or material for any detail that is necessary to carry out the intent and purpose of the Specifications without extra charge.

1.2.2 Misuse of Words or Punctuation: The misplacement, addition, or omission of any word, letter, or punctuation mark will not in any way change the intent or meaning of the Contract Documents. Any part of the Work, or any article pertaining thereto which is not specifically set forth in these Contract Documents, but which is necessary for the proper completion of the Work, is to be supplied and set in place at the Contractor's expense, the same as if it had been mentioned in these Contract Documents. The Contractor shall furnish all things necessary to make a good and workmanlike job in accordance with the intent and purpose of the Contract Documents.

## **1.3 ASSIGNMENT OF CONTRACT**

1.3.1 Mutual Consent: Neither party to the Contract shall assign the Contract without the written consent of the other party, nor shall the Contractor assign any moneys due or to become due to him hereunder without the written consent of the Owner.

1.3.2 Assignment Under Anti-Trust Claims: In accordance with Section 4552 of the California Government Code, and Section 7103 of the Public Contract Code, Contractor and subcontractors shall conform to the following requirements:

1. In entering into a public works contract or a subcontract to supply goods, services, or materials pursuant to a public works contract, Contractor or subcontractors offers and agrees to assign to the Owner all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C Section 15) or under the Cartwright Act, [Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code], arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the Owner tenders Final Payment to the Contractor, without further acknowledgment by the parties.
2. If an awarding body or public purchasing body receives, either through judgment or settlement, a monetary recovery for a cause of action assigned under Government Code Sections 4550-4554, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery. Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under Government Code Sections 4550-4554 if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.

## **1.4 WAIVER OF "COMMON PRACTICE"**

1.4.1 The Contractor shall waive "common practice" and "common usage" as construction criteria wherever the Contract Documents details, plans, technical specifications, governing codes, or ordinances require greater quantity or better quality than common practice or common usage would require.

## 1.5 EXCESSIVE COSTS

1.5.1 Failure to Comply with Contract: If Contractor fails to comply with any Contract requirements, including any required coordination with other contractors, and that failure results in additional costs to Owner, then Contractor shall be liable for such additional costs.

1.5.2 Construction Methods: If Contractor's construction methods and techniques result in additional costs to Owner, after notice, such Contractor shall be responsible for cost attributable to his methods and techniques.

## Article 2

### OWNER

#### 2.1 OWNER'S REPRESENTATIVE

2.1.1 Owner Representative: The Owner will be represented by the Owner's Representative who shall oversee the performance of the Contract on behalf of the Owner.

2.1.2 Owner May Appoint Inspector: Owner shall be entitled to appoint an agent as Inspector who shall see that the performance of the Work is in strict accordance with the Contract Documents on behalf of the Owner.

2.1.3 Communication: In order that the Owner may act upon expert advice and upon good procedure, all communications from the Contractor shall be in writing and will be through said Owner's Representative or Inspector, as the Owner may direct, and all communications and instructions from the Owner to the Contractor will be so routed. The Owner reserves the right to alter this procedure without the consent of the Contractor. All communications not in compliance herewith, shall be considered non-binding on the Owner.

#### 2.2 RIGHTS OF OWNER

2.2.1 Right to Clean Up: Subject to the strict prohibition against maintaining a nuisance, if a dispute arises between the Contractor, Subcontractors, or separate contractors as to the responsibility under their respective Contracts for maintaining the premises and surrounding area free from waste materials and rubbish the Owner may, but need not, clean up and allocate the cost among those responsible as the Inspector determines to be just.

2.2.2 Right to Accept Imperfect Work: If any part or portion of the Work completed under this Contract is defective and not in accordance with the Plans or Contract Documents, and if the imperfection is judged by Owner to be not of sufficient magnitude or importance so as to make the Work unacceptable, then Owner shall have the right and authority to retain such Work but will make such deductions in Contract Price as may be equitable and reasonable. However, Owner does not by this section; waive any other rights provided for herein.

2.2.3 Right to do Adjacent Work: The Owner reserves the right to perform construction or operations on the site of the Work. In doing this Owner may use its own forces or award separate contracts in connection with other construction or operations on the site but not covered by the Contract Documents. Contractor shall defend, indemnify, and hold Owner harmless for costs incurred by Owner that are payable to a separate contractor because of delays, improperly timed activities, or defective construction by the Contractor, unless such costs are incurred due to the sole or active negligence of Owner.

2.2.4 Right to Finish Contractor's Work: If the Contractor defaults or neglects to carry out all or any part of the Work in accordance with the Contract Documents, the Owner has the right, exercisable solely at Owner's discretion, to commence and continue completion of the Work with diligence and promptness. In such an event, if the Owner's cost to complete to Work exceeds the remaining balance of the Contract with the Contractor, Contractor shall reimburse the Owner for such excess costs.

2.2.5 **Right of Partial Use of Project:** The Owner may occupy or use any completed or partially completed portion of the Work at any stage, upon agreement of Owner and Contractor.

1. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, heat, utilities, damage to work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents.
2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld.
3. Immediately prior to such partial occupancy or use, the Owner and Contractor shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.
4. Unless otherwise agreed upon in writing, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of work not complying with the requirements of the Contract Documents.
5. No claim for acceleration, delay, or hindrance, may be made by Contractor on his own behalf or that of any of his subcontractors, for any delays, accelerations, or hindrances that may arise out of Owner's partial occupancy of the Project.

2.2.6 **Right to Audit:** Contractor shall maintain and make available to the County, State Auditor, or to any of their duly authorized representatives all books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the Work or under terms of this Contract. Contractor shall maintain such books, records, data and documents in accordance with generally accepted accounting principles and in accordance with these Contract Conditions and federal and state requirements. These books, papers, records, claims, and accounts shall be made available for examination during normal business hours and shall be readily available and accessible at Contractor's principal place of business in California, for audit during normal business hours at such place of business. Contractor shall provide office space, photocopies and other assistance to enable audit or inspection representatives to conduct such audits or inspections. This right to audit books and records directly related to this Contract shall also extend to any first-tier subcontractors employed under this Contract. Contractor shall incorporate this provision in any subcontract entered into as a result of this Contract and shall require its subcontractors to agree to cooperate with the above-listed agencies by making all appropriate and relevant Project records available to those agencies for audit and copying.

All of Contractor's books, papers, job cost records, detailed cost estimates, claims, and accounts, including payment, property, payroll, personnel, subcontractor records, and financial records related to or which arise out of the work or under terms of this Contract shall be retained for access, inspection and/or audit by the County, the State Auditor, or their duly authorized representatives for at least three (3) after County's final payment to Contractor and/or the final resolution of any claims under this Contract. Contractor shall incorporate this provision in any subcontract entered into as a result of this Contract.

## **2.3 RESPONSIBILITIES OF OWNER**

2.3.1 **Removal, Relocation, or Protection of Underground Infrastructure:** If the Contractor while performing the contract discovers utility facilities not identified by the Owner in the contract plans or specifications, Contractor shall immediately notify the Owner in writing. Owner shall have the sole discretion to perform the repairs or relocation work itself, or to permit the Contractor to do such repairs or relocation work at a reasonable price. In the event that the Owner authorizes the Contractor to perform the work, the parties shall proceed with a written Change Order as set forth in Article 5 herein. Compensation to the Contractor for said costs shall be in accordance with Section 4215 of the Government Code.

Nothing herein shall be construed to require the Owner to locate the presence of any existing services not expressly included in Government Code Section 4215, nor to limit the Owner's rights or remedies set forth therein.

In accordance with the provisions of Section 4215 of the California Government Code, Contractor shall not be assessed liquidated damages for delay in completion of the project, when such delay was caused by the failure of the Owner or owner of the utility to provide for the removal or relocation of such utility facilities.

### Article 3

#### CONTRACTOR'S RESPONSIBILITIES

##### 3.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS

3.1.1 Reporting Errors in Contract Documents: The Contractor shall carefully study and compare the Contract Documents with each other and shall at once report to the Inspector errors, inconsistencies, or omissions discovered. If the Contractor performs any construction activity knowing it involves a recognized error, inconsistency, or omission in the Contract Documents without such notice to the Owner, the Contractor shall assume responsibility for such performance and shall bear all costs for correction.

3.1.2 Reporting Errors in Field Conditions: The Contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing activities. Errors, inconsistencies, or omissions discovered shall be reported to the Owner at once.

3.1.3 No Implied Warranty: No warranty is to be implied nor shall any warranty arise by operation of law, or by interpretation of this Contract, that the Plans and Contract Documents are adequate and sufficient to construct the Project.

##### 3.2 SUPERVISION AND CONSTRUCTION PROCEDURES

3.2.1 Supervision of Work: The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences, and procedures and for coordinating all portions of the Work under the Contract, unless Contract Documents give other specific instructions concerning these matters.

3.2.2 Acts of Employees and Agents: The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, subcontractors and their agents and employees, and other persons performing portions of the Work under a contract with the Contractor.

Acts Do Not Waive Contractor's Obligation: The Contractor shall not be relieved of obligations to perform the Work in strict accordance with the Contract Documents either by activities or duties of the Owner's Representative or the Inspector in the administration of the Contract, or by tests, inspections, or approvals required or performed by persons other than the Contractor.

##### 3.3 PROSECUTION OF WORK

3.3.1 Time of the Essence: It is expressly understood and agreed that the time of beginning, rate of progress, and time of completion of the Work are of the essence. The time for completion of this contract shall be 150 calendar days commencing from the date shown on the Contractor Notice To Proceed.

3.3.2 Owner and Contractor recognize that time is of the essence of the Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified, plus any extensions thereof. They also

recognize the delays, expense, and difficulties involved with proving in a legal proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner the sum of **One Thousand Five Hundred dollars (\$1,500) per day**, as liquidated damages and not as a penalty, for each and every calendar day's delay in finishing the Work in excess of the contract time prescribed herein.

3.3.3 Work During Operational Hours: The Facility will be operational during the Work. The Contractor shall not interfere or hinder government center operations. The Contractor shall keep all equipment and materials within designated work areas and out of hallways and doorways. Emergency exit routes shall be maintained at all times.

3.3.4 Construction Schedule: The Contractor shall coordinate the final critical path method (CPM) construction schedule with the Owner. The CPM schedule is required to be submitted within five (5) days of issuance of Notice to Proceed. The CPM schedule will be for Owner's information only. Silence or inaction with regard to Contractor's schedule shall not be construed as acquiescence or acceptance of the schedule as being binding on Owner. Contractor's schedule shall provide for the completion date not to exceed nor shall it provide for the completion date earlier than the time limits for completion set forth in the Contract Documents. Float, whether for the entire Project or for specific tasks therein, shall be deemed to be for the benefit of the Owner. The Contractor shall keep the construction schedule current, and shall submit weekly updates to the Owner's Representative and Inspector, if any. The Contractor shall further prepare and keep current a schedule of submittals which is coordinated with the construction schedule, and which allows the Owner reasonable time to review the submittals.

### **3.4 SUBMITTALS**

3.4.1 Use of Listed Manufacturers; Review of "Or Equals": Contractor shall utilize only the manufacturer designated in its Proposal for major equipment items listed therein. In accordance with the provisions of Section 3400 of the California Public Contract Code, but subject to Subsection (b) thereof, if requesting approval of an "or equal" product, Contractor shall within two (2) business days following the bid opening submit data substantiating its request. Failure to submit such substantiating data within two (2) business days following the bid opening shall constitute submission of a non-responsive bid.

### **3.5 STATE AND FEDERAL LABOR REQUIREMENTS**

#### 3.5.1 Hours of Work:

1. Eight (8) hours of labor shall constitute a legal day's work upon all work done hereunder, and it is expressly stipulated that no workman employed at any time by the Contractor, or by any subcontractor under this Contract, upon the Work, shall be required or permitted to work thereon more than eight (8) hours in any one (1) calendar day and/or more than forty (40) hours in any one (1) calendar week except as provided in Section 1815 of the Labor Code of California, and it is further expressly stipulated that for each and every violation of said last named stipulation, said Contractor shall forfeit, as penalty to the said Owner, \$25.00 for each workman employed in the execution of this Contract, or by any subcontractor under this Contract, for each calendar day during which said workman is required or permitted to labor more than eight (8) hours in any one (1) calendar day or more than forty (40) hours in any one (1) calendar week in violation of the provisions of said Labor Code.
2. In accordance with the provisions of section 1776 of the Labor Code of the State of California, the Contractor, and each subcontractor, shall also keep an accurate record showing the names and actual hours worked for all workers employed by him in connection with the Work contemplated by the Agreement, which record shall be open at all reasonable hours to the inspection of the Owner or its officers or agents, and to the Chief of the Division of Labor Statistics and Law Enforcement or the Department of Industrial Relations, his deputies or agents.

### 3.5.2 Apprentice Employment:

1. Pursuant to the provisions of Section 1777.5 of the Labor Code as amended, the Contractor or subcontractor employing tradesmen in any apprenticeable occupation shall apply to the joint apprenticeship committee nearest the site of the public works project and which administers the apprenticeship program in that trade for a Certificate of Approval. The certificate will also fix the ratio of apprentices to journeymen that will be used in the performance of the Contract. All requirements and exceptions to those requirements set forth herein for Apprenticeship Employment are contained in Labor Code Section 1777.5 and are available from the applicable Joint Apprenticeship Committee.
2. The Contractor shall make contributions to funds established for the administration of the apprenticeship programs if he employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making such contributions.
3. The Contractor and any subcontractor under him shall comply with the requirements of Sections 1777.5 and 1777.6 in the employment of apprentices. Information relative to apprenticeship standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices.

### 3.5.3 Wage Rates:

1. Pursuant to Labor Code Section 1770 et seq., each laborer or mechanic of Contractor or any subcontractor engaged in work on the Project under this Contract shall be paid not less than the hourly wage rate of per diem wages set forth in the prevailing wage rate schedule published by the Director of Industrial Relations regardless of any contractual relationship which may be alleged to exist between Contractor or any subcontractor and such laborers and mechanics.
2. Any laborer or mechanic employed to perform work on the Project under this Contract, which work is not covered by any of the foregoing classifications, shall be paid not less than the prevailing rate of per diem wages specified herein for the classification which most nearly corresponds to the work to be performed by him.
3. The foregoing specified prevailing wage rates are minimum rates only, and the Contractor may pay any wage rate in excess of the applicable rate contained in this Contract.
4. Pursuant to Labor Code Section 1775, the Contractor as a penalty to the Owner shall forfeit \$50.00 for each calendar day, or portion thereof for each worker paid less than prevailing rate established by the Department of Industrial Relations for such work or craft in which such worker is employed. The difference between such prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which the worker was paid less than the prevailing wage rate shall be paid to each worker by the Contractor.
5. An error on the part of an awarding body does not relieve the Contractor from responsibility for payment of the prevailing rate of per diem wages and penalties pursuant to Labor Code Sections 1770 - 1775.
6. All Contractors and subcontractors are subject to the provisions of Sections 1810-1814 of the California Labor Code which provide that the maximum hours a worker is to be employed is limited to eight (8) hours a day and forty (40) hours a week and the Contractor or subcontractor shall forfeit, as a penalty, \$25.00 for each worker employed in the execution of the Contract for each calendar day during which a worker is required or permitted to labor more than eight (8) hours in any calendar day or more than forty (40) hours in any calendar week and is not paid overtime.
7. Section 1815 of the California Labor Code requires that notwithstanding the provisions of Sections 1810-1814, employees of Contractors who work in excess of eight (8) hours per day and forty (40) hours per week shall be compensated for all hours worked in excess of eight (8) hours per day at not less than 1-1/2 times the basic rate of pay.

8. In the case of federally funded projects, where federal and state prevailing wage requirements apply, compliance with both is required. This project is funded in whole or part by federal funds. Contractor's attention is directed to the requirements of, and compliance with the Copeland Act (18 U.S.C. 874 and 29 CFR Part 3), the Davis-Bacon Act (40 U.S.C. 276a to 276a-7 and 29 CFR Part 5), and the Contract Work Hours and Safety Standards Act (40 U.S.C. 327-330 and 29 CFR Part 5). (NOT APPLICABLE)
9. If there is a difference between the minimum wage rates predetermined by the Secretary of Labor and the general prevailing wage rates determined by the Director of the California Department of Industrial Relations for similar classifications of labor, Contractor and subcontractors shall pay not less than the higher wage rate. The Department will not accept lower State wage rates not specifically included in the Federal minimum wage determinations. This includes "helper" (or other classifications based on hours of experience) or any other classification not appearing in the Federal wage determinations. Where Federal wage determinations do not contain the State wage rate determination otherwise available for use by Contractor and subcontractors, Contractor and subcontractors shall pay not less than the federal minimum wage rate which most closely approximates the duties of the employees in question. (NOT APPLICABLE)
10. Interested parties can obtain the current wage information by submitting requests to the Department of Industrial Relations, Division of Labor Statistics and Research, PO Box 420603, San Francisco CA 94142-0603, Telephone (415) 703-4708 or by referring to the website at <http://www.dir.ca.gov/dlsr/PWD>. The rates at the time of the bid advertisement date of a project will remain in effect for the life of the project in accordance with the California Code of Regulations, as modified and effective January 27, 1997.
11. Copies of the applicable state prevailing wage rates are on file with the County of El Dorado, Chief Administrative Office, Facilities Division, 3000 Fairlane Court, Placerville, CA 95667, and they are available to any interested party on request.

**3.5.4 Certified Payroll:** As required under the provisions of Labor Code Section 1776 Contractor and subcontractors shall keep accurate payroll records:

1. The payroll records shall show the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice, worker, or other employee by him or her in connection with the Project.
2. A certified copy of all payroll records enumerated above shall be available for inspection at all reasonable hours at the principal office of the Contractor as follows:
  - a. Make available or furnish to the employee or his or her authorized representative on request.
  - b. Make available for inspection or furnished upon request to a representative of the Owner, the Division of Labor Standards Enforcement, and the Division of Apprenticeship Standards of the Department of Industrial Relations.
  - c. Make available upon request by the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the Owner, the Division of Labor Standards Enforcement, or the Division of Apprenticeship Standards. The requesting party shall, prior to being provided the records, reimburse the costs of preparation by the Contractor, subcontractor, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the Contractor.

**3.5.5 Discrimination In Employment:** No discrimination shall occur in the employment of persons upon the Work because of race, color, sex, national origin, or ancestry or religion of such persons.

**3.5.6 Convict-Made Materials:** Except as may be provided by law, the Contractor agrees that no materials manufactured or produced in a penal or correctional institution shall be incorporated in the construction under this Contract.

### **3.6 TAXES**

3.6.1 Contractor Pays Taxes: The Contractor and subcontractors shall pay all local, state, and federal taxes upon labor or materials involved in their branch of the Work, cost of same to be included in the Contract price.

### **3.7 COMPLIANCE WITH LAW AND LOCAL REQUIREMENTS**

3.7.1 Regulations: The Contractor and all subcontractors shall conform to and abide by all city, county, and state laws, ordinances, rules, and regulations, as the same pertain to the Work contemplated by said Plans and Contract Documents.

3.7.2 Permits, Licenses, and Fees: The County shall procure and pay for all permits and inspection fees that may be required to commence, carry on, and complete the Contract. Contractor shall be responsible for all applicable license fees.

The County has received a building permit for this project. The Contractor shall be responsible for following the provisions of the permit. See Appendix A for a copy of the permit.

3.7.3 Patent Rights, Copyrights, Trade Names, and Royalties: The Contractor shall indemnify and save harmless the Owner and all persons acting under him for all liability on account of any patent rights, copyrights, or trade names which may affect the articles or materials or their application under the Contract Documents. The Contractor shall pay all royalties, or other charges that may arise, due to methods, types of construction, processes, materials or use of equipment, and shall hold the Owner harmless from any charges whatsoever which may arise, and shall furnish written assurance, satisfactory to the Owner, that such charges have been paid.

### **3.8 GUARANTEE**

3.8.1 Final Guarantee: The Contractor shall guarantee all materials and equipment furnished and work performed for a period of one (1) year. Contractor warrants and guarantees for a period of one year from the date of the Notice of Acceptance that the Work is free from all defects due to faulty materials or workmanship and Contractor shall promptly make such corrections as may be necessary, including repairs of any damage to other parts of the Work resulting from such defects. Owner will give notice of observed defects with reasonable promptness. In the event that Contractor should fail to make such repairs, adjustments, or other work that may be made necessary by such defects within ten (10) calendar days after being notified in writing by Owner, Owner may do so and charge Contractor the cost thereby incurred.

3.8.2 Extended Guarantees: If a guaranty exceeding one year is provided by the supplier or manufacturer of any equipment used in this Project, then the guarantee for such materials shall be extended for such term. Contractor expressly agrees to act as co-guarantor of such equipment and materials, and Contractor shall supply Owner with all warranty and guaranty documents relative to equipment and materials incorporated in the job and guaranteed by their suppliers or manufacturers.

### **3.9 WARRANTY**

3.9.1 Contract Warranty: The Contractor warrants to the Owner that materials and equipment furnished under the Contract will be of good quality and new, unless otherwise required or permitted by the Contract, that the Work will be free from defects or flaws and is of the highest quality of workmanship and that the Work will conform with the requirements of the Contract. Work not conforming to these requirements, including substitutions not properly approved and authorized, shall be considered defective.

### **3.10 INDEMNIFICATION**

3.10.1 Owner Not Liable for Damages: The Owner or its authorized representative shall not in any way or manner be answerable or suffer loss, damage, expense, or liability for any loss or damage that may happen to said Work, or part thereof, or in or about the same during its construction and before acceptance and the said Contractor shall assume all liabilities of every kind or nature arising from said Work, either by accident, negligence, theft, vandalism, or any cause whatever; and shall hold the Owner and its authorized representatives harmless from all liability of every kind and nature arising from accident, negligence, or any cause whatever, other than for the active negligence of the Owner, its officers, agents and employees.

3.10.2 Owner Not Liable for Debts: Indebtedness incurred for any cause in connection with this Work must be paid by the Contractor, and the Owner is hereby relieved at all times from any indebtedness or claim other than the Contract price.

3.10.3 Indemnity: To the fullest extent allowed by law, Contractor shall defend, indemnify, and hold the County and its officers, directors, and employees, harmless against and from any and all claims, suits, losses, damages, and liability for damages, including attorney's fees and other costs of defense brought for or on account of injuries to or death of any person, including but not limited to, workers and the public, or on account of injuries to or death of County employees or damage to property, or any economic, consequential or special damages which are claimed or which shall in any way arise out of or be connected with Contractor's services, operations or performance hereunder, regardless of the existence or degree of fault or negligence on the part of the County, the Contractor, subcontractors or employees of any of these, except for the active, or sole negligence of the County its officers and employees, or where expressly prescribed by statute.

The duty to indemnify and hold harmless the County specifically includes the duties to defend set forth in Section 2778 of the Civil Code. The insurance obligations of Contractor are separate, independent obligations under the Contract Documents, and the provisions of this defense and indemnity are not intended to modify nor should they be construed as modifying or in any way limiting the insurance obligations set forth in the Contract Documents.

3.10.4 Environmental Indemnification: To the fullest extent allowed by law, from and after recording of the Notice of Acceptance, Contractor shall indemnify, defend, and save harmless Owner from all losses or damages resulting from injury to or death of any person and damage to property, and any fine, which is occasioned by or arises out of any breach of Environmental and Toxics Warranty, representations, or covenants of Contractor under this Contract. Contractor further agrees to indemnify and hold harmless Owner, its officers, employees, and agents, from and against any and all liability as follows:

1. Including all foreseeable and all unforeseeable consequential damages, directly or indirectly arising out of the use, generation, storage, or disposal of hazardous materials in any location by Contractor, and
2. Including, without limitation, the cost of any required or necessary repair, cleanup, or detoxification and the preparation of any closure or other required plans, whether such action is required or necessary prior to or following filing of the Notice of Acceptance to the full extent that such action is attributable, directly or indirectly, to the presence or use, generation, storage, release, threatened release, or disposal of hazardous materials by any person on the Project prior to filing of the Notice of Acceptance. Contractor's obligations pursuant to the foregoing indemnity shall survive the filing of the Notice of Acceptance of the Project.
3. This agreement as to indemnity and reimbursement as above set forth to be undertaken by the Contractor shall survive the performance of the remainder of said Contract and shall remain in full force and effect notwithstanding such performance.
4. The foregoing duties of indemnity shall not apply to loss, damage, expense, or liability caused solely by the active negligence of the Owner or the Owner's agents, servants or independent contractors.

### **3.11 WORK REQUIREMENTS**

3.11.1 Conduct of Work: The Contractor shall confine the storage of his equipment and materials to limits as designated. He shall at all times exercise due caution and provide all necessary barricades and other safety equipment around the Work to protect the general public from injury to person and property during the entire time of performance of the Work. The Contractor shall not create excessive dust or noise.

3.11.2 Maintenance of Site: Strict prohibition against committing nuisances in or about the Work shall be maintained, and the Contractor shall not in any way obstruct or interfere with movements of traffic on any public right of way without first obtaining the necessary approval of the proper public agency.

3.11.3 Clean Up of Site: The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials. If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the cost thereof shall be charged to the Contractor.

3.11.4 Cutting and Patching:

1. The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly.
2. The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

### **3.12 SUBCONTRACTORS**

3.12.1 Contractor Responsible for Subcontractor's Acts: Contractor shall be fully responsible to Owner for the acts and omissions of his subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

3.12.2 Contractor's Subcontract: Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by the terms of the Contract Documents insofar as applicable to the Work of subcontractors and to give Contractor the same power as regards terminating any subcontract that Owner may exercise over Contractor under any provisions of the Contract Documents. The percentage of retention withheld from any subcontractor by the Contractor shall not exceed the percentage of retention withheld from the Contractor as provided herein.

3.12.3 Ineligible Subcontractor: Contractor is prohibited from performing work with a subcontractor who is ineligible to perform work pursuant to Labor Code Section 1777.1 or 1777.7.

### **3.13 SUPERINTENDENT**

3.13.1 Work Superintendent: The Contractor will employ and maintain on the worksite a qualified supervisor or Superintendent who shall have been designated in writing by the Contractor as the Contractor's representative at the sites. The Superintendent shall have full authority to act on behalf of the Contractor, and all communications given to the Superintendent shall be as binding as if given to the Contractor. The Superintendent shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

### **3.14 LABOR AND MATERIALS**

3.14.1 Skilled Labor: All labor must be especially skilled for each kind of work, and must be thorough and first class in all respects. Any person whom the Inspector or Owner may deem incompetent or disorderly shall be promptly discharged from the Project and not re-employed.

3.14.2 Quality of Materials: All materials used on this Contract shall be new and the best market quality, unless specified or shown otherwise. All Work executed under this Contract shall be done in the best, most thorough, substantial and workmanlike manner and without flaws. All materials and labor shall be subject to the approval of the Inspector as to its quality and fitness, and shall be immediately removed if it does not meet with his approval. The Inspector may refuse to issue the Certificate for Payment until all defective materials or work have been removed and other material of proper quality substituted therefore. All removal and replacement with same shall be done at the Contractor's expense. Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned as directed by the manufacturer.

## **Article 4**

### **ADMINISTRATION OF CONTRACT**

#### **4.1 ADMINISTRATION OF CONTRACT**

4.1.1 Contract Communications: Unless otherwise provided in the Contract or when direct communications have specifically been authorized, all parties shall communicate through the Owner's Representative or the Inspector if the Owner so directs. Communications by and with the subcontractors and material suppliers shall be through the Contractor. Communications by Contractor to separate contractors, architect, or Project Manager shall be through the Owner's Representative.

4.1.2 Control of Work: The Owner's Representative or the Inspector will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, since these are solely the Contractor's responsibility. The Owner's Representative or the Inspector will not be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The Owner's Representative or the Inspector will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

4.1.3 Recommendation for Payments: Based on his or her observations and evaluations of the Contractor's Applications for Payment, the Owner's Representative will review amounts due the Contractor and will recommend to Owner, payments to Contractor as set forth in the section entitled CERTIFICATION FOR PAYMENTS.

4.1.4 Inspector's Authority: The Inspector will have the authority to stop work whenever necessary to ensure a proper execution of the Work. The Inspector will also have authority to reject Work which does not conform to the Contract Documents. Whenever the Inspector considers it necessary or advisable for implementation of the intent of the Contract Documents, the Inspector will have authority to require additional inspection or testing of the Work in accordance with the following section whether or not such Work is fabricated, installed, or completed. However, neither this authority of the Inspector nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Inspector to the Contractor, subcontractors, material and equipment suppliers, their agents or employees, or other persons performing portions of the Work. In the event an Inspector is not appointed by the Owner, the Owner's Representative shall have the authority set forth herein.

#### **4.2 INSPECTION AND TESTING**

4.2.1 **Advance Notice:** Contractor shall provide Owner's Representative seventy-two (72) hours notice prior to beginning work at a specific location and for a specific department. Contractor shall notify Owner's Representative and Inspector twenty four (24) hours prior to any day in which Contractor will 1) require an inspection of any portion of the Work, and 2) work in excess of eight (8) hours or any time Contractor intends to work weekends. Any work not performed subject to inspection will not be accepted and will be rejected and/or ordered removed by Owner, or Inspector.

4.2.2 **Access to Work:** The Owner's Representative, the Architect, the Project Manager, and the Inspector will at all times have access to the Work. In addition, authorized representatives and agents of any participating Federal or State Agency shall be permitted to inspect all Work, materials, payrolls, and records on personnel, invoices of materials, and other relevant data and records. The Contractor will provide proper facilities for such access and observation of the Work and also for any inspection or testing thereof.

4.2.3 **Costs of Tests:** The Owner shall bear all costs related to testing for conformance of the Work to the Contract requirements. However, if the Contractor has called for any testing, and that test fails, subsequent tests, and all related costs, shall be borne by the Contractor.

4.2.4 **Preparation of Change Directives/Orders:** The Owner's Representative or the Inspector, if one is appointed, will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in the section entitled CHANGES IN WORK.

### **4.3 CLAIMS**

4.3.1 **Concealed or Unforeseen Conditions:** It is understood by both parties that Contractor has made a pre-contract investigation of the site. All concealed, unforeseen, or materially differing conditions are the responsibility of the Contractor in the absence of an actual material, intentional misrepresentation by the Owner as to the conditions on the site. Contractor shall give written notice of any conditions encountered at the site which are unforeseen, concealed, or materially different from those set forth in the Plans or Contract Documents, or ordinarily encountered and generally recognized as inherent in the Work. Such written notice shall be given within five (5) days of his discovery of any such facts.

#### 4.3.2 **Notice of Discovery of Hazardous Waste or Unusual Conditions:**

1. The Contractor shall promptly, and before the following conditions are disturbed, notify the Owner in writing, in the event the Contractor encounters any of the following:
  - a. Material that the Contractor believes may be 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.
  - b. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in the work of the character provided for in the contract.
2. The Owner shall promptly investigate the conditions, and if it finds that the conditions do materially so differ, or do involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work shall issue a change order under the procedures described herein.
3. In the event a dispute arises between the Owner and the Contractor whether the conditions materially differ, or involve hazardous waste, or cause a decrease or increase in the Contractor's cost of, or time required for, performance of any part of the work, the Contractor shall not be excused from any scheduled completion date provided for in the contract, but shall proceed with all work to be performed under the Contract. The Contractor shall retain any and all rights provided either by contract or by law which pertain to the resolution of disputes and protests between the Contractor and the Owner.

4.3.3 Time Limits on Claims: Claims by Contractor must be made within ten (10) calendar-days after occurrence of the event giving rise to such Claim, except that claims made due to delay or hindrances which Contractor claims was caused by Owner shall be made within five (5) calendar-days after occurrence of the event giving rise to such Claim. Claims must be made by written notice. Failure to make such claim in writing in the time set forth herein shall bar Contractor from recourse for such claim. All claims must be filed on or before the payment date of Final Payment.

4.3.4 Claims for Additional Costs:

1. If Contractor wishes to make a Claim for an increase in the Contract Price, he shall give the Owner written notice thereof within the time set forth in Paragraph 4.3.3. This notice shall be given by the Contractor before proceeding to execute the work, except in an emergency endangering life or property in which case the Contractor shall, as soon as possible, advise Owner of his intent to do the Work.
2. Increases in Contract Price due to Claims shall be calculated based on the Cost Reimbursement method detailed in Paragraph 5.4.1.3.
3. Under no circumstances shall Contractor recover any administrative overhead costs or recover on the basis of any "Home Office" damages formula, "Total Cost" recovery formula, or any other such formula.

4.3.5 Claims for Additional Time:

1. If the Contractor wishes to make Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate probable effect of delay on progress of the Work.
2. If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time and could not have been reasonably anticipated, and that weather conditions had an adverse effect on the scheduled construction.
3. The Owner shall not be liable for any damages on account of any reasonable delay or hindrance of the Owner. However, Contractor shall be entitled to an extension of time for any delay or hindrance caused by the Owner. Any delay or hindrance by Owner which is unreasonable and not within the contemplation of the parties may subject Owner to a claim for damages. Contractor shall make any claims in writing within the time set forth in Paragraph 4.3.3., for any unreasonable delay or hindrance caused by Owner, and specifying the cause thereof as required in paragraph "Submittal of Claims".

4.3.6 Submittal of Claims: Any disputes relating to this Contract, or its breach, which is not disposed of by agreement shall be promptly submitted as a claim to the Owner's Representative who shall issue a written response on the dispute. Claims shall be submitted by the Contractor to the Owner's Representative with adequate supporting data and include a demand for the Owner's Representative's decision. Adequate supporting data shall include, but is not limited to, a statement of the reasons for the asserted entitlement, the certified payroll, invoice for material and equipment rental, and an itemized breakdown of any adjustment sought.

4.3.7 Submission Under Penalty of Perjury: The Contractor shall certify, at the time of submission of a claim, as follows:

"I certify under penalty of perjury under the laws of the State of California, that the claim is made in good faith, that the supporting data are accurate and complete, and that the amount requested accurately reflects the contract adjustment for which the Owner is liable.

By: \_\_\_\_\_  
“(Contractor's signature)”

4.3.8 **Third Party Claims:** Owner will notify Contractor of receipt of any third party claim relating to the contract within 5 business days of receipt of such claim.

#### **4.4 DISPUTES RESOLUTION**

4.4.1 **Continue Work During Dispute:** In the event of any dispute between the Owner and the Contractor, the Contractor will not stop Work but will prosecute the work diligently to completion in the manner directed by the Owner, and the dispute shall be resolved as set forth herein after completion of the Work. However, all disputes must be submitted by Contractor in accordance with the subsequent provisions of this section.

4.4.2 **Requirements for Filing a Claim:** For any claim subject to this Article, the following requirements apply: the claim shall be in writing and include the documents necessary to substantiate the claim. Claims must be filed on or before the date of final payment. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by this contract for the filing of claims.

1. For claims of less than fifty thousand dollars (\$50,000.00), the Owner shall respond in writing to any written claim within forty five (45) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claims or relating to defenses or claims the Owner may have against the Contractor, any additional documentation supporting the claim or relating to defenses to the claim the Owner may have against the Contractor.

If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within fifteen (15) days after receipt of the further documentation or within a period of time not greater than that taken by the Contractor in producing the additional information, whichever is greater.

2. For claims of over fifty thousand dollars (\$50,000.00) and less than or equal to three hundred seventy-five thousand dollars (\$375,000.00), the Owner shall respond in writing to all written claims within sixty (60) days of receipt of the claim, or may request, in writing, within thirty (30) days of receipt of the claim, any additional documentation supporting the claim or relating to the defenses or claims the Owner may have against the Contractor.

If additional information is thereafter required, it shall be requested and provided pursuant to this subdivision, upon mutual agreement of the Owner and the Contractor.

The Owner's written response to the claim, as further documented, shall be submitted to the Contractor within thirty (30) days of receipt of the further documentation, or a period of time no greater than that taken by the Contractor in producing the additional information or requested documentation, whichever is greater.

3. If the Contractor disputes the Owner's written response, or the Owner fails to respond within the time prescribed, the Contractor may so notify the Owner, in writing, either within fifteen (15) days of receipt of the Owner's written response or within fifteen (15) days of Owner's failure to respond within the time prescribed, respectively, and demand an informal conference to meet and confer for settlement of the issues in dispute. Upon a demand, the Owner shall schedule a meet and confer conference within thirty (30) days for settlement of the dispute.
4. If following the meet and confer conference the claim or any portion remains in dispute, the Contractor may file a claim 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, and in accordance with Section 20104.2 of the Public Contract Code.

4.4.3 **Owner's Review of Claim:** The Owner's Representative shall review the facts pertinent to the claim, secure assistance from legal and other advisors, coordinate with the contract administrators, and promptly provide a

written response. The response shall be furnished to the Contractor by certified mail, return receipt requested, or any other method that provides evidence of receipt. The Owner's Representatives' response shall be final and conclusive except as is otherwise provided herein.

**4.4.4** Claims Exempt from Review: The procedures and remedies provided in this Section 4.4 do not apply to:

1. Any claims by the Owner.
2. Any claim for or respecting personal injury or death or reimbursement or other compensation arising out of or resulting from liability for personal injury or death.
3. Any claim or dispute relating to stop payment requests or stop notices.
4. Any claim related to the approval, refusal to approve, or substitution of subcontractors, regardless of tier, and suppliers.

**4.4.5** Suit in El Dorado County Only: Any litigation arising out of this Contract shall be brought in El Dorado County. The Owner and the Contractor shall follow procedures established for all civil actions filed to resolve claims pursuant to Public Contract Code section 20104 et seq., including but not limited to section 20104.4.

**4.4.6** Payment of Undisputed Portion of Claim: Payment by Owner of undisputed portion of claim; interest on arbitration award or judgment.

1. Owner shall pay Contractor such portion of a claim which is undisputed except as otherwise provided in the contract.
2. In any suit filed pursuant to Public Contract Code section 20104.4, the provisions of section 20104.6 shall apply.
3. The rate of interest payable on unpaid and undisputed claims shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Owner information in sufficient detail to enable the Owner to accept the claim statement.
4. The rate of interest payable on any judgment or award in arbitration shall not exceed 6% per annum in accordance with Civil Code Section 3287 et seq.

## **Article 5**

### **CHANGES IN WORK**

#### **5.1 WAIVER**

**5.1.1** Waivers of Contract Provisions: It is expressly understood and agreed that no waiver granted by the Inspector or the Owner of any term, provision, or covenant of this Contract shall constitute a precedent for breach of the same or any other terms, provisions, or covenants of this Contract.

#### **5.2 CHANGES**

**5.2.1** Owner May Order Changes in Work: The Contractor agrees that the Owner, without invalidating the Contract, may order changes in Work by altering, adding to, or deducting from the Work, the Contract Amount and Time being adjusted according to the provisions of Section 5.4 and Section 5.5. Contractor agrees to enter into a modification of his original Contract for such changes.

**5.2.2** Cost Proposals: Upon request of the Owner for a quotation on the change to the Work, the Contractor shall promptly submit to Owner's Representative, and the Inspector, if one is appointed, in writing a detailed breakdown of the work and of the amount of deduction or addition claimed. In no case shall Cost Proposals be

provided later than ten (10) calendar days from the date requested. The Owner's request for quotations on alterations to the Work shall not be considered authorization to proceed with the work prior to issuance of a Change Order, nor shall such request justify any delay in existing work. If Contractor fails to provide Cost Proposals within ten (10) calendar days, Owner may prepare the Cost Proposal based on estimates of labor, materials, and equipment. This proposal, prepared by Owner, shall be binding on the Contractor, will become the basis for Contract Price adjustment, and shall not be subject to dispute or claim.

5.2.3 Contract Change Instrument: Changes in work involving a change in Contract Price or Contract Time shall be done only pursuant to an Architect's Supplemental Instructions, Change Order, or Construction Change Directive as set forth below in this article.

5.2.4 Changes Shall Conform to Contract: Changes in work shall be performed in conformance with applicable provisions of the Contract Documents, and the Contractor shall proceed promptly unless otherwise provided in the Architect's Supplemental Instructions, Change Order, or Change Directive.

### **5.3 CONTRACT CHANGE INSTRUMENTS**

5.3.1 Architect's Supplemental Instructions (ASI): The Owner's Representative or the Architect may order minor changes in work by use of an Architect's Supplemental Instruction. These minor changes will involve neither changes in the Contract Price or Contract Time. If the Contractor disagrees that the change does not involve a change in cost or time, then a Change Order or Change Directive shall be used.

5.3.2 Change Order (CO): The Change Order shall be used in cases where Owner and Contractor agree on the change in work, the amount of or method of computing the Contract Amount, and the amount of adjustment in Contract Time.

5.3.3 Construction Change Directive (CCD): In the event that the Owner and Contractor do not agree on the proposed change in work, and/or the proposed adjustment of Contract Price and Time, or in the event it is essential that the Contractor proceed expeditiously and without delay, then Owner may, by issuance of a Construction Change Directive, order changes in work, and the Contractor shall promptly proceed with the change in work involved.

1. Acceptance of Change Directive: If Contractor agrees with the Change Directive, the Contractor shall by his signature thereon, indicate his acceptance of the terms of the Directive, including adjustments to price and time, and the Change Directive shall then be followed by a Change Order.
2. Non-Acceptance of Change Directive: If the Contractor disagrees with the method of computing an increase in Contract Price, then the amount of adjustment shall be computed by the Cost Reimbursement method detailed in Basis for Adjustment. Disagreements with amounts or credits, under the Cost Reimbursement method, or time, shall be considered a dispute, and processed under the section on Disputes Resolution.

### **5.4 BASIS OF ADJUSTMENT**

5.4.1 Methods of Adjustment: The amount of adjustments to Contract Price, whether a credit or payment, shall be computed by one of the methods detailed below. The method used shall be at the sole determination of the Owner.

1. Unit Prices: Those prices stipulated in the Bid Proposal shall be utilized where they are applicable. In the event the change in original quantity is in excess of twenty five (25) percent of the original bid quantity, and the total dollar value of that bid is greater than \$5,000, the Owner shall review the unit price to determine if a new unit price shall be renegotiated. Unit prices for new items shall be negotiated and mutually agreed upon.

2. **Lump Sum:** A total lump sum for the Work negotiated and mutually acceptable to the Contractor and Owner. Lump sum quotations for modifications to the Work shall include substantiating documentation with an itemized breakdown of Contractor's and subcontractor's costs, including labor, materials, rentals, approved services, overhead, and profit all calculated as specified in the Cost Reimbursement method which follows.
3. **Cost Reimbursement (Extra Work):** In this method, the payment for Extra Work shall be made on a time and expense basis that is on an accounting of the Contractor's forces, materials, equipment, and other items of cost as required and used to do the Work. Payment will be made for the documented actual cost of the following:
  - a. Costs of direct labor, excluding supervisory personnel, including social security, old age and unemployment insurance, fringe benefits required by agreement, labor insurance and labor taxes established by law.
  - b. Costs of materials, supplies, and equipment, including cost of transportation and sales tax, whether incorporated if paid for by the Contractor or his subcontractor.
  - c. Rental costs, prevailing in the area, of machinery and equipment for the actual time used, and including transportation costs for items having value in excess of \$100.00.
  - d. Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work.

To the above cost the Contractor shall be allowed a markup of twenty (20) percent on direct labor charges and fifteen (15) percent for all other cost items. When any or all of the Extra Work is done by one of the Contractor's subcontractors, the markups set forth above shall be applied to the subcontractor's actual costs to which a five (5) percent markup shall be allowed the Contractor. These markups shall be considered to be full compensation, covering the cost of general supervision, administration, overhead, profit, and any and all other general expenses, including, but not limited to, uniforms, hand tools, safety equipment, travel and lodging.

## **5.5 EXTENSION OF TIME FOR COMPLETION**

**5.5.1 Contractor Delayed or Hindered:** Should the Contractor be delayed or hindered in the completion of the Work by the neglect of the Owner, or by fire, by strikes, lockouts, embargoes or earthquakes, and any other causes the Inspector approves as not having been reasonably foreseeable at the time of execution of the Contract Documents, then the time allowance herein fixed for the completion of the Work shall be extended for a period equivalent to the time lost by reason of any or all of the causes aforesaid. Time extensions must be requested in accordance with Section 4.3.

**5.5.2 Agreement on Time Extension:** In addition, the Contractor and the Owner reserve the right to mutually agree in writing upon an extension of time for completion for causes other than enumerated above.

**5.5.3 Time Extension Not Waiver:** The granting of an extension of time by the Owner for performance by the Contractor shall not operate as a waiver or stop the Owner from claiming damages due to any other delays, prior or subsequent, which were not approved by the Owner as provided herein.

## **Article 6**

### **PAYMENTS AND COMPLETION**

#### **6.1 GENERAL**

**6.1.1 Contract Price:** The Contract Price is stated in the Contract is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

6.1.2 Waiver: Neither the acceptance of the Work by the Owner nor the payment of any part or all of the sum due the Contractor hereunder shall constitute a waiver by the Owner of any claim which the Owner may have against the Contractor or Surety under this Contract or otherwise.

6.1.3 Manner of Paying Warrants: Payment becomes due under the terms of this Contract in the manner prescribed by law. The Auditor shall cause a warrant for the Certified amount to be drawn upon the proper fund of the Treasurer of the Owner, which warrant shall be approved and issued to Contractor within that period of time customarily required to process said warrants in the ordinary course of Owner's business..

## **6.2 APPLICATIONS FOR PAYMENT**

6.2.1 Submittal of Applications: The Contractor shall submit to the Owner OR Owner's Representative, an Application for Payment form, which will be provided by the Owner. Such application shall be supported by such data substantiating the Contractor's right to payment as the Owner may require, such as copies of requisitions from subcontractors and material suppliers.

6.2.2 Basis for Payment: The Payment shall be based upon the total Contract price and upon percentage of completion of the Work at the time of the submittal of the application for payment.

6.2.3 Work Free of Liens: The Contractor warrants that upon submittal of an Application for Payment, all work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests, or encumbrances against Contractor by subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials, and equipment in relation to the Work.

## **6.3 CERTIFICATION FOR PAYMENT**

6.3.1 Certification Determination: The Owner's Representative will, within seven (7) days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certification for Payment, with a copy to the Contractor, for such amount as determined to be properly due, or notify the Contractor of the reasons for withholding certification in whole or in part as provided in section 6.4.1.

6.3.2 The Owner shall pay or cause to be paid to Contractor, an amount equal to ninety five percent (95%) as noted in section 6.4.3 of the amount set forth in the approved Certificate for Payment within thirty (30) days of receipt of an Application for Payment approved by the Owner's representative as provided for in Paragraph 6.3.1 above, and shall retain the remaining five percent (5%) as noted in 6.4.3 until the time provided for in section 6.6.4. The Owner shall withhold amounts pursuant to stop notices received in addition to the retainage. Failure of Owner to make payments provided herein in a timely manner shall not constitute a default by the Owner of the Contract, but may entitle the Contractor to interest as provided by law.

## **6.4 WITHHOLDING FROM PAYMENTS**

6.4.1 Reasons for Withholding: The Owner, upon recommendation of the Inspector, may withhold payments, or on account of subsequently discovered evidence nullify the whole or a part of any progress or retention payments to such extent as may be necessary to protect the Owner from loss on account of:

1. Defective work or material not remedied or replaced.
2. The filing of claims or Stop Notices to withhold, or reasonable evidence indicating probable filing of such claims or notices.
3. Failure of the Contractor to make payments properly to subcontractors, or for materials or labor.

4. Failure to make payments to any person or entity for financial obligations of the Contractor under terms of this Contract.
5. A reasonable doubt that the Contract can be completed for the balance then unpaid.
6. Damage to another contractor.
7. Performance of work in violation of the terms of the Contract Documents.
8. Excessive costs to Owner.
9. Failure of Contractor to comply with requirements for timely submittal of specified documentation, including but not limited to construction schedules, cost proposals, and submittals.

**6.4.2** Release of Payment: When the above grounds for withholding are removed, payment shall be made for amounts withheld because of them.

**6.4.3** Method of Retainage: The Department will retain 5% of the value of each progress payment from each progress payment. The retained funds shall be retained until thirty five (35) days after recordation of the Notice of Acceptance.

## **6.5 SUBSTITUTE SECURITIES FOR RETENTION**

**6.5.1** Substitution of Securities: Bidders are hereby put on notice that the successful bidder may substitute securities for any monies withheld by the County of El Dorado to insure performance of the Contract pursuant to Public Contract Section 22300. This section provides that the Contractor may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention from any portion of the payment by the County of El Dorado, by depositing eligible securities of equivalent value with the County of El Dorado or qualified escrow agent in accordance with the provisions of Public Contract Code Section 22300. Eligible securities shall be limited to those listed in Section 16430 of the Government Code, or bank or savings and loan certificates of deposit from a qualified institution. Any such escrow agreement shall follow the form set forth in Public Contract Code Section 22300(f) and provided by the Owner.

## **6.6 FINAL COMPLETION AND PAYMENT OF RETAINAGE**

**6.6.1** Affidavit of Payment: After the date of Substantial Completion of the Work, and before final acceptance of the Work, the Contractor shall file with the Owner his affidavit, sworn to before a Notary Public, stating that all workmen and persons employed, all firms supplying materials, and all subcontractors upon the project for either labor or material have been paid in full, except certain items, if any, to be set forth in such affidavit covering disputed claims, including claims for acceleration, disruption, delays, inefficiencies, and hindrance, or items in connection with which Stop Notices have been filed under the provisions of the Statutes of the State of California. The filing of such affidavit by the Contractor shall be one of the prerequisites to the making, by the Owner, of the final retainage payment on the Contract.

**6.6.2** Final Inspection: Upon receipt of written notice that the Work is ready for final inspection and acceptance and upon receipt of the Application for Payment, the Owner will promptly make such inspection. The Contractor shall complete all punch list items within two days of receipt of the written punch list. When the Owner's Representative finds the work acceptable under the Contract Documents and the Contract fully performed, the Owner's Representative will promptly recommend to Owner that Owner may consider the Project complete, that the Purchasing Agent may accept the project and that the Notice of Acceptance may be issued.

**6.6.3** Final Certification: Before issuance of payment, Contractor shall file, with Owner, a certificate in which he certifies that to the best of the Contractor's knowledge, information, and belief, and on the basis of observations

and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents.

6.6.4 **Payment of Retention:** Thirty-five (35) days after the Notice of Acceptance has been filed, provided the Work is fully completed and the Contract fully performed, the balance due under the Contract shall be paid, less any monies held for stop notices. Payment shall not be construed as an absolute acceptance of the work done up to the time of such payment. The Contractor, if requested by the Owner, shall furnish receipts or other vouchers showing his payments for materials and labor. Owner may withhold from payment an amount not to exceed 150 percent of any amount in dispute.

6.6.5 **Notice of Acceptance:** The Work shall be accepted in writing in the form of a Notice of Acceptance when the whole of the work has been completed satisfactorily to the Owner. In judging the Work, no allowance for deviations from the original Contract Documents will be made unless already approved in writing at the proper times and in the manner as called for herein.

## **Article 7**

### **PROTECTION OF PERSONS AND PROPERTY**

#### **7.1 PROTECTION OF WORK, PROPERTY, AND PERSONS**

7.1.1 **Responsible for Damage to Owner's Property:** The Contractor shall be entirely responsible for any damage to the property of the Owner due to careless handling of tools and/or materials or other causes attributed to the Contractor's Work in performing this Contract.

7.1.2 **Responsible for Safety:** The Contractor will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury, or loss to all employees on the Work and other persons who may be affected thereby, all the Work and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

7.1.3 **Safety and Convenience:** The Contractor will comply with all applicable laws, ordinances, rules, regulations, and orders of any public body having jurisdiction. The Contractor will erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.

7.1.4 **Remedy Damages:** The Contractor will remedy all damage, injury, or loss to any property caused, directly or indirectly, in whole or part, by the Contractor, any subcontractor, or anyone directly or indirectly employed by any of them or anyone of whose acts any of them would be liable, except damage or loss attributable to the sole or active negligence of the Owner or the Inspector or anyone employed by them and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the Contractor.

## **Article 8**

### **INSURANCE AND BONDS**

#### **8.1 INSURANCE**

##### **GENERAL INSURANCE REQUIREMENTS**

The Contractor shall provide proof of a policy of insurance satisfactory to the El Dorado County Risk Management Division and documentation evidencing that the Contractor maintains insurance that meets the following requirements:

1. Full Workers' Compensation and Employers' Liability Insurance covering all employees of the Contractor as required by law in the State of California.
2. Commercial General Liability Insurance of not less than Two Million Dollars (\$2,000,000) combined single limit per occurrence for bodily injury and property damage, including but not limited to endorsements for the following coverage: Premises, personal injury, operations, products and completed operations, blanket contractual, and independent contractors liability. This insurance can consist of a minimum \$1 Million primary layer of CGL and the balance as an excess/umbrella layer, but only if the County is provided with written confirmation that the excess/umbrella layer "follows the form" of the CGL policy.
3. Automobile Liability Insurance of not less than One Million Dollars (\$1,000,000) is required in the event motor vehicles are used by the Contractor in performance of the contract.
4. In the event Contractor is a licensed professional and is performing professional services under this contract, Professional Liability Insurance is required with a limit of liability of not less than One Million Dollars (\$1,000,000).
5. Explosion, Collapse and Underground coverage is required when the scope of work includes XCU exposures. For the purpose of this contract, XCU coverage is not required.

#### **PROOF OF INSURANCE REQUIREMENTS**

1. Contractor shall furnish proof of coverage satisfactory to the El Dorado County Risk Management Division as evidence that the insurance required herein is being maintained. The insurance will be issued by an insurance company acceptable to the Risk Management Division, or be provided through partial or total self-insurance likewise acceptable to the Risk Management Division.
2. The County of El Dorado, its officers, officials, employees, and volunteers shall be included as additional insureds, but only insofar as the operations under this Contract are concerned. This provision shall apply to all general liability and excess liability policies. Proof that the County is named additional insured shall be made by providing the Risk Management Division with a certified copy, or other acceptable evidence, of an endorsement to Contractor's insurance policy naming the County additional insured.
3. In the event Contractor cannot provide an occurrence policy, Contractor shall provide insurance covering claims made as a result of performance of this contract for not less than three (3) years following completion of performance of this Contract.
4. Any deductibles or self-insured retentions must be declared to and approved by the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the County, its officers, officials, employees and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.
5. Contractor shall require each of its subcontractors to procure and maintain commercial general liability insurance, automobile liability insurance, and workers compensation insurance of the types and in the amounts specified above, or shall insure the activities of its subcontractors in its own policy in like amounts. Contractor shall also require each of its subcontractors to name Contractor and County of El Dorado as additional insureds.

#### **INSURANCE NOTIFICATION REQUIREMENTS**

1. Contractor agrees no cancellation or material change in any policy shall become effective except upon thirty (30) days prior written notice to the County of El Dorado, Chief Administrative Office, Facilities Division, Russ Fackrell at 3000 Fairlane Court, Placerville, CA 95667.
2. Contractor agrees that the insurance required herein shall be in effect at all times during the term of this agreement. In the event said insurance coverage expires at any time or times during the term of this Contract, Contractor shall immediately provide a new certificate of insurance as evidence of the required insurance coverage. In the event

Contractor fails to keep in effect at all times insurance coverage as herein provided, County may, in addition to any other remedies it may have, terminate this Contract upon the occurrence of such event. New certificates of insurance are subject to the approval of the Risk Management Division.

#### ADDITIONAL STANDARDS

Certificates shall meet such additional standards as may be determined by the Department either independently or in consultation with the Risk Management Division, as essential for protection of the County.

#### COMMENCEMENT OF PERFORMANCE

Contractor shall not commence performance of this Contract unless and until compliance with each and every requirement of the insurance provisions is achieved.

#### MATERIAL BREACH

Failure of Contractor to maintain the insurance required herein, or to comply with any of the requirements of the insurance provisions, shall constitute a material breach of the entire Contract.

#### REPORTING PROVISIONS

Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

#### PRIMARY COVERAGE

The Contractor's insurance coverage shall be primary insurance as respects the County, its officers, officials, employees and volunteers. Any insurance or self-insurance maintained by the County, its officers, officials, employees or volunteers shall be in excess of the Contractor's insurance and shall not contribute with it.

#### PREMIUM PAYMENTS

The insurance companies shall have no recourse against the County of El Dorado its officers, agents, employees, or any of them for payment of any premiums or assessments under any policy issued by any insurance company.

#### CONTRACTOR'S OBLIGATIONS

Contractor's indemnity and other obligations shall not be limited by the insurance required herein and shall survive the expiration of this Contract.

## 8.2 BONDS

8.2.1 General Requirements for Bonds: Before commencing any Work under the Contract, the Contractor shall provide all bonds to the Owner. These bonds shall be in the amounts and for the purposes specified below. They shall be Surety bonds and shall be issued by corporations duly and legally licensed and qualified to transact business in the State of California. They shall be maintained by him and at his expense during the entire life of the Contract or later as provided.

8.2.2 Performance Bond: One bond shall be in the amount of 100 percent of the Awarded Contract and shall guarantee the faithful performance of the Contract and shall insure the Owner during the life of the Contract and the Guarantee period. The Contractor may provide, subject to approval by the Owner, a separate guarantee bond upon completion of and acceptance of the work.

8.2.3 Payment Bond: One bond shall be in the amount of 100 percent of the Awarded Contract and shall guarantee the payment in full of all claims for labor and materials in accordance with the provisions of the laws of the State of California.

8.2.4 Change of Surety: If, at any time a Surety on such bonds becomes irresponsible or loses its right to do business in the State of California, the Owner may require another Surety which the Contractor shall furnish within ten (10) calendar days after receipt of written notice to do so.

8.2.5 Authentication of Bonds: Evidence of authority of an attorney-in-fact acting for the corporate Surety must be provided in the form of a certificate as to his power of attorney and to the effect that it is not terminated and remains in full force and effect on the date of the bonds. The form of the bonds shall be in accordance with those provided in the Draft Agreement.

## **Article 9**

### **UNCOVERING AND CORRECTION OF WORK**

#### **9.1 DEVIATION FROM CONTRACT DOCUMENTS**

9.1.1 Improper Work: If the Contractor shall vary from the Contract Documents in the form or quality of the Work, or the amount or value of the materials herein provided for, the Owner shall have the right to order such improper work or materials removed, remade, or replaced. In the event that the Work is ordered changed, any other work disturbed or damaged by such alteration shall be made good at the Contractor's expense.

#### **9.2 CORRECTION OF WORK**

9.2.1 Covered or Completed Work: If any work is covered contrary to the written instructions of the Owner's Representative, or the Inspector, if one is appointed, it must, if requested, be uncovered for observation and replaced at the Contractor's expense.

9.2.2 Inspection of Covered Work: If the Owner's Representative or the Inspector, if one is appointed, considers it necessary or advisable that covered Work be inspected or tested by others, the Contractor, upon request, will uncover, expose, or otherwise make available for observation, inspection, or testing as the Inspector may require, that portion of the Work in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such Work is defective, the Contractor will bear all the expenses of such uncovering, exposure, observation, inspection, and testing and of satisfactory reconstruction; if, however, such Work is not found to be defective, the Contractor will 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 construction, and an appropriate Change Order shall be issued.

9.2.3 Rejected Work: The Contractor shall promptly remove from the premises all Work rejected by Owner for failure to comply with the Contract Documents, whether incorporated in the construction or not, and the Contractor shall promptly replace and re-execute the work either during the term of the Contract or during the warranty period, in accordance with the Contract Documents and without expense to the Owner and shall bear the expense of making good all Work of other contractors destroyed or damaged by such removal or replacement.

9.2.4 Cost of Correction: All removal and replacement Work shall be done at the Contractor's expense. If the Contractor does not take action to remove such rejected Work within ten (10) days after receipt of written notice, the Owner may remove such Work and store the materials at the expense of the Contractor. Owner also may perform such Work or repairs itself and charge the expense to the Contractor.

## **Article 10**

### **SUSPENSION OF CONTRACT**

#### **10.1 SUSPENSION OF WORK**

10.1.1 Owner May Suspend: The Owner may suspend the Work or any portion thereof for a period of not more than ninety (90) days or such further time as agreed upon by the Contractor, by written notice to the Contractor and the Inspector which shall fix the date on which work shall be resumed.

10.1.2 Resumption of Work: The Contractor shall resume that Work on the dates so fixed. The Contractor shall be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributed to any suspension.

**“END OF DOCUMENT”**

**APPLICATION FOR PAYMENT FORM**

**PLACERVILLE GENERATOR REPLACEMENT PROJECT  
BID #14-968-001**

CONTRACTOR \_\_\_\_\_

Statement Date \_\_\_\_\_

CONTRACT LUMP SUM PRICE	
Less 5% Retention	
Total Amount Due	

Submitted by:

Approved by:

\_\_\_\_\_

\_\_\_\_\_

**COUNTY OF EL DORADO**

**GENERATOR REPLACEMENT**

**PLACERVILLE, CALIFORNIA**

**BID #14-968-001**

**CONTRACT ADMINISTRATION FORMS**

# **CONTRACT ADMINISTRATION FORMS**

SUBMITTAL TRANSMITTAL FORM

TESTS AND INSPECTIONS FORM

REQUEST FOR INTERPRETATION (RFI) FORM

SUBSTITUTION REQUEST FORM

CERTIFICATION OF BUILDING MATERIALS

WARRANTY FORM

## SUBMITTAL COVER SHEET

<b>PROJECT NAME:</b> County of El Dorado Generator Replacement	<b>ARCHITECT'S JOB NO.</b> 12201	<b>CONTRACTOR'S JOB NO.</b>	<b>SUBMITTAL NO.</b>
<b>SUBCONTRACTOR</b>  NAME:  ADDRESS:  PHONE:  CONTACT:	<b>CONTRACTOR CERTIFICATION</b> I hereby certify that I have reviewed the attached, and have verified field requirements and compliance with the Contract Documents.  CONTRACTOR:  ADDRESS:  SIGNED: _____ DATE: _____		
<b>PRODUCT OR SYSTEM:</b>		<b>SECTION NUMBER:</b>	
CHECK ONE ONLY: <input type="checkbox"/> SPECIFIED PRODUCT <input type="checkbox"/> SUBSTITUTION (ATTACH SUBSTITUTION REQUEST FORM) <input type="checkbox"/> SPECIFIED ALTERNATE <input type="checkbox"/> RESUBMITTAL: PREVIOUS SUBMITTAL NO.			
<b>SUBMITTAL HISTORY</b>			
<b>DATE REC'D. FROM CONTR.</b>	<b>CONSULTANT REVIEW</b>  <input type="checkbox"/> Civil <input type="checkbox"/> Mechanical <input type="checkbox"/> Structural <input type="checkbox"/> Electrical <input type="checkbox"/> Landscape <input type="checkbox"/> Other  Date Sent: _____  Date Due: _____  Date Rec'd: _____	<b>DISTRIBUTION DATE</b> _____ <b>Copies to:</b> Contr. _____  Insp. _____  File _____  Owner _____  Other _____	
<b>REMARKS:</b>		<div style="text-align: center;"><b>ANOVA NEXUS ARCHITECTS</b></div> <input type="checkbox"/> Reviewed, No Exceptions Taken <input type="checkbox"/> Revise & Submit <input type="checkbox"/> Reviewed, Comply w/ Exceptions Noted <input type="checkbox"/> Rejected  This review and noted exceptions do not relieve the contractor from compliance with any requirement of the contract documents. This review is only for conformance with the design intent, consistency with specified requirements, and to promote the planning of the work by the contractor in sufficient detail to allow for proper coordination and execution of the Work. Shop drawings typically require information which is more detailed or specific than that shown in the contract documents. Contractor is solely responsible for such specific or detailed information. Contractor is solely responsible for completeness, dimensions, quantities, coordination with other work, selection of fabrication processes and techniques of construction, and any omissions or deviations from contract documents not so identified in the submittal.  <div style="display: flex; justify-content: space-between;"> <span><b>BY:</b></span> <span><b>DATE:</b></span> </div>	

### TESTS AND INSPECTIONS FORM

The testing and inspection form can be downloaded from DSA's website at the link below. A draft should be completed by the project structural engineer prior to DSA submittal.

[http://www.documents.dgs.ca.gov/dsa/forms/DSA-103\\_rev5-20-11.xls](http://www.documents.dgs.ca.gov/dsa/forms/DSA-103_rev5-20-11.xls)

This page will be replaced with the DSA approved testing and inspection form prior to bidding.

## REQUEST FOR INTERPRETATION

PROJECT NAME: <b>EDC Generator Replacement, Placerville, CA</b>		JOB NO. <b>12201</b>	
		RFI NO.	
TO: ANOVA ARCHITECTS 778 PACIFIC STREET PLACERVILLE, CA 95667		FROM:	
SUBJECT:			
CATEGORY:			
<input type="checkbox"/> NEED CLARIFICATION		<input type="checkbox"/> REQUEST FOR DEVIATION FROM DOCUMENTS	
<input type="checkbox"/> UNFORESEEN CONDITION		<input type="checkbox"/> CONSTRUCTION CONFLICT	
<input type="checkbox"/> CONFLICT BETWEEN DOCUMENTS		<input type="checkbox"/> OTHER	
SPEC. SECTION	PARAGRAPH NO.	DRAWING NO.	DETAIL NO.
DESCRIPTION:			
CONTRACTOR'S PROPOSED RESOLUTION:			
<input type="checkbox"/> ATTACHMENTS:			
<input type="checkbox"/> COST IMPACT:		<input type="checkbox"/> TIME IMPACT:	
CONTRACTOR SIGNATURE:		DATE:	
RESPONSE:			
<input type="checkbox"/> ATTACHMENTS:			
ARCHITECT SIGNATURE:		DATE:	

## SUBSTITUTION REQUEST FORM

<b>PROJECT NAME:</b> EDC Generator Replacement Placerville, CA	<b>ARCHITECT'S JOB NO.</b> 12201	<b>CONTRACTOR'S JOB NO.</b>	<b>SUBMITTAL NO.</b>
<b>PRODUCT OR SYSTEM:</b>  <b>SECTION NUMBER:</b>  <b>SPECIFIED ITEM:</b>  <b>PROPOSED SUBSTITUTION:</b>  <b>REASON FOR REQUEST:</b>  <b>REDUCTION OF CONTRACT SUM OR TIME WITH THIS SUBSTITUTION:</b>			
Attached data includes product description, specifications, illustrations, performance and test data of specified and proposed product or system required for a side-by-side comparison. Applicable portions of data are clearly identified.  Attached data also includes a description of changes to other work which proposed substitution will require for its proper installation.  The undersigned certifies that the following paragraphs, unless modified by attachments, are correct: <ol style="list-style-type: none"> <li>1. The proposed substitution does not affect dimensions shown on drawings.</li> <li>2. The undersigned will pay for changes to the building design, including engineering design, detailing and construction costs caused by the requested substitution.</li> <li>3. The proposed substitution will have no adverse affect on other trades, the construction schedule, or specified warranty requirements.</li> <li>4. Maintenance and service parts will be readily available for the proposed substitution.</li> </ol> The undersigned further states that the function, appearance, and durability of the proposed substitution are equivalent or superior to the specified item.			
Submitted by:  Signature:  Contractor:  Telephone:  Date:  Attachments:	For use by Architect:  <input type="checkbox"/> Acceptable, see submittal review comments <input type="checkbox"/> Rejected, see remarks below.  By:  Date:  Remarks:		

**Counsel – Is this form required? If not Facilities would like to omit.**

**CERTIFICATION OF COMPLIANCE FOR BUILDING MATERIALS**

This is to certify, in accordance with the Environmental Protection Agency **[and the California Green Building Standards Code]** requirements, that the materials and equipment used in the construction of the **[project name]** for the **[district name]** School District of **[name of county]** County, California, are asbestos free and are, therefore, not subject to monitoring for asbestos contamination, and that materials used in the construction comply with all local, regional and State volatile organic compound (VOC) regulations and requirements.

**Project Name:** \_\_\_\_\_

**Address:** \_\_\_\_\_

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

**Address:** \_\_\_\_\_

**Signature:** \_\_\_\_\_

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

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

## WARRANTY FORM

Project Name \_\_\_\_\_

Description of Work \_\_\_\_\_

Specification Section \_\_\_\_\_

Date of Acceptance by Owner \_\_\_\_\_

We hereby guarantee that the workmanship and materials that we installed in the above named project have been in accordance with the Drawings and Project Manual and that the work as installed will fulfill the requirements of the guarantee included in the Project Manual. We agree to repair or replace any or all work, together with any other adjacent work that we may displace in so doing, that may prove to be defective in its workmanship or material within a period of \_\_\_\_\_ (\_\_\_\_) years from date of acceptance by the Owner, without any expense whatsoever to Owner, ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with the above-mentioned conditions within 10 days after being notified in writing by the Architect or Owner, we collectively or separately do hereby authorize Owner to proceed to have said defects repaired and made good at our expense and we will honor and pay the costs and charges therefore upon demand. This guarantee is a supplement to the General Conditions of the Contract and not in lieu of any provision thereof.

**SUBCONTRACTOR:**

\_\_\_\_\_  
Signed Date

\_\_\_\_\_  
Name Title

\_\_\_\_\_  
Company Name License No.

\_\_\_\_\_  
Address

**GENERAL CONTRACTOR:**

\_\_\_\_\_  
Counter signed Date

\_\_\_\_\_  
Name Title

\_\_\_\_\_  
Company Name License No.

**COUNTY OF EL DORADO**

**GENERATOR REPLACEMENT**

**PLACERVILLE, CALIFORNIA**

**BID #14-968-001**

**TECHNICAL SPECIFICATIONS**

# TECHNICAL SPECIFICATIONS

## DIVISION 1 – GENERAL REQUIREMENTS

01 11 00	Summary of Work
01 26 00	Contract Modification Procedures
01 26 13	Requests for Interpretation
01 29 00	Payment Procedures
01 29 73	Schedule of Values
01 31 00	Project Management and Coordination
01 31 26	Electronic Communication Protocols
01 32 16	Progress Schedule – No Dryout
01 33 00	Product Submittals and Substitutions
01 35 16	Alteration Project Procedures
01 42 00	References
01 43 00	Quality Assurance
01 45 29	Testing Laboratory Services
01 50 00	Temporary Facilities and Controls – No Dryout
01 56 39	Temporary Tree and Plant Protection
01 60 00	Product Requirements
01 73 00	Execution Requirements
01 73 29	Cutting and Patching
01 77 00	Closeout Procedures

## DIVISION 2 – EXISTING CONDITIONS

## DIVISION 3 – CONCRETE

03 30 00	Concrete
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## DIVISION 4 – MASONRY

04 21 13	Brick Masonry
04 22 00	Concrete Unit Masonry

## DIVISION 5 – METALS

05 50 00	Metal Fabrications
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## DIVISION 6 – WOOD, PLASTICS AND COMPOSITES

06 10 00	Rough Carpentry
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## DIVISION 7 – THERMAL AND MOISTURE PROTECTION

07 62 00	Sheet Metal Flashing and Trim
07 92 00	Joint Sealants

**DIVISION 8 – OPENINGS**

**DIVISION 9 – FINISHES**

09 90 00 Painting and Coating

**DIVISION 10 – SPECIALTIES**

**DIVISION 11 – EQUIPMENT**

**DIVISION 12 – FURNISHINGS**

**DIVISION 13 – SPECIAL CONSTRUCTION**

**DIVISION 14 – CONVEYING EQUIPMENT**

**DIVISION 16 – ELECTRICAL**

16050	Basic Material
16060	Ground
16073	Hanger and Supports
16075	Electrical Identification
16120	Cable
16130	Raceway
16231.1	Diesel Engine Generator
16231.2	Propane Engine Generator
16410	Switch and Circuit breakers
16415	Transfer Switch
16441	Switchboards

**DIVISION 31 – EARTHWORK**

31 00 00 Earthwork and Trenching

**DIVISION 32 – EXTERIOR IMPROVEMENTS**

32 12 00	Flexible (Asphalt) Paving
32 31 13	Chain Link Fences and Gates
32 32 19	Unit Masonry Retaining Walls

## DIVISION 1 – GENERAL REQUIREMENTS

### 01 11 00 SUMMARY OF WORK

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

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

##### 1.2 GENERAL

- A. The Project: The name of the Project is **County of El Dorado Generator Replacement**. The project site is located at **360 Fair Lane, Placerville, CA 95667**.
- B. Responsible Parties: Construction of this Project is governed by the agreement between the Owner and the Contractor. Statements in the specifications are directed to this contractor, who has overall responsibility for the subcontractors.

##### 1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

- A. General: Under a single contract construct a **Replacement Generator** in conformance with Drawings and Specifications prepared by ANOVA Architects, Inc., Placerville, California, and bound herewith.

##### 1.4 EXISTING SITE CONDITIONS AND RESTRICTIONS:

- A. Prior to commencement of Work, Contractor, Owner's representative and Architect shall jointly survey the site and existing buildings, paving, plant life and other items. Contractor shall note and record existing damage such as cracks, sags, loose materials, and other damage.
- B. This record shall serve as a basis for determination of subsequent damage to these items due to settlement or movement due to demolition and construction operations.
- C. Such damage, as noted, shall be suitably marked on the item, if possible and the official record of existing damage shall be signed by the parties making the survey.
- D. Cracks, sags or other damage to the site and adjacent building areas, paving, plant life and other items not noted in the original survey, but subsequently observed shall be reported immediately to the Architect.

##### 1.5 REQUIREMENTS FOR SEQUENCING OR SCHEDULING:

- A. General: Begin work as identified in Document GENERAL CONDITIONS, proceed as shown in the Progress Schedule as required under Section 01 32 16 - PROGRESS SCHEDULE, and complete work within the limits designated in Document OWNER-CONTRACTOR AGREEMENT.
- B. Coordination: Coordinate work to accommodate the Owner's operations and use of premises during construction period; coordinate construction schedule and operations with Owner's Representative; indicate all special requirements in the Progress Schedule as specified.

## **PART 2 - PRODUCTS**

### **2.1 HAZARDOUS MATERIALS**

- A. General: No asbestos or products containing asbestos have been knowingly specified for this Project.
- B. Notification: If materials containing asbestos are brought to the site for use or installation in the Work; or if such materials are encountered in existing work upon which new work is being performed, notify the Architect immediately so that appropriate action may be taken.
- C. Certification: Submit CERTIFICATION OF COMPLIANCE FOR BUILDING MATERIALS certifying that no new materials containing asbestos have been included in the Work is required at the completion of the Project.

## **PART 3 - EXECUTION**

### **3.1 CONTRACTOR'S USE OF PREMISES**

- A. General: Confine operations at the site to areas permitted by law, ordinances, permits and the Contract Documents; do not unreasonably encumber the site with materials or equipment.
- B. Coordination with Occupants: Do not interfere with Owner's activities in and about existing facilities. Disruption of Owner's operations will be acceptable only with prior agreement with the Owner. 10 days minimum notice will be required, including establishment of a firm schedule for operations.
- C. Access to Site: Roads for access to and from building site, loading areas and parking space shall be as indicated. Confine traffic and materials delivery to these roads and locations.
- D. Storage: Contractor is responsible for protection and safekeeping of products stored on the site. Specific areas for storage of materials and site fabrication shall be as indicated by the Architect.

### **3.2 PROTECTION**

- A. General: Erect temporary barricades, warning signs and substantial handrails to protect persons in and around the work areas and observe safety precautions. Conform to applicable OSHA rules and regulations and State Safety Regulations and Orders.

**END SECTION 01 11 00**

## 01 26 00 CONTRACT MODIFICATION PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Section includes requirements for documentation of changes in the Work, as defined in Document GENERAL CONDITIONS.
- B. Change Procedures:
  - 1. Authorized Agent: Submit to Architect the name of the individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.
  - 2. Proposal Request: Architect may issue a Proposal Request on AIA Document G709 - Proposal Request, which includes a detailed description of a proposed change in the Work. Contractor will prepare and submit an estimate within 10 days.
  - 3. Request for Change: Contractor may propose a change by submitting a written request to the Architect, describing the proposed change and its full effect on the Work; include a statement describing the reason for the change, the effect on the Contract Sum/Price and Contract Time with full documentation, and a statement describing the effect on work by separate or other contractors. Document any requested substitutions in accordance with Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.

#### 1.3 CHANGE ORDERS

- A. Format: Issued by Architect to order changes to the work which involve a change in Contract Price and/or Contract Time; signed by Architect, Owner and Contractor.
- B. Documentation of Change in Contract Price and/or Contract Time:
  - 1. General: Maintain detailed records of work done on a time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs of changes in the Work.
  - 2. Quotation Breakdown: Itemize each quotation for a change in cost or time in sufficient detail to allow evaluation of the quotation. As a minimum, itemize separately each significant material and equipment purchase and the work of each trade and subcontractor.
  - 3. Supporting Data:
    - a. Costs: Separate costs for products, labor, equipment, and subcontractor quotations.
    - b. Quantities: Products, labor, and equipment.

- c. Taxes, Insurance and Bonds: As required.
  - d. Overhead and Profit: As required, not to exceed limits set in Document GENERAL CONDITIONS.
  - e. Justification: Change in Contract Time.
  - f. Additional Data: On request, as required to support computations.
4. Claim for Additional Costs:
- a. General: Support each claim for additional costs, and for work done on a time and material basis, with the following additional information:
  - b. Origin and Date of Claim: State name and originator and date.
  - c. Dates and Times: When work was performed and by whom.
  - d. Time Records and Wage Rates: As recorded and paid.
  - e. Invoices and Receipts: For products, equipment, and subcontracts.
- C. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

#### **1.4 CONSTRUCTION CHANGE DIRECTIVE**

- A. General: Issued by Architect on Architects - Construction Change Directive form, signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. The document will describe changes in the Work, and will designate method of determining any change in Contract Price or Contract Time. Promptly execute the change in Work.

#### **1.5 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS**

- A. General: Issued by Architect on Architect's - Architect's Supplemental Instructions form to provide supplemental instructions, interpretations, or order minor changes in the Work not involving an adjustment to Contract Price or Contract Time.

### **PART 2 - PRODUCTS**

#### **2.1 TYPES OF CHANGE ORDERS**

- A. Stipulated Price Change Order: Based on Proposal Request and Contractor's maximum price quotation or Contractor's request for a Change Order approved by Architect.
- B. Unit Price Change Order:
  - 1. General: For unit costs or quantities of units of work which are not pre-determined, execute Work under a Construction Change Directive.
  - 2. Pre-determined Unit Prices and Quantities: Change Order will be executed on a fixed unit price basis.

3. Changes in Contract Price or Contract Time: Computed as specified for Time and Material Change Order.
- C. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect will determine the change allowable in Contract Price and/or Contract Time as provided in the Contract Documents. Maintain detailed records of work done on time and material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

## **PART 3 - EXECUTION**

### **3.1 CORRELATION OF CONTRACTOR SUBMITTALS**

- A. General: Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum/Price.
- B. Progress Schedule: Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust time for other items of work affected by the change, and resubmit.
- C. Record Documents: Record authorized changes in Project Record Documents.

**END SECTION 01 26 00**

## 01 26 13      **REQUESTS FOR INTERPRETATION**

### **PART 4 - GENERAL**

#### **1.1      RELATED DOCUMENTS**

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

#### **1.2      SUMMARY**

- A.      Submit request for interpretation, information and/or clarification to the Architect promptly upon identification of need, and in reasonable time so as not to affect the progress of the Work.

#### **1.3      SUBMISSION PROCEDURES**

- A.      General: Request for interpretation beyond that set forth in the Contract Documents will be considered only when the request is in writing and fully documented.
  
- B.      Time: Identify and submit requests for information in a timely manner.
  
- C.      Pre-Submission Review: Before submitting request to the Architect, Contractor shall conduct a review to determine that the interpretation requested, including items submitted by subcontractors or suppliers, is not shown in the Contract Documents.
  
- D.      Category of Request:
  - 1.      General: Submit requests for interpretation when one or more of the following conditions occur:
  - 2.      Need for Clarification: When information shown or indicated in the Contract Documents is unclear in its intent.
  - 3.      Unforeseen Condition: Discovery of unforeseen condition or circumstance that is not shown or indicated in the Contract Documents.
  - 4.      Conflict Within Documents: Discovery of an apparent inconsistency, conflict or discrepancy between different portions of the Contract Documents, where the intent cannot be reasonably inferred from information shown or indicated.
  - 5.      Omission: Discovery of what appears to be an omission in the Contract Documents, where the intent cannot be reasonably inferred from information shown or indicated.
  - 6.      Coordination Problem: Discovery of unforeseen condition in coordinating placement of work that is specifically related to the Contract Documents.
  
- E.      Unacceptable Requests:
  - 1.      General: Do not submit requests for interpretation for confirmation of any action already taken by the Contractor. Requests will not be accepted that imply confirmation of any unauthorized change to the Work.

2. **Untimely Submission:** A request for interpretation that is submitted in a belated manner without proper coordination and scheduling of the Work of related subcontractors will not be reviewed and will be returned to the Contractor.
  3. **Submittal:** A request for interpretation that is included as part of a submittal will not be processed; see Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
  4. **Substitution:** A request for interpretation that is a request for substitution will not be processed; see Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.
  5. **Exclusionary Submission:** A request that implies that specific portions of the work are assumed to be excluded or considering a separate portion of the Contract Documents in part rather than as a whole will not be processed.
- F. **Log:** Contractor shall prepare and maintain the official log of requests for interpretation. Review status of log at each job progress meeting.

## 1.4 SUBMISSION REQUIREMENTS

- A. **Request For Interpretation (RFI) Form:**
1. **General:** Provide a completed and legible copy of the RFI Form with each submittal.
  2. **RFI Number:** Identify RFIs sequentially starting from number 1; number re-submissions with same number as original and add letter designation A., B., C., etc., in order submitted, until resolution is achieved.
  3. **Contractor:** Provide company name and mailing address with signature of contact person responsible for work on this Project, certifying to review of RFI.
  4. **Subcontractor and/or Supplier:** Provide company name, mailing address, telephone number and name of contact person responsible for work on this Project.
  5. **RFI Description:**
    - a. **General:** Describe subject of RFI completely.
    - b. **Specifications References:** Identify specification section number and paragraph number under consideration.
    - c. **Drawing References:** Identify specific drawing number and/or detail number under consideration.
    - d. **Attachments:** Identify as required, to support description.
  6. **Contractor's Proposed Resolution:**
    - a. **General:** Describe suggested resolution; support with attachments as required.
    - b. **Cost Impact:** Indicate impact on costs; explain Contractor's original basis for bid and, based on the current request, reason that additional costs should be considered.
    - c. **Time Impact:** Indicate effect on schedule; explain Contractor's original basis for bid and, based on the current request, why a time extension should be considered.

## **1.5 ARCHITECT'S RESPONSE**

- A. General: Architect will respond on the RFI Form and include attachments, as referenced. Verbal and FAX responses to such requests are to be considered informational; official written response will only be given on original RFI Form.
- B. Architect's Review:
  - 1. General: Allow 14 calendar days after receipt. If more than 10 requests are received within 1 calendar week, the Architect will specifically schedule and extend response time as required to accomplish the reviews.
  - 2. Prioritization: If more than 5 requests have been received by the Architect, the Contractor shall identify the order of requests most critical to the schedule of the Project.

## **1.6 DISTRIBUTION**

- A. General: Submit 2 original, signed copies; 1 will be retained by Architect, the other will be returned with the official response, to the Contractor. Only the original copy with wet signatures and identified attachments will be considered official.
- B. Consultants: The Architect will distribute copies of requests for interpretation to project consultants, as required for their participation. Direct communication and response between project consultants and Contractor will be considered informational only.
- C. Response: The Contractor will make and distribute copies of the official response to subcontractors and suppliers, as required.

## **PART 2 - PRODUCTS and PART 3 – EXECUTION**

Not Used

**END SECTION 01 26 13**

## 01 29 00 PAYMENT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's Applications for Payment.

#### 1.3 GENERAL REQUIREMENTS

- A. Submit Applications for Payment to the Architect in accordance with the schedule established by Document OWNER-CONTRACTOR AGREEMENT and GENERAL CONDITIONS. Refer to requirements for record drawings in Document GENERAL CONDITIONS.
- B. Related Requirements Specified Elsewhere:
  - 1. Schedule of Values: Section 01 29 73 - SCHEDULE OF VALUES.
  - 2. Contract Closeout: Section 01 77 00 - CLOSEOUT PROCEDURES.

#### 1.4 SUBMITTALS

- A. Form:
  - 1. General: Prepare itemized applications typed on AIA Document G702 - Application and Certificate for Payment and Continuation Sheet AIA Document G703.
  - 2. Format: Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
  - 3. Change Orders: List each authorized Change Order as an extension on AIA G703 - Continuation Sheet, listing Change Order number and dollar amount as for an original item of work.
  - 4. Mechanics Lien Guarantee: Provide guarantee of lien releases sufficient to cover previously released payments.
  - 5. Final Payment: Prepare Application for Final Payment as specified in Section 01 77 00 - CLOSEOUT PROCEDURES.
- B. Record Drawings: Update Record Drawings as required in Document GENERAL CONDITIONS and Section 01 77 00 - CLOSEOUT PROCEDURES.

C. Procedure:

1. Required Copies: Submit 4 copies of each Application for Payment.
2. Payment Period: Submit at intervals stipulated in Document OWNER-CONTRACTOR AGREEMENT.

**PART 2 - PRODUCTS AND PART 3 - EXECUTION**

Not Used

**END SECTION 01 29 00**

## 01 29 73 SCHEDULE OF VALUES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Description: Submit to the Architect 3 copies of Schedule of Values within 7 days of the date of commencement. Schedule of Values will be used as basis for, and review of, Contractor's Applications for Payment.
- B. Substantiation: Upon request by the Architect, support values given with data that will substantiate their correctness.
- C. Quantities: Submit quantities of designated materials, if applicable.
- D. Payment for Materials: Materials stored on or off site will be limited to those materials listed in Schedule of Unit Material Values.

### PART 2 - PRODUCTS

#### 2.1 FORM OF SUBMITTAL

- A. General: Submit typed schedule on AIA Document G703 - Application and Certificate for Payment Continuation Sheet. Contractor's standard form of electronic media printout will be considered as an alternative.
- B. Format:
  - 1. Major Categories: Break total contract amount into subtotals by Building Unit Designations with a separate category for sitework.
  - 2. Line Items: Use the Table of Contents of this Project Manual as the basis for format for listing costs of work specified in Divisions 2 through 16 within each major category. Identify each line item with the number and title of its specification section.

### PART 3 - EXECUTION

#### 3.1 PREPARING SCHEDULE OF VALUES

- A. Installed Costs: Break down installed costs into the delivered cost of product, with taxes paid, and the total installed cost, with overhead and profit.
- B. Major Items: For each line item which has an installed value of more than \$25,000, break down the costs to list major products or operations under each item.

- C. Figures: Round off to the nearest dollar.
- D. Sum: Make the sum of total costs of all items listed in the schedules equal to the total Contract Sum.
- E. General Cost Items: Itemize separate line item costs for each of the following:
  - 1. Performance and payment bonds.
  - 2. Field supervision and layout.
  - 3. Scheduling.
  - 4. Temporary facilities and controls.
  - 5. Other documentable general cost items as applicable. (No mobilization line item will be allowed.)

### **3.2 PREPARING SCHEDULE OF UNIT MATERIAL VALUES**

- A. Stored Materials: Submit a separate schedule of unit prices for materials to be stored on which progress payments will be made.
- B. Identification: Make the form of submittal parallel to the Schedule of Values, with each line item identified the same as the line item in the Schedule of Values.
- C. Unit Costs: Include in the unit costs only the value of material, delivery and unloading at site, including sales taxes.
- D. Unit Material Item Total: Make sure that the unit prices multiplied by quantities are given an equal material cost of that item in the Schedule of Values.

### **3.3 REVIEW AND RESUBMITTAL**

- A. After review by the Architect, revise and resubmit the schedule (and the Schedule of Unit Material Values) as required. Revise schedule to list approved Change Orders, with each Application for Payment.

**END SECTION 01 29 73**

## 01 31 00 PROJECT MANAGEMENT AND COORDINATION

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Coordinate scheduling, submittals, and work of the various sections of these Specifications to assure the efficient and orderly sequence of installation of each part of the work. Coordinate construction operations included under different sections that depend on each other for proper installation, connection, and operation.

#### 1.3 SUBMITTALS

- A. General: Within 7 days of date of commencement, submit a list of the Contractor's principal staff assignments, including the superintendent and other key personnel in attendance at the Project Site. Identify each individual by name, title, and provide a description of their duties and responsibilities. Update list within 7 calendar days of any staff change.
- B. Communications: Submit written procedures for Project communications including submittals, reports and records, schedules, coordination drawings, and recommendations. Communications between the Owner, and Contractor shall be through the Architect.
- C. Coordination Drawings:
  - 1. General: Submit as required under Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS. Prepare where careful coordination is required for installation of products and materials fabricated by separate entities and/or where limited space availability requires maximum utilization of space for efficient installation of different components. Show the relationship of components and required installation sequences.
  - 2. Site Utilities: Show piping and conduit for underground drainage, sewer, gas, power, signal, and water under fire access road and at major crossings and congested areas.
  - 3. Attic/Ceiling spaces: Show piping, ductwork, conduit and equipment for HVAC, electrical, plumbing, and fire sprinklers in congested areas or where there is the potential for routing conflicts.

#### 1.4 SCHEDULING

- A. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures such as preparation of schedules, installation and removal of temporary facilities, delivery and processing of submittals, progress meetings, and Project closeout activities, with other construction activities to avoid conflicts and assure orderly progress of the Work.

## 1.5 MEETINGS

### A. Pre-Construction Conference:

1. Prior to start of construction, a conference will be called for the purpose of reviewing the construction program. At this conference, procedures for implementing the communication and administration requirements of these construction documents agreeable to Contractor and Architect shall be established.
2. Schedule for progress meetings shall be established at pre-construction conference.
3. Attendance: Job superintendent, major subcontractors and suppliers, owners representative, Architect, and Architect's consultants.

### B. Progress Meetings:

1. Attendance: Job superintendent, Architect, Owner, and others as required.
2. Architect's Responsibility: Preside at meetings and distribute minutes to all attendees for review. Minutes will be assumed to accurate if no revisions are requested by attendees within 10 days or by the next meeting whichever is later. Minutes are not a part of the contract documents and cannot change the contract documents.
3. Contractor's responsibility: Make physical arrangements for meetings. Assure attendance of any subcontractors or suppliers required at the meetings. Review minutes of meeting for accuracy and completeness.
4. Completion: All Progress Meetings within 30 days of planned or required date of substantial completion shall address the following items:
  - a. Outstanding work required to be completed before inspection for substantial completion. Refer to Section 01 77 00 – CLOSEOUT PROCEDURES for minimum list of requirements prior to inspection.
  - b. Scheduled date of inspection for substantial completion.
  - c. Scheduled date of final completion.

## 1.6 CONSTRUCTION PLANNING

- A. Coordinate the use of the site and facilities. Allocate areas of site for field offices and sheds, staffing, access, traffic, and parking facilities.

## PART 2 - PRODUCTS

Not Used

## PART 3 - EXECUTION

Not Used

**END SECTION 01 31 00**

## 01 31 26 ELECTRONIC COMMUNICATION PROTOCOLS

### PART 1 - GENERAL

#### 1.1 SUMMARY

- A. Description: This section provides procedures for Contractor's use certain of the Architect's computer aided design (CAD) files as background drawings preparation of submittals.

#### 1.2 BACKGROUND DRAWINGS

- A. Purpose: Use of electronic background drawing is optional and is offered only as a convenience to the Contractor to save the expense of redrawing the backgrounds.
- B. Drawings: Background drawings will include only floor plans, interior and exterior elevations, reflected ceiling plans, roof plans, site plan, and building sections.

#### 1.3 SUBMISSION PROCEDURES

- A. Agreement: Submit request for electronic data transfer by signing the Agreement included at the end of this Section and sending copy to ANOVA Architects.
- B. Time: Submit request a minimum of 10 days prior to the date that files are needed.
- C. Response: Architect will email the files or provide files on a diskette, as requested in the transmittal. Files will be in the program used by the Architect's firm; any necessary translations will be the responsibility of the Contractor. Architect is not responsible for any problems encountered as a result of electronic transmission or translation.

### PART 2 - PRODUCTS AND PART 3 - EXECUTION

Not Used

**END SECTION 01 31 26**

# ELECTRONIC DATA TRANSFER AGREEMENT

PROJECT NAME: **County of El Dorado Generator Replacement**

ARCHITECT'S PROJECT NO.: **12201**

ARCHITECT: Anova NEXUS Architects

1990 3<sup>rd</sup> Street, Suite 500  
Sacramento, CA 95811

CONTRACTOR MAKING REQUEST:

Firm Name  
Address  
City, State, Zip

BACK GROUND DRAWINGS FOR PREPARATION OF SHOP DRAWINGS PER SECTION:

Architect will provide background drawings (floor plans, reflected ceiling plans, roof plans, interior and exterior elevations, building sections and site plans) in electronic format to contractor for contractor's use in preparation of shop drawings. No other use is authorized. The drawings will be provided as a courtesy. Any fee charged is to defray the cost of retrieving and handling the files and not to pay for any professional service. Contractor's use of the drawings is optional and will not change the responsibility of any party to any contract related to this project nor alter any provision of the contract documents.

Contractor acknowledges the following: The electronic background drawings are not part of the Contract Documents. They have been extracted from the Architects working CAD files for the project, are incomplete, and differ from the current printed Contract Documents. Shop drawings require more precision and detail than do construction documents as typically prepared by architects. Architect makes no representation that the electronic background drawings are suitable for any particular purpose. Contractor further acknowledges that contractor is solely responsible for the accurate, complete, and timely production and submission of shop drawings and that contractor will modify the electronic background drawings to accurately depict field conditions and the current contract documents to the extent necessary to fulfill those responsibilities.

In consideration for use of the electronic background drawings, contractor agrees to defend, indemnify, and hold harmless the Architect, the Architects Consultants, and the Owner from any claim or liability of any kind, and to waive any claim against the Architect or Owner, arising out of the authorized or unauthorized use of the electronic background drawings by the contractor.

\_\_\_\_\_  
Contractor's Representative's Name (print)

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

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

## 01 32 16      **PROGRESS SCHEDULE – NO DRYOUT**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. Within 7 days of commencement date, submit to the Architect estimated construction progress schedules for the Work, with sub-schedules of related activities essential to its progress. Submit revised progress schedules periodically.

#### **1.3 SCHEDULE:**

- A. Format: Either Gantt chart or network diagram format is acceptable.
  - 1. Bar Chart: Prepare Schedule as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first work day of each week.
  - 2. CPM Schedule: Prepare network analysis system using the critical path method, as outlined in The Associated General Contractors of America (AGC) publication "The Use of CPM in Construction - A Manual for General Contractors".
  - 3. Sequence of Listings: List each item in chronological order of its start date.
  - 4. Item Identification: Identify each task by specification section number. Coordinate with schedule of values
- B. Content:
  - 1. General: Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
  - 2. Phases: Identify work of separate stages and other logically grouped activities. Provide sub-schedules for each stage of Work identified in Section 01 11 00 - SUMMARY OF WORK. Provide sub-schedules to define critical portions of the entire Schedule.
  - 3. Multiple Buildings: Identify start and finish date of each task for each building.
  - 4. Percentage of Completion: Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each progress billing cycle.
  - 5. Scheduled Submittals: Show submittal dates on schedule or provide separate schedule of submittal dates for shop drawings, product data, and samples and dates reviewed submittals will be required from Architect.

6. Project Closeout: Identify date of inspection for substantial completion. Show 7-day punch list close-out period immediately following this inspection.

C. Revisions to Schedules:

1. General: Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Revisions: Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Reports: Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.

## 1.4 SUBMISSIONS

- A. General: After review of initial Schedule, resubmit required revised data within 7 days.
- B. Revised Schedules: Submit revised Progress Schedules with each Application for Payment. Provide the number of copies required by Contractor, plus 2 copies which will be retained by Architect.
- C. Distribution: Distribute copies of reviewed Schedules to project site file, subcontractors, suppliers, and other concerned parties. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in Schedules.

## PART 2 - PRODUCTS AND PART 3 – EXECUTION

Not Used

**END SECTION 01 32 16**

## 01 33 00      **PRODUCT SUBMITTALS AND SUBSTITUTIONS**

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

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

#### **1.2 SUMMARY**

- A. This Section specifies requirements for preparation, processing, and review of Submittals related to products, materials, and assemblies to be incorporated into the Work.
- B. Product submittals are required to determine conformance with specified requirements, and to promote the planning of the work by the contractor in sufficient detail to allow for proper coordination and execution of the Work. For coordination purposes, submittals typically contain information which is more detailed or specific than that shown in the contract documents. Contractor is solely responsible for reviewing and coordinating that more specific or detailed information.

#### **1.3 RELATED DOCUMENTS**

- A. General: Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.
- B. Technical Specifications: Specific product submittal and substitution requirements are identified in the individual sections of these specifications.
- C. Non-Product Submittals: Requirements for informational submittals not subject to review and action of the Architect, and requirements for submittals not related to product selection, such as Schedule of Value, Progress Payments, Test Reports, Close-out Submittal, RFI's, etc. are specified in other portions of the Contract Documents.

#### **1.4 SUBMITTALS**

- A. Shop Drawings:
  - 1. General: Make drawings legible and complete in every respect. Show relationship to adjacent structure or material; clearly identify all field dimensions.
  - 2. Variations: If shop drawings show variations from Contract requirements because of standard shop practice or other reason, specifically note such variations in letter of transmittal as well as on drawings.
- B. Product Data:
  - 1. General: Provide manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data. Clearly mark each copy; identify proposed materials, products or models.

2. Required Information: Provide dimensions and clearances required; performance characteristics and capacities; and diagrams of equipment and controls.
  3. Manufacturer's Standard Schematic Drawings: Provide standard drawings; delete information not applicable to Project. Supplement standard information as required for Project.
- C. Manufacturer's Instructions:
1. General: Submit most recent applicable printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing of the subject material as provided by the manufacturer for use under conditions similar to those of this Project.
- D. Evidence of Compliance:
1. Provide evidence of compliance with referenced codes and standards such as certification of recognized producer or association, test results, manufacturer's literature indicating compliance.
- E. Samples:
1. Submit samples to illustrate functional and aesthetic characteristics of product with integral parts and attachment devices. Submit color samples in the size and range of colors specified in the individual specification sections.

## **1.5 CONSIDERATION OF SUBSTITUTIONS**

- A. General: After award of contract, requests to substitute Products for those specified in the Proposal will only be consider as described below.
- B. Format: Requests for substitution will not be considered unless a fully executed Substitution Request form has the following information included:
1. Submittal Information: Provide all information required by this specification section and by the specification section of the specified product.
  2. Data Comparison: Submit a side-by-side, item-by-item comparison of all characteristics and of the specified product and the proposed product.
  3. Construction Time and Sum. Provide statement of the affect of the substitution on Contract Time and Contract Sum.
  4. Substitution request and associated justification documents to be submitted within forty-eight (48) hours of bid.

## **1.6 ACCEPTANCE OF SUBSTITUTIONS**

- A. Proposed substitutions are subject to acceptance by the Architect. Architect may reject any substitution which, in Architects opinion is not equal in quality, function, durability, ease of maintenance or aesthetics to that of the specified product. Architect's opinion is final and not subject to appeal or claim procedure.

- B. Architect's acceptance of a product substitution does not relieve Contractor from responsibility for compliance with the Contract Documents. Contractor shall be responsible for any costs, delays or any changes in other parts of the Work which are necessary to accommodate or that result from such substitution.

## 1.7 SUBMITTAL PROCESS

- A. General: Make submittals as required to cause no delay in the orderly progress of work, layout or fabrication under Contract, due allowance being made for checking by the Architect and for such corrections, resubmission and rechecking as may be necessary. Do not commence work requiring submittals until review by Architect has been completed.
- B. Contractors Review of Subcontractors Submittals:
  - 1. Before Submittal: Contractor shall review submittals for compliance with Contract Documents, stamp and initial or sign submittals. By stamping and initialing submittals, contractor certifies that contractor has performed the following:
    - a. Substitutions: Determine whether submittal meets the specified requirements or a substitution. If it is a substitution, verify that it will have no detrimental affect on project schedule, quality of construction, or coordination with the Work of other trades. Verify that Substitution Request Form is fully executed and that submittal contains side-by-side comparison.
    - b. Complete Submittal: Verify that submittal is complete and contains all submittal items called for in individual specification section.
    - c. Specificity: When product literature contains information on multiple models, options or features, verify that the specific model number, options, and features be proposed are clearly identified and meet specified requirements.
  - 2. Before or After Submittal: By signing and forwarding a submittal to Architect, Contractor certifies that Contractor has verified, or will verify, dimensions and has coordinated, or will coordinate, the information shown on the submittal with field conditions and information shown on other submittals and on the drawings.
- C. Required Information:
  - 1. General: Provide a completed copy of the Submittal Cover Sheet included with each submittal. Complete identified areas of the form as follows:
    - a. Submittal Number: Identify submittals sequentially starting from number 1; number re-submissions with same number as original and add letter designation A., B., C., etc., in order submitted.
    - b. Specification Section: Identify submitted work with section number shown in the Project Manual. Provide separate submittals for each specification section or Product, as required.
    - c. Contractor: Provide company name and mailing address with signature of contact person responsible for work on this project, certifying to review of submittal, verification of field requirements, and compliance with Contract Documents.
    - d. Subcontractor: Provide company name, mailing address, telephone number, and name of contact person responsible for work on this project.

- e. Submittal Description: Describe contents of submittal completely; identify if material is a resubmittal, and give previous submittal number.
- f. Submittal Index: List items included in submittal; properly cross-reference to Contract Documents.
- g. Date: Submission date and revision dates.
- h. Project: Project name and number; names of Architect, Contractor, and Subcontractor as shown on Submittal Cover Sheet.
- i. Product or Material: Name of manufacturer, product name and model number, and name of supplier.

D. Number of Copies Required:

- 1. General: Provide electronic PDF's copies of all Product Submittals except as listed below.

E. Architect's Review:

Architect's review will be for general conformance with the Contract Documents. Review does not relieve Contractor from responsibility for compliance with the Contract Documents or from furnishing materials and work required by contract which may not be indicated on submittals when reviewed. Efforts will be made by Architect to identify errors, but Contractor is solely responsible for accuracy, completeness, dimensions, quantities, coordination with other work, selection of fabrication processes and techniques of construction, or deviations from contract documents not so identified in the submittal. Review does not authorize changes from Contract requirements.

F. Distribution:

- 1. Shop drawings, substitutions and submittals and color selections:
  - a. General: Reviewed submittals will be returned to Contractor for subsequent action, as required. Distributed as follows.
  - b. No Resubmittal Required:
    - i. Architect: 1 electronic PDF copy retained.
    - ii. Reviewing Engineer (if any): 1 electronic PDF copy.
    - iii. Owner: 1 electronic PDF copy.
    - iv. Contractor: 1 electronic PDF copy.
  - c. Resubmittal Required: Electronic copy retained by Architect; electronic PDF copy forwarded to Contractor. Make corrections to original drawings and send new electronic PDF copy to Architect for review. Secure final review prior to commencing work.

**END SECTION 01 33 00**

## 01 35 16 ALTERATION PROJECT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. **DESCRIPTION:** This Section describes requirements for cutting, patching, protection, and finishing of existing construction, coordination of existing construction to remain with demolition and new construction, and related work and procedures.
- B. **REQUIREMENTS INCLUDED:**
  - 1. **General:** Coordinate Work per Section 01 31 00 - PROJECT MANAGEMENT AND COORDINATION.
  - 2. **Demolition Work:**
    - a. **General:** In addition to work as specified in Section 02 41 00 - DEMOLITION and that specifically shown; cut, move or remove items as necessary to provide access or to allow alterations and new work to proceed. Include such items as:
    - b. **Hazardous and Unsanitary Conditions:** Repair and/or removal.
    - c. **Abandoned Items:** Removal of abandoned items and items serving no useful purpose, such as abandoned piping, conduit and wiring.
    - d. **Unusable Materials:** Removal of unsuitable or extraneous materials not marked for salvage, such as abandoned furnishings and equipment, and debris such as rotted wood, rusted metals and deteriorated concrete.
    - e. **Resurfacing:** Cleaning of surfaces, and removal of surface finishes as needed to install new work and finishes.
  - 3. **Refinishing:** Make transitions consistent with new or existing detailing. Patch, repair and refinish existing items to remain, to the quality specified for new construction of each material, with clean, neat, straight, uniform and unobtrusive transition.
- C. **SEQUENCE AND SCHEDULES:**
  - 1. **General:** Schedule Work in the sequences and within times specified in Section 01 11 00 - SUMMARY OF WORK.
  - 2. **Progress Schedule:** Per Section 01 32 16 - PROGRESS SCHEDULE.

### **1.3 ALTERATIONS, CUTTING AND PROTECTION**

- A. GENERAL: Assign work of moving, removal, cutting and patching, to trades qualified to perform the work in manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.
- B. CUTTING AND REMOVAL:
  - 1. General: Perform cutting and patching as specified in Section 01 73 29 - CUTTING AND PATCHING. Remove minimum necessary, and in a manner to avoid damage to adjacent work.
  - 2. Lines and Levels: Cut finish surfaces such as masonry, tile, plaster or metals, by methods to terminate surfaces in straight line at natural point of division.
- C. PROTECTION:
  - 1. General: Protect existing finishes, equipment, and adjacent work which is scheduled to remain, from damage.
  - 2. Weather Protection: Protect existing and new work from weather and extremes of temperature.
  - 3. Environmental Conditions: Maintain existing interior work above 60 degrees F.
- D. TEMPORARY ENCLOSURE: Provide temporary enclosure as specified in Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS, to separate work areas from existing building and from areas occupied by Owner, and to provide weather protection.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. GENERAL: Refer to Section 01 60 00 - PRODUCT REQUIREMENTS.

### **2.2 PRODUCTS FOR PATCHING, EXTENDING AND MATCHING**

- A. GENERAL: Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
- B. EXISTING CONSTRUCTION: Generally, Contract Documents will not define products or standards of workmanship present in existing work; the Contractor shall identify products by inspection and testing; and workmanship by use of selected existing work as a sample for comparison.
- C. PRESENCE OF PRODUCT, FINISH OR TYPE OF CONSTRUCTION: Perform patching, extending or matching as necessary to make Work complete and consistent to identical standards of quality.

## **PART 3 - EXECUTION**

### **3.1 PERFORMANCE**

- A. GENERAL: Refer to Section 01 73 00 - EXECUTION REQUIREMENTS. Patch and extend existing work using skilled mechanics who are capable of matching existing quality of workmanship. Quality of patched or extended work shall be not less than that specified for new work.

### **3.2 ADJUSTMENTS**

- A. GENERAL: Where partitions are removed, patch floors, walls, and ceilings, with finish materials to match existing.
- B. LINES AND LEVELS: Where removal of partitions results in adjacent spaces becoming one, rework floors and ceilings to provide smooth planes without breaks, steps, or bulkheads.
- C. CHANGES OF PLANE: Where extreme change of plane of two inches or more occurs, request instructions from Architect as to method of making transition.
- D. DOORS: Trim and refinish existing doors as necessary to clear new floors.

### **3.3 DAMAGED SURFACES**

- A. GENERAL: Patch and replace any portion of an existing finished surface which is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.
- B. SUBSTRATE: Provide adequate support of substrate prior to patching finish.
- C. PATCHED SURFACES: Refinish patched portions of painted or coated surfaces in manner to produce uniform color and texture over entire surface.
- D. REFINISHED SURFACES: When existing surface finish cannot be matched, refinish entire surface to nearest intersections of surfaces.

### **3.4 TRANSITION FROM EXISTING TO NEW WORK**

- A. GENERAL: When new work abuts or finishes flush with existing work, make smooth and workmanlike transition. Patched work shall match existing adjacent work in texture and appearance so that patch or transition is invisible at distance of 5'-0".
- B. SURFACE TRANSITIONS: When finished surfaces are cut in such a way that smooth transition with new work is not possible, terminate existing surface in neat manner along straight line at a natural line of division, and provide trim appropriate to finished surface.

### **3.5 CLEANING**

- A. GENERAL: Perform periodic cleaning in accordance with Document GENERAL CONDITIONS and final cleaning as specified in Section 01 77 00 - CLOSEOUT PROCEDURES.

B. OWNER OCCUPIED AREAS:

1. General: Clean daily.
2. Spillage, Overspray, or Heavy Collection of Dust: Clean immediately.

C. WORK OF TRADES: At completion of work of each trade, clean area and make surfaces ready for work of successive trades.

D. FINAL CLEANING: At completion of alterations work in each area, provide final cleaning and return space to condition suitable for use by Owner.

**END SECTION 01 35 16**

## 01 42 00 REFERENCES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Description:
  - 1. General: Standards, codes, definition of words and terms, are identified in this Section.
  - 2. Additional Instructions: Refer to Section USER GUIDE TO THE PROJECT MANUAL.

#### 1.3 REFERENCES

- A. General: References are made throughout the technical specifications to various standard specifications, codes, practices, and requirements for materials, work quality, installation, inspections and tests, which are published and issued by the organizations, societies and associations listed below by abbreviation and name.
- B. Referenced Standards: Obtain copies direct from publication sources as needed for proper performance and completion of the Work. Addresses for these organizations are available from the Architect.

#### 1.4 STANDARDS

- A. General: All references to established Standards mean and include the latest edition of such Standards, as of the date of issue of this Project Manual.

#### 1.5 CODES AND LAWS

- A. General: Work of this project shall conform to applicable codes, current editions adopted by enforcing agencies.
- B. Applicable Codes:
  - 1. California Building Code (CBC): With amendments.
  - 2. California Code of Regulations (CCR): Title 19, Public Safety; Title 24, Building Standards, Parts 1, 2, 3, 4, 5, 9 and 12.
  - 3. California Mechanical Code (CMC): With amendments.
  - 4. California Plumbing Code (CPC): With amendments.
  - 5. California Electric Code (CEC): With amendments.
  - 6. Americans with Disabilities Act (ADA): Latest edition.

7. Environmental Protection Agency (EPA): National Standards.
8. California Environmental Protection Agency (CalEPA): State and local Standards.

## 1.6 DEFINITIONS

### A. References:

1. Governing Dictionary, Non-technical: The definitions of words and abbreviations used in these Specifications are given in "The American Heritage Dictionary of the English Language, Fourth Edition".
2. Governing Dictionary, Technical: The definitions of words and abbreviations specific to the Architectural/Construction industry are given in the "Means Illustrated Construction Dictionary, Third Edition, Unabridged".

### B. Words and Terms:

1. General: The following are used in addition to those defined in the General Conditions, and are defined as follows:
2. Accepted Equal: Reviewed and accepted by the Architect as being equal in quality, utility and appearance.
3. Approved: As accepted by the Architect.
4. As Required: As required by regulatory requirements, referenced standards, existing conditions, or by the Contract Documents.
5. Building Code or Code: Refers to regulations of governmental agencies having jurisdiction.
6. Directed: As instructed by the Architect in writing.
7. Furnish: Supply and deliver to the site.
8. Indicated: As shown, noted, or scheduled on the Drawings.
9. Install: Anchor, fasten, or connect in place and adjust for use; place or apply in proper position and location; establish in place for use or service.
10. Product: Includes materials, systems and equipment.
11. Provide: Furnish and install.
12. Shown: As indicated, noted or scheduled on the Drawings.
13. Site: Area to be occupied by the Project. Use of the word "jobsite" or "site" shall be interpreted to be synonymous with "site of the Work" or "Work Site".

### C. Abbreviations:

1. General: Definition of abbreviations and symbols used on the Drawings are identified on the Drawings.

2. Abbreviations of Proper Nouns and Brand Names: Names of manufacturer's names and Brand Names may be assigned abbreviations. The abbreviation will follow the first reference of the manufacturer's name or product in the specification and appear in parenthesis subsequently.
3. Keynote References: Materials or products may be assigned abbreviations for the purpose of distinguishing between different types of similar materials or products. Key note abbreviations will appear in parenthesis following the material or product designation in the specification (e.g. Carpet No. 1 (CPT1), Carpet No. 2 (CPT2)). The same Key Notes will be used on the drawings.

## **PART 2 - PRODUCTS**

### **2.1 REFERENCE STANDARDS**

- A. General: The reference standards applicable to this Project are specifically identified in the technical specification Sections listed in the Table of Contents - Divisions 2 through 33.
- B. Association Names: The following abbreviation or acronym shall be understood to mean the full name of the respective organization or document, as follows:

AA: Aluminum Association  
AABC: Associated Air Balance Council  
AAC: Aluminum Anodizers Council  
AAMA: American Architectural Manufacturers Association  
AAN: American Association of Nurserymen  
AASHTO: American Association of State Highway and Transportation Officials  
AATCC: American Association of Textile Chemists and Colorists  
AAU: Amateur Athletic Union  
ABMA: American Boiler Manufacturers Association  
ACI: American Concrete Institute  
ACIL: American Council of Independent Laboratories  
ACPA: American Concrete Pipe Association  
ADC: Air Diffusion Council  
AFPA: American Forest and Paper Association  
AGA: American Gas Association  
AGC: Associated General Contractors of America  
AHA: American Hardboard Association  
AHAM: Association of Home Appliance Manufacturers  
AI: Asphalt Institute  
AIA: American Institute of Architects  
AIA: American Insurance Association (successor to NBFU)  
AIHA: American Industrial Hygiene Association  
AIMA: Acoustical and Insulating Materials Association  
AISC: American Institute of Steel Construction  
AISI: American Iron and Steel Institute  
AITC: American Institute of Timber Construction  
ALI: Associated Laboratories, Inc.  
ALSC: American Lumber Standards Committee  
AMCA: Air Movement and Control Association  
ANSI: American National Standards Institute  
AOSA: Association of Official Seed Analysts  
APA: American Plywood Association  
API: American Petroleum Institute  
ARI: Air-Conditioning and Refrigeration Institute  
ARMA: Asphalt Roofing Manufacturers Association

ASA: Acoustical Society of America  
 ASC: Adhesive and Sealant Council  
 ASHRAE: American Society of Heating, Refrigerating, and Air-Conditioning Engineers  
 ASME: American Society of Mechanical Engineers  
 ASPA: American Sod Producers Association  
 ASPE: American Society of Plumbing Engineers  
 ASSE: American Society of Sanitary Engineering  
 ASTM: American Society for Testing and Materials  
 ATIS: Alliance for Telecommunications Industry Solutions  
 AWI: Architectural Woodwork Institute  
 AWWA: American Water Works Association  
 BHMA: Builder's Hardware Manufacturers Association  
 BIA: Brick Industry Association  
 BIFMA: The Business and Institutional Furniture Manufacturer's Association  
 BSI: Building Stone Institute  
 CAGI: Compressed Air and Gas Institute  
 CalOSHA: California Occupational Safety and Health Administration  
 CalTrans: State of California, Department of Transportation  
 CARB: California Air Resources Board  
 CAUS: Color Association of the United States  
 CBHF: Bureau of Home Furnishings and Thermal Insulation, State of California, Dept. of Consumer Affairs  
 CBM: Certified Ballast Manufacturers  
 CCC: Carpet Cushion Council  
 CDA: Copper Development Association  
 CFFA: Chemical Fabrics and Film Association, Inc.  
 CGA: Compressed Gas Association  
 CHPS: Collaborative for High Performance Schools  
 CISCA: Ceiling and Interior Systems Construction Association  
 CISPI: Cast Iron Soil Pipe Institute  
 CLFMI: Chain Link Fence Manufacturing Institute  
 CRA: California Redwood Association  
 CRI: Carpet and Rug Institute  
 CRRC: Cool Roof Rating Council  
 CRSI: Concrete Reinforcing Steel Institute  
 CS: Commercial Standard  
 CSA: Canadian Standards Association  
 CSDA: Concrete Sawing and Drilling Association  
 CSI: Construction Specifications Institute  
 CSIAC: California State Industrial Accident Commission  
 CPSC: Consumer Product Safety Commission  
 CSSB: Cedar Shingle and Shake Bureau  
 CTI: Ceramic Tile Institute of America  
 DHI: Door Hardware Institute  
 DIPRA: Ductile Iron Pipe Research Association  
 DLPA: Decorative Laminate Products Association  
 DOT: State of California, Department of Transportation  
 DSA: Division of the State Architect  
 DTSC: California Environmental Protection Agency Department of Toxic Substances Control  
 EIA: Electronic Industries Association  
 EIMAEIFS: Industry Manufacturers Association  
 EJMA: Expansion Joint Manufacturers Association  
 ETLETL: Testing Laboratories  
 FCI: Fluid Controls Institute  
 FCICA: Floor Covering Installation Contractors Association  
 FGMA: Flat Glass Marketing Association

FM: Factory Mutual Research and Engineering Corporation  
 FMRC: Factory Mutual Research Corporation  
 FTI: Facing Tile Institute  
 FS: Federal Specification General Services Administration  
 GA: Gypsum Association  
 GANA: Glass Association of North America  
 GIS: Germany Institute for Standardization  
 HEI: Heat Exchange Institute  
 HI: Hydronics Institute  
 HI: Hydraulic Institute  
 HMA: Hardwood Manufacturers Association  
 HMMA: Hollow Metal Manufacturers Association  
 HPVA: Hardwood Plywood and Veneer Association  
 HUD: U.S. Department of Housing and Urban Development  
 IAPMO: International Association of Plumbing and Mechanical Officials  
 IBD: Institute of Business Designers  
 ICC-ES: International Code Council – Evaluation Services  
 ICEA: Insulated Cable Engineers Association  
 IEC: International Electrotechnical Commission  
 IEEE: Institute of Electrical and Electronics Engineers  
 IESNA: Illuminating Engineering Society of North America  
 IFAI: Industrial Fabrics Association International  
 IGCC: Insulating Glass Certification Council  
 ILI: Indiana Limestone Institute of America  
 IMSA: International Municipal Signal Association  
 IRI: Industrial Risk Insurers  
 ISA: Instrument Society for Measurement and Control  
 ISO: International Standards Organization  
 KCMA: Kitchen Cabinet Manufacturers Association  
 LIA: Lead Industries Association, Inc.  
 LPI: Lightning Protection Institute  
 LSGA: Laminators Safety Glass Association  
 MBMA: Metal Building Manufacturers Association  
 MCAA: Mechanical Contractors Association of America  
 MFMA: Maple Flooring Manufacturers Association  
 MIA: Marble Institute of America  
 ML/SFA: Metal Lath/Steel Framing Association Division of NAAMM  
 MSSVFI: Manufacturers Standardization Society of the Valve and Fittings Industry  
 NAA: National Arborist Association  
 NAAMM: National Association of Architectural Metal Manufacturers  
 NAIMA: North American Insulation Manufacturers Association  
 NAPA: National Asphalt Pavement Association  
 NCAA: National Collegiate Athletic Association  
 NCMA: National Concrete Masonry Association  
 NCPI: National Clay Pipe Institute  
 NCRPM: National Council on Radiation Protection and Measurements  
 NCSPA: National Corrugated Steel Pipe Association  
 NECA: National Electrical Contractors Association  
 NEI: National Elevator Industry, Inc.  
 NEMA: National Electrical Manufacturers Association  
 NETA: International Electrical Testing Association  
 NFPA: National Fire Protection Association  
 NHLA: National Hardwood Lumber Association  
 NIST: National Institute of Standards and Technology  
 NLGA: National Lumber Grades Authority  
 NOFMA: National Oak Flooring Manufacturers Association  
 NPA: National Particleboard Association

NPCA: National Paint and Coatings Association  
NRCA: National Roofing Contractors Association  
NRMCA: National Ready-Mix Concrete Association  
NSF: National Sanitation Foundation  
NSSEA: National School Supply and Equipment Association  
NSWMA: National Sanitation and Waste Management Association  
NTMA: National Terrazzo and Mosaic Association  
OSHA: Occupational Safety and Health Administration  
OSHPD: Office of Statewide Health Planning and Development  
PATMI: Power Actuated Tool Manufacturers' Institute, Inc.  
PCA: Portland Cement Association  
PCI: Precast Prestressed Concrete Institute  
PDCA: Painting and Decorating Contractors of America  
PDI: Plumbing and Drainage Institute  
PEI: Porcelain Enamel Institute  
PS: Product Standard of National Bureau of Standards  
RFCI: Resilient Floor Covering Institute  
RIS: Redwood Inspection Service  
RMA: Rubber Manufacturers Association  
SAMA: Scientific Apparatus Makers Association  
SDI: Steel Deck Institute  
SDI: Steel Door Institute  
SIGMA: Sealed Insulating Glass Manufacturers Association  
SFM: State Fire Marshal  
SGCC: Safety Glazing Certification Council  
SJI: Steel Joist Institute  
SMA: Screen Manufacturers Association  
SMA: Stucco Manufacturers Association  
SMACNA: Sheet Metal and Air Conditioning Contractors National Association  
SPIB: Southern Pine Inspection Bureau  
SPR: Simplified Practice Recommendation  
SPRI: Single-Ply Roofing Institute  
SSMA: Steel Stud Manufacturers Association  
SSPC: Steel Structures Painting Council  
SSPMA: Sump and Sewage Pump Manufacturers Association  
STI: Steel Tank Institute  
SWI: Steel Window Institute  
SWPA: Submersible Wastewater Pump Association  
SWRI: Sealant, Waterproofing and Restoration Institute  
TCA: Tile Council of America  
TIMA: Thermal Insulation Manufacturers Association  
TPI: Truss Plate Institute  
UL: Underwriters' Laboratories, Inc.  
UNI: Uni-Bel PVC Pipe Association  
USP: United States Pharmacopoeial Convention  
USDA: United States Department of Agriculture  
USTC&TBA: United States Tennis Court and Track Builders Association  
VWDI: Vinyl Window and Door Institute  
WA: Wallcoverings Association  
WCLIB: West Coast Lumber Inspection Bureau  
WCMA: Window Covering Manufacturers Association  
WCRSI: Western Concrete Reinforcing Steel Institute  
WDMA: Window & Door Manufacturers Association  
WH: Warnock Hersey International, Inc.  
WI: Woodwork Institute  
WLPDIA: Western Lath, Plaster, Drywall Industries Association  
WRI: Wire Reinforcement Institute

WSC: Water Systems Council  
WSFI: Wood and Synthetic Flooring Institute  
WWPA: Western Wood Products Association  
WWPA: Woven Wire Products Association

### **PART 3 - EXECUTION**

Not Used

**END SECTION 01 42 00**

## 01 43 00 QUALITY ASSURANCE

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Description: This section includes administrative and procedural requirements for quality assurance.

#### 1.3 REFERENCES:

- A. General: Refer to Section 01 42 00 - REFERENCES. Products or workmanship specified in the Project Manual by association, trade, or other consensus standards shall conform to the requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Contractual Relationship: The contractual duties and responsibilities of the parties of the Contract and those of the Architect shall not be altered from the requirements of the Contract Documents by any statement or inference in any reference document.

#### 1.4 TESTING

- A. General: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
- B. Quality Control: Provide facilities for storage and field curing of test samples.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. General: Refer to Section 01 60 00 - PRODUCT REQUIREMENTS; assure a consistent quality of products furnished by suppliers and manufacturers as indicated throughout the Project Manual.

### PART 3 - EXECUTION

#### 3.1 PERFORMANCE

- A. Workmanship: Perform shop and field work with mechanics, craftspersons, artisans, and workers skilled and experienced in the fabrication and installation of work specified. Install and erect work plumb, level, square, and true, or true to indicated angle, and in proper alignment and relationship to other work. Finished work shall be free from defects and damage. Quality of work shall conform to the highest established standards and practices of the various trades required. The Architect reserves the right to reject materials and work quality which does not meet accepted standards. Repair or replace substandard material or work as directed, at no additional cost to the Owner.

- B. Inspection of the Work: Do not cover up work that requires inspection, testing and approval by Architect or Project Inspector until such approval is received. Give timely notice of readiness for such inspections. Any such work covered up without approval shall, if required by Architect, be uncovered and replaced at Contractor's expense, including the expense of testing, if required.

### 3.2 INSTALLATION

- A. General: Conduct quality control in concert with suppliers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Manufacturer's Instructions:
  - 1. General: Follow manufacturer's instructions, including each step in progression of installation. If manufacturer's instructions conflict with Contract Documents, request clarification from Architect before commencing Work.
  - 2. Installer: Manufacturer approved, as required in the technical sections of the Project Manual.
  - 3. Field Services: Coordinate with manufacturer of a product, system, or assembly which requires special knowledge and skill for proper application/installation of the product, system, or assembly to obtain field service, consultation and inspection as required for the application/installation work at no additional cost to the Owner.
- C. Reference Standards: Conform to specified standards as minimum quality for the Work except where more stringent codes or specified requirements indicate higher standards or more precise workmanship.
- D. Anchorage: Secure products in place with positive anchorage devices designed and sized to withstand stress, vibration, physical distortion, or disfigurement.
- E. Tolerances:
  - 1. General: Adjust products to appropriate dimensions; position before securing in place. Monitor and control tolerances of installed products to produce acceptable Work.
  - 2. Floor Surfaces:
    - a. Concrete Floors: Tolerances for concrete floors and pavement are specified in Section 03 30 00 - CONCRETE.
- F. Protection of Material:
  - 1. General: Provide protection of materials and products, whether or not installed, including erected and installed wood framing and sheathing, from water and moisture damage until completion and acceptance of the Project. Keep informed of weather conditions and forecasts and, when there is a likelihood of rain, protect installed and exposed construction and stored materials and lumber to the elements with suitable water-repellent coverings, such as canvas/tarpaulins or polyethylene sheeting.
  - 2. Finish Materials: Keep millwork and trim, paneling, cabinets, shelving, and other products susceptible to water damage under cover and dry at shop until time of delivery. Do not deliver fabricated finish materials to the site until the building is roofed, and exterior walls are sheathed and protected with

building paper as a minimum, the doors and windows are installed and glazed, and there is ample interior storage space for such materials and products. Do not deliver during periods of rain or heavy fog.

3. Moisture Damage: Interior finishes and materials or products which are susceptible to water damage, that become wet from rain, dew, fog, or other source will be considered to have moisture damage and will be rejected, requiring replacement by the Contractor with new, dry materials or products at no additional cost.
- G. Protection of Installed Work: Provide barriers, covers or other temporary construction as required to protect work from damage or accident from any source, including vandalism or contractor's own forces.

**END SECTION 01 43 00**

## 01 45 29 TESTING LABORATORY SERVICES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This section includes administrative and procedural requirements for testing laboratory services, for inspections, tests, and related actions, including reports prepared by Contractor, by independent agencies, and by governing authorities. Contract enforcement activities performed by Architect are not included.

#### 1.3 REQUIREMENTS INCLUDED

- A. General: Owner will employ and pay for services of an independent testing laboratory to perform specified testing. Costs of retesting after failed test will be paid by Owner and deducted from contract amount. Testing laboratory shall be approved by the Architect.
- B. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.
- C. Cooperation: Cooperate with laboratory to facilitate required services.
- D. Performance of Work: Employment of laboratory shall not relieve Contractor's obligations to perform work of Contract.

#### 1.4 RELATED REQUIREMENTS

- A. Conditions of the Contract: Inspections and testing required by laws, ordinances, rules, regulations, orders or approvals of public authorities.
- B. Respective Sections of the Specifications: Certification of products.
- C. Listed Specification Sections: Laboratory tests required and standards for testing.
- D. Testing Laboratory Inspection, Sampling and Testing is Required for:
  - 1. Concrete and Reinforcement: Section 03 30 00
  - 2. Concrete Unit Masonry: Section 04 22 00.

### PART 2 - PRODUCTS

Not Used

## **PART 3 - EXECUTION**

### **3.1 LABORATORY DUTIES**

- A. General: Comply with ASTM E329 "Standards of Recommended Practice for Inspection and Testing Agencies for Concrete and Steel as Used in Construction".
- B. Cooperation: Cooperate with Architect, Engineer and Contractor; provide qualified personnel after due notice.
- C. Services:
  - 1. General: Perform specified inspections, sampling and testing of materials and methods of construction.
  - 2. Specified Standards: Verify compliance.
  - 3. Specified Materials: Ascertain compliance with requirements of Contract Documents.
- D. Notification: Promptly inform Architect and Engineer of observed irregularities or deficiencies of work or products.
- E. Distribution of Reports: Distribute 1 copy of certified written report, of each inspection, test, or similar services to each of the following: Owner, Architect, Contractor, Civil Engineer, Structural Engineer.
- F. Additional Testing: Perform additional tests as required by Architect or Owner.

### **3.2 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY**

- A. Laboratory is Not Authorized to release, revoke, alter or enlarge on requirements of Contract Documents or perform any duties of Contractor.

### **3.3 CONTRACTOR'S RESPONSIBILITIES**

- A. Coordination:
  - 1. Scheduling: Notify laboratory sufficiently in advance of operations to allow laboratory to schedule tests and assign personnel. When tests or inspections cannot be performed after such notice, reimburse Owner for laboratory personnel and travel expenses incurred.
  - 2. Laboratory Personnel: Cooperate with, provide access to Work, and to manufacturer's operations.
  - 3. Inspector: Cooperate with Inspector to secure and deliver to laboratory adequate quantities of representative samples of materials proposed for use and that require testing.
  - 4. Report Distribution: Provide contact name and addresses to laboratory for test report distribution.
- B. Statement of Responsibility: The contractor's statement of responsibility shall contain the following for each system or component requiring special inspection:
  - 1. Acknowledgment of awareness of the special requirements contained in the statement of special inspections.

2. Acknowledgement that control will be exercised to obtain conformance with the construction documents approved by the building official;
  3. Procedures for exercising control within the contractor's organization, the method and frequency of reporting and the distribution of the reports; and
  4. Identification and qualifications of the person(s) exercising such control and their position(s) in the organization.
- C. Manufacturer's Test Reports: Furnish copies of products test reports as required.
- D. Incidental Labor and Facilities: Provide access to Work to be tested; facilitate inspections and tests.
- E. Additional Testing: Paid for by Owner and backcharged to Contractor as specified in the individual sections.
- F. Repair and Protection: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Refer to Section 01 73 29 - CUTTING AND PATCHING.

**END SECTION 01 45 29**

# 01 50 00 TEMPORARY FACILITIES AND CONTROLS – NO DRYOUT

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

- A. Furnish and install temporary facilities and controls as specified, plus other unspecified temporary facilities, including labor, materials, services, utilities, and equipment, as may be required for proper performance of the contract, except as otherwise provided.

### 1.3 SUBMITTALS

- A. Temporary Sign: Submit layout; see page 5 of this section for additional information.

### 1.4 REQUIREMENTS OF REGULATORY AGENCIES

- A. General: Temporary facilities and controls shall be approved by appropriate authorities and regulatory agencies, including insurance companies, for safety precautions, operation and fire hazard.
- B. California Code of Regulations (CCR): Title 8 - (Cal-OSHA) Construction Safety Orders.
- C. Associated General Contractors of America (AGC): "Manual of Accident Prevention in Construction".

### 1.5 PRODUCT HANDLING

- A. Protection: Protect and maintain temporary facilities and controls in proper and safe condition throughout progress of work.
- B. Replacements: Immediately repair or replace lost or damaged temporary facilities or controls.

## PART 2 - PRODUCTS AND EXECUTION

### 2.1 TEMPORARY UTILITIES

- A. General: Provide and pay for water, electricity, gas and other specified utility services required during construction and extend service lines to construction areas; allow use by all trades.
- B. Utility Loss: Provide temporary utilities to the site or any area affected on the site that may lose utilities due to the Work that is being performed for this project at no additional cost to the Owner.
- C. Temporary Water:
  - 1. General: Provide and pay for ample supply of potable water from sources off site.

2. Temporary Connections: Provide connections to source and sufficient hose or pipe to carry water to all required locations.

D. Temporary Electrical Facilities:

1. General: Provide temporary electrical power and facilities necessary to supply lighting for work operations, power for power driven tools and testing, and temporary heat, ventilation, and dehumidification. If temporary power from utility company is not adequate for heating, ventilating, and dehumidification requirements, provide electrical generators of appropriate capacity.
2. Construction Requirements:
  - a. General: Construct and maintain temporary electrical facilities per requirements of the utility company providing service. Provide electrical materials, devices, and equipment that are in good and safe condition as follows:
  - b. Division of Industrial Safety: "Electrical Safety Orders" (ESO).
  - c. Public Utilities Commission: "Rules for Overhead Line Construction" (G.O. 95).
3. Electrical Service: Make application for temporary service from serving utility company. Pay for electric service and energy used during construction.

E. Telephone:

1. General: Provide telephone in field office for the use of the Contractor, Provide separate telephone and fax machine with separate telephone lines for use of the Architect and Inspector. Provide for a cellular telephone and/or pager for use of Contractor's Superintendent.
2. Availability: Provide access to telephone service for subcontractors and suppliers for duration of construction.

## 2.2 FIELD OFFICE

- A. General: Provide acceptable construction trailer or temporary construction office with floor raised above grade; waterproof, weather tight, and well lit and ventilated, including separate office space of sufficient size for Architect and Inspector. Equip with shelves, desks, filing cabinet, chairs, and such other items of equipment needed. Office and equipment is the property of the Contractor and must be removed from the site upon completion of work.
- B. Utilities: Provide electric lighting and power; make adequate provisions for heating and cooling.

## 2.3 SANITARY FACILITIES

- A. Toilet Facilities: Provide enclosed chemical toilets with urinal for use of personnel engaged on Project.
- B. Drinking Water Facilities: Provide adequate clean and sanitary drinking water.

## **2.4 CONSTRUCTION EQUIPMENT**

- A. General: Erect, equip, operate, and maintain construction equipment per applicable statutes, laws, ordinances, rules, and regulations of jurisdictional authorities and insurance companies regarding safety, operation and fire hazard.
- B. Construction Access Equipment:
  - 1. General: Provide and maintain scaffolding, staging, runways, and similar equipment, as required. Coordinate furnishing and use with subcontractors.
  - 2. Vertical Transportation: Provide and maintain hoists per Safety Orders of State of California, Division of Industrial Safety, until work is completed or until no longer required under this Contract.

## **2.5 ENCLOSURES, FENCING AND BARRICADES**

- A. General: Provide and maintain barricades, fencing, shoring, pedestrian walkways including lights and other safety precautions to guard against personal injury and property damage as prescribed by jurisdictional authorities, including insurance companies.
- B. Safety Orders: Obtain copies and conduct work under the requirements of applicable Safety Orders issued by State of California, Division of Industrial Safety. Inform subcontractors and material suppliers as to the requirements of applicable Safety Orders.
- C. Contractor's Storage Area: Locate where shown; enclose with fences and gates as required for security.

## **2.6 SITE CONTROLS AND PARKING**

- A. Entrance to Work Site: Use identified entrances and access roads, as shown, or as directed. Maintain roads in satisfactory condition during Contract; repair damage resulting from work of this Project, as required, to leave in condition equal to that existing at start of Work.
- B. Site Storage and Work Areas: On-site storage and work areas will be identified by the Architect, for the Contractor's use, subject to change as necessary as job progresses.
- C. Regulations: Observe and comply with rules and regulations in effect at occupied facilities, including parking and traffic regulations, security restrictions, hours of access, and the like.
- D. Use of Public Sidewalks and Streets: Make arrangements with civic authorities for temporary use of streets and sidewalks for offices, shops, storage, etc.; abide by rules, regulations and ordinances; obtain and pay fees for permits.
- E. Debris Control: Keep work and storage areas clean and free of debris. Dispose of debris off site as it accumulates; pay required fees for use of dumps. Burning or burying on site is prohibited.
- F. Dust Controls:
  - 1. Indoor Operations: Control dust by using temporary partitions, curtains, or other means to prevent its spread beyond immediate work area. Use temporary means of closure for ducts and other openings communicating with other parts of building.

2. Outdoor Operations: Use sprayed water to control dust from outdoor operations, as required.
- G. Noise Control: Minimize noise caused by work operations.
- H. Dewatering Facilities: Provide temporary grading and drainage systems to prevent storm water accumulation from impeding progress of work. Grading operations may encounter seepage and/or perched ground water. Keep excavations and sub-grade areas free from water during process of work, regardless of cause, source or nature of water. Provide and maintain pumping facilities to keep site and excavations reasonably dry; protect materials and installed work from water damage until dewatering is no longer required. Excess water interfering with progress of work shall be disposed of off-site.
- I. Winterization: Take steps necessary to maintain access to, and the ability to work on all portions of the site throughout the contract time under all expected weather conditions.
- J. Security: Contractor is responsible for security of areas of Work during entire time of Contract. Repair damage to Work and replace materials lost due to vandalism or theft.

## **2.7 MAINTENANCE AND REMOVAL**

- A. Maintain temporary facilities and controls as long as required for safe and proper completion of Work; remove temporary facilities and controls as rapidly as progress of Work will permit.

**END SECTION 01 50 00**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes protection of trees to remain and related work as shown and specified.
- B. The primary area of protection shall be defined as that area within the drip line of each tree. The drip line is all the area directly under the foliage of the tree. If that area is quite irregular then it will be considered to be a somewhat circular form around the tree.

**1.3 QUALITY ASSURANCE**

- A. Requirements of Regulatory Agencies: All work and materials shall be in full accordance with the latest rules and regulations of all legally constituted agencies having jurisdiction. Nothing in Drawings and Specifications is to be construed to permit work not conforming to these rules and regulations.
- B. Supervision: Furnish the service of a qualified and experienced superintendent who shall constantly be in charge of the Work of this Section and who shall remain at the site at all times that work is in progress.

**1.4 PROJECT CONDITIONS**

- A. Verification of Trees and Locations: Before proceeding with any work, Contractor shall carefully check and verify all tree quantities and shall immediately inform Architect of any existing bark damage (which could later be attributed to construction) or discrepancies between Drawings and/or Specifications and actual conditions. No work shall be done in any area where there is any such discrepancy until approval for same has been given by Architect.
- B. Protection: Contractor shall be responsible for the protection in accordance with these Specifications of all existing trees to remain on site, as indicated on Drawings.
  - 1. Vehicular traffic under the drip-line of the trees is prohibited at all times. Parking of equipment or storage of materials is prohibited.
  - 2. Chemicals, cement, gasoline, oils, and other deleterious substances shall not be stored or used within the drip-line or within close proximity to the trees.

**PART 2 - PRODUCTS**

**2.1 MATERIALS**

- A. All materials used within the drip-line of trees to remain shall be as specified; any deviation or substitution from Specifications and/or Drawings must first be approved by Architect.

- B. Fill Materials: Type specified in 31 00 00 – EARTHWORK AND TRENCHING.
- C. Temporary Fencing: Type indicated on Drawings

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Prior to any site work, Contractor shall locate and tag all trees to be saved; trees as indicated on Drawings.
- B. Contractor shall provide a temporary fence at drip line of trees to remain or as directed by Architect. Fence to remain in place for duration of Project.

### **3.2 INSTALLATION**

- A. Install temporary fencing to protect remaining trees and vegetation from construction damage. Maintain temporary fence and remove when construction is complete.
- B. Do not store construction materials, debris, or excavated material inside tree protection zones. Do not permit vehicles or foot traffic within tree protection zones; prevent soil compaction over root systems.
- C. Any site work or landscaping to occur within the tree line shall meet the following requirements in order to maintain the trees' healthy state:
  - 1. No grade change shall occur within the temporary fencing without the written approval of Architect. No cuts shall occur within 5 feet of the trunk, without approval of Architect.
  - 2. No trenching shall be allowed within the temporary fencing. If it is necessary to install footings within the temporary fence, the trench shall be hand dug so as not to cut any roots over 2 inches in diameter.
  - 3. Contractor shall hose off all dust from foliage of trees every other week maximum, or more often as direct by Architect, during the construction of the project to allow the trees to breath.
  - 4. Wherever cuts have been made within the drip line of trees to remain, Contractor shall mulch the area with a 4 inch depth layer of wood chips where slopes do not exceed 4:1.
  - 5. Watering: Should the areas surrounding the trees be required to be excavated so that existing subgrade is exposed to drying, Contractor shall apply water, as directed by Architect, to maintain a good moisture level similar to natural ground.

### **3.3 LIQUIDATED DAMAGES**

- A. The actual value of the damage to existing trees resulting from non-conformance to this specification section is difficult to determine precisely. Owner and Contractor agree to the following liquidated damages for each non-compliant act of the Contractor:
  - 1. Liquidated damages for vehicles or equipment within the drip line trees to be protected, without written permission of Owner or Architect shall be \$250.00 for each occurrence.

2. Liquidated damages for damage to the bark of trees to remain, which was not noted prior to commencing work shall be \$10.00 per square inch of damaged area.
  3. Liquidated damages for removal or breakage of limbs from trees to remain shall result be \$15.00 per square inch of limb section at the point of the cut or break.
- B. Contractor shall pay liquidated damages directly to Owner within 2 weeks of being informed by Owner or Architect of each non-compliant act.
  - C. Contractor shall not be held responsible for damage by vandals or weather.
  - D. Liquidated damages shall be combined as applicable.

### **3.4 CLEAN-UP**

- A. Contractor shall remove temporary fencing upon Architect's or Owner's written instructions.
- B. Upon completion of the work of this Contract, Contractor shall hose off all tree foliage.
- C. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

**END SECTION 01 56 39**

## 01 60 00 PRODUCT REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Contractor's selection of products for use in the Project.
- B. Definitions:
  - 1. Products:
    - a. General: Items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
    - b. Named Products: Items identified by the manufacturer's product name, including make or model number or other designation, shown or listed in the manufacturer's published product literature, that is current as of the date of the Contract Documents.
  - 2. Materials: Components shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed, or installed to form a part of the Work.
  - 3. Equipment: Product with operational parts, whether motorized or manually operated, that requires service connections, such as wiring or piping.

#### 1.3 SUBMITTALS

- A. Products List: Within 2 days after bid opening, submit complete list of products intended for use on this Project. Provide list tabulated by Section Number, giving the trade name, name of the manufacturer, and model number or catalog designation of each product. Indicate which products will have submittals, which are being proposed as substitutions (Substitution Request Form) and which do not require submittals.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: To the fullest extent possible, provide products of the same kind from a single source.
- B. Compatibility of Options: When the Contractor is given the option of selecting between 2 or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

C. Nameplates:

1. General: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products that will be exposed to view in occupied spaces or on the exterior.
2. Labels: Locate required product labels and stamps on concealed surfaces or, where required for observation after installation, on accessible surfaces that are not conspicuous.
3. Equipment: Provide a permanent nameplate on each item of service-connected or power-operated equipment. Locate on an easily accessible surface that is inconspicuous in occupied spaces.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, new at the time of installation.

### **2.2 PRODUCT OPTIONS**

- A. General: For purposes of this Project, and in satisfaction of the requirements of the California Public Contract Code products have been specified with the following options:
- B. Products Specified By Reference Standards: Contractor may select any product which meets the standards, by any manufacturer.
- C. Accepted Equal: Where specification includes the designation "or accepted equal", Contractor may request acceptance as "equal" any material, process, or product of unnamed manufacturer through use of the Substitution Request specified in Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS. Requirements of that Section must be satisfied. Acceptance as "equal" will be the decision of the Architect; if the material, process or product is not, in the opinion of the Architect, equal in quality, utility and appearance to that specified, Contractor must furnish material, process or product specified.

## **PART 3 - EXECUTION**

- A. Product Handling: Assure that Work is manufactured and/or fabricated in ample time so as to not delay construction progress.

**END SECTION 01 60 00**

## 01 73 00 EXECUTION REQUIREMENTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Description: This Section includes administrative and procedural requirements governing the Contractor's installation of products specified for use in the Project.

#### 1.3 QUALITY ASSURANCE

- A. Qualifications: Use installers specialized in the work required, as specified in the individual sections of the Project Manual.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- A. Product Handling:
  - 1. Delivery: Schedule delivery of materials to the site at such time as required for proper coordination of the work. Receive materials in manufacturer's unopened packages and bearing manufacturer's label.
  - 2. Storage: Store materials in a dry, adequately protected from damage and exposure to the elements.

### PART 3 - EXECUTION

#### 3.1 PREPARATION

- A. Construction Layout:
  - 1. General: Engage a land surveyor or civil engineer to lay out the work using accepted surveying practices.
  - 2. Verification: Before beginning to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. Verify that existing improvements are correctly located on drawings. If deviations are observed, promptly notify Architect.
  - 3. Layout All Work: Lay out location and elevation of all work as shown. Notify Architect of any work whose location or elevations are not clearly dimensioned. Do not scale drawings to establish location.
  - 4. Templates: Obtain templates, patterns, and setting instructions as required; verify dimensions.

5. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.
- B. Examination of Conditions: Carefully examine subsurfaces before beginning work; report to Architect any defects. Starting of work constitutes acceptance of conditions as they exist.
- C. Environmental Requirements: Verify that ambient temperature and moisture content are within specified limits and limits of material and equipment manufacturers' instructions.

## **3.2 INSTALLATION**

- A. General: Install products in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Embedded Items: Coordinate delivery and placement of items embedded in work.
- C. Operating Equipment: Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate Work of various contractors having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Mechanical and Electrical:
  1. General: Coordinate space requirements and installation of mechanical and electrical work which are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
  2. Pipes, Ducts, Conduit, Fixtures and Outlets: In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. COMPLETION:
  1. General: Coordinate completion and clean-up of Work of various subcontractors in preparation for Substantial Completion and for portions of Work designated for Owner's occupancy.
  2. Correction of Defective Work: After Owner occupancy of premises, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

**END SECTION 01 73 00**

## 01 73 29 CUTTING AND PATCHING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Provide all cutting, fitting and patching, including excavation and backfill as required per Section 31 00 00 – EARTHWORK AND TRENCHING, to complete the Work and to accomplish the applicable listed items.
- B. Listed Items:
  - 1. Fitting: Make parts fit together properly.
  - 2. Untimely Work: Uncover portions of the Work to provide for installation of work not installed in the proper sequence of construction.
  - 3. Defective Work: Remove and replace defective and non-conforming work.
  - 4. Samples for Testing: Remove samples of installed work for testing per Section 01 45 29 - TESTING LABORATORY SERVICES and as identified in individual sections of the specifications.
  - 5. Mechanical and Electrical Penetrations: Provide penetrations of non-structural surfaces for installation of piping and conduit; refer to and Division 16 - ELECTRICAL.
  - 6. Existing Construction: Install specified work in existing Construction.

#### 1.3 SUBMITTALS

- A. Cutting and/or Alteration Request:
  - 1. General: Submit written request to the Architect in advance of executing any cutting or alteration affecting any of the following: work process of the Owner or any separate contractor; structural value or integrity of any element of the Project; integrity or effectiveness of weather-exposed or moisture-resistant elements or systems; efficiency, life, maintenance or safety of operational elements; visual qualities of sight-exposed elements.
  - 2. Request Requirements: Project name and location; description of all affected work; explanation of necessity for cutting, alteration or excavation; impact on the work of the Owner or any separate contractor, or on the structural or weatherproof integrity of the building; description of proposed work, including scope of cutting, patching, alteration, or excavation, products proposed to be used, trades who will complete the work, and extent of refinishing to be done; alternatives to cutting and patching; cost proposal, when applicable; written permission from any separate contractor whose work will be affected.

3. Product Substitutions: Should conditions of Work or schedule indicate change of products from original installation, submit request for substitution as specified in Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.
4. Field Observation: Submit written notice to Architect designating date and time work will be uncovered.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. General: Comply with requirements of individual sections of these Specifications for replacement of Work removed and type of work to be done.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION**

- A. General: Inspect existing conditions; include elements subject to damage or movement during cutting and patching.
- B. After Uncovering Work: Inspect conditions affecting the installation of products, or performance of Work.
- C. Unsatisfactory Conditions: Report unsatisfactory or questionable conditions to the Architect in writing; do not proceed with work until Architect has provided further instructions.

### **3.2 PREPARATION**

- A. Protection:
  1. General: Provide devices and methods to protect other portions of the Project from damage.
  2. Environmental Protection: Provide protection from the elements for that portion of the Project which may be exposed by cutting and patching, and maintain excavations free from water.

### **3.3 PERFORMANCE**

- A. Excavation and Backfill: Execute excavating and backfilling by methods which will prevent settlement or damage to other work per Section 31 00 00 - EARTHWORK AND TRENCHING.
- B. Surface Preparation: Provide proper surfaces to receive installation of repairs.
- C. Patching: Perform work with workers skilled in the trades involved. Make patches, seams and joints durable and inconspicuous.
- D. Adjustment: Execute fitting and adjustment of products to provide a finished installation complying with specified products, functions, tolerances and finishes.
- E. Fitting: Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

- F. Restoration: Restore work which has been cut or removed; install new products to provide completed Work as shown and specified.
- G. Refinishing: Refinish entire surfaces as necessary to provide even finish to match adjacent finishes; refinish continuous surfaces to nearest intersection; entire unit of any assembly.

**END SECTION 01 73 29**

## 01 77 00 CLOSEOUT PROCEDURES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. Perform operations necessary for and incidental to closing out the Contract and assisting in obtaining Project acceptance by the Owner.

#### 1.3 FINAL CLEANING

- A. General: Remove marks, stains, fingerprints, dust, dirt, and paint drippings resulting from work of this Project. Wash tile, plumbing and other fixtures clean; polish hardware and other unpainted metals. Remove temporary labels, tags and paper covering.

#### 1.4 CLOSEOUT SCHEDULE AND PROCEDURE

- A. Requirements Prior to Inspection For Substantial Completion: Work required to be completed prior to inspection for substantial completion include but are not limited to the following:
  - 1. All products and materials shown and/or specified shall be installed and finished.
  - 2. All equipment and systems shall be installed and operational as shown and specified.
  - 3. Instruction of Owner in use and operation of equipment and systems as specified.
  - 4. Thorough site and building cleaning as specified.
- B. Requirements Prior to Final Completion and Final Payment:
  - 1. Temporary Facilities: Remove from site per Section 01 50 00 - TEMPORARY FACILITIES AND CONTROLS.
  - 2. Adjustments:
    - a. General: As required in the various technical sections of this Project Manual.
    - b. Plumbing and Mechanical Equipment: Assure that equipment operates quietly and free from vibration. Properly adjust, repair, balance, or replace equipment producing objectionable noise or vibration in occupied areas of building; provide additional brackets, bracing, etc., to prevent such objectionable noise or vibration.
    - c. Systems: Assure that all operate without humming, surging, or rapid cycling.
  - 3. Affidavits: Submit affidavits of release of stop notices or liens, payment of debts and claims and all applicable taxes.

4. Submittals: Collect closeout submittals and deliver with itemized list of submittals. Provide all items listed under PART 2 – PRODUCTS of this section.

## **PART 2 - PRODUCTS**

### **2.1 RECORD DRAWINGS**

- A. General: Refer to GENERAL CONDITIONS, Paragraph 3.11.1. Record drawings shall be kept up-to-date at all times.
- B. Drawings:
  1. General: Designate sets of prints at job site for record drawing documentation. Architect will furnish reproducibles to the Contractor for final Record Drawings.
  2. Progress: At time of installation, record installed locations of underground, drainage, plumbing and electrical work, including storm drain grate and invert elevations on prints, and review with Inspector.
  3. Documentation:
    - a. General: Transfer installed locations to reproducible transparencies and submit drawings to Architect.
    - b. Identification of Changes: Information entered on reproducible prints shall be neat, legible and emphasized by drawing "clouds" around changed items.
    - c. Dimensions: Locate work, including stubs for future connections, with reference to permanent landmarks or buildings and indicate depth below finish grade.
    - d. Symbols and Designations: Use same as shown on Contract Drawings.
- C. Certification: Completed Record Drawings shall be signed by Contractor as complete and accurate records of the Project, as built.

### **2.2 OPERATION AND MAINTENANCE INSTRUCTIONS**

- A. General: Incorporate in Maintenance/Operating Manual(s), as specified below, brochures, manufacturer's catalogs and written instructions for equipment and materials needing regular care or maintenance; mechanical and electrical equipment, etc. Provide 2 complete copy of each manual required.
- B. Manual:
  1. General: Prepare manuals using durable plastic loose leaf binders approximately 8-1/2 x 11 inches in size with following minimum data:
    - a. Identification: On, or readable through, a front cover stating general nature of manual.
    - b. Index: Neatly typewritten at front of manual; clearly identify location of emergency data.
    - c. Operation and Maintenance Data: Complete instructions for products and equipment required.

- d. Repair/Replacement Parts: Provide name and address of nearest vendor for replacement of parts or repair services.
  - e. Additional Data: Where contents of manuals include manufacturer's catalog pages, clearly indicate precise items included in this installation and delete, or otherwise clearly indicate, manufacturer's data which is not in this installation.
- C. Operating Instructions: Mount and post instructions for equipment, as required.
- D. Service and Maintenance Contracts: As specified, executed by each subcontractor, manufacturer, and supplier as applicable.

## **2.3 GUARANTEES**

- A. General: Provide in conformance with the requirements of Document 00 72 13 - GENERAL CONDITIONS and as required in the individual sections of this Project Manual.
- B. Guarantee Period: Duration of the guarantees shall be as stated in the individual sections of this Project Manual. Guarantee periods shall commence on the official date of acceptance by the Owner of the Project.
- C. Submittal: Submit required Guarantees on copies of Guarantee Form and deliver in a complete package to the Architect. Required Guarantee Forms must be reviewed and accepted by the Architect prior to final acceptance by Owner.

## **PART 3 - EXECUTION**

### **3.1 PROJECT ACCEPTANCE**

- A. Substantial Completion:
  - 1. Scheduling Inspection: Complete "requirements prior to inspection for substantial completion" listed in PART 1 and any item of work identified in project progress meetings as requiring completion prior to substantial completion. Attach punch list of any known items of work remaining to be completed or corrected.
  - 2. Inspection: Architect accompanied by Owner, and engineering consultants as appropriate, will inspect work to determine if project is substantially complete in accordance with Document GENERAL CONDITIONS. If project is determined to be substantially complete Architect will prepare Certificate of Substantial completion and attach a punch list of work to be corrected or completed prior to final inspection. If project is determined not to be substantially complete, Architect will notify contractor in writing. Additional inspections at contractor's expense may be required. If contractor desires a detailed list of work remaining to be completed or corrected prior to substantial completion, the Owner may hire the Architect to prepare such a list and deduct the cost of the service from the amount owed to the Contractor.
- B. Final Completion:
  - 1. Scheduling Inspection: Complete "requirements prior to final completion and final payment" listed in PART 1 and every item of work identified on the punch list. Submit request for final payment and written request for inspection for final completion, stating that all punch list items have been performed.

2. Inspection: Architect accompanied by Owner, and engineering consultants as appropriate, will inspect work to determine if project is complete. If project is determined to be complete Architect will begin processing of the final certificate of payment and owner will file the Notice of Completion. If project is determined not to be complete, owner may exercise, at owner's sole discretion, any provisions of the GENERAL CONDITIONS, including the following 2 options: Owner may require contractor to complete the work and deduct from the contract amount any costs incurred by the Owner related to failure of the contractor to complete the work as previously scheduled; or Owner may take possession of the work in its incomplete state and deduct from the contract amount the estimated cost of having the work completed by a different contractor.

**END SECTION 01 77 00**

**END DIVISION 1 – GENERAL REQUIREMENTS**

**DIVISION 2 – EXISTING CONDITIONS**

**NOT USED**

**END DIVISION 2 – EXISTING CONDITIONS**

## **DIVISION 3 – CONCRETE**

### **03 30 00 SUMMARY OF WORK**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes concrete, formwork, reinforcement, and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's data, installation instructions and evidence of compliance with requirements of this section for the following:
  - 1. Cement: Submit certification from cement manufacturer that the cement proposed for use on the project has been manufactured and tested in compliance with the requirements of ASTM C150 for Portland cement and ASTM C595 for blended hydraulic cement, whichever is applicable.
  - 2. Reinforcement: Submit mill test and chemical analysis certificates for all reinforcing steel delivered to the site.
- B. Shop Drawings: Reinforcement shop drawings in accordance with ACI 315. Show all fabrication and installation details and dimensions, including embedded items.
- C. Mix Designs: Include record of test data per CBC 1905A.3. Identify mixes by design strength, intended use, and placement restrictions, such as “pump mix” or “hot weather mix”.
- D. Samples: Submit concrete finish samples, if requested.
- E. Materials List: Within 7 days after award of Contract, and before any concrete is delivered to the jobsite, submit to Architect a complete list of all materials proposed to be used in this portion of the work, showing manufacturer's name and catalog number of all items such as admixture, membrane, concrete mix design and the name and address of supplier of transit-mix concrete.
- F. Placement Records: Keep on job site until completion, and open to inspection, record showing time and date of placing concrete in each portion of structure together with transit-mix delivery slip certifying contents of each placement. Delivery placement record and delivery slips to the architect upon completion of the work.
- G. Closeout Submittals: Provide completed Guarantee form per Article 1.5.

##### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.

B. Reference Standards:

1. American Society of Testing Materials (ASTM): Materials and testing standards as identified throughout this Section.
2. American Concrete Institute (ACI):
  - a. ACI 302.1R: Guide for Floor and Slab Construction.
  - b. ACI 304R: Guide for Measuring, Mixing, Transporting and Placing Concrete.
  - c. ACI 305R: Hot Weather Concreting.
  - d. ACI 306R: Cold Weather Concreting.
  - e. ACI 308: Standard Practice for Curing Concrete.
  - f. ACI 315: Details and Detailing of Concrete Reinforcement
  - g. ACI 318: Building Code Requirements for Reinforced Concrete.
  - h. ACI 347R: Recommended Practice for Concrete Formwork.
  - i. ACI SP-66: Detailing Manual.
3. American Welding Society (AWS): AWS D1.4 - Structural Welding Code - Reinforcing Steel.
4. California Building Code (CBC) 2010, Chapter 19A, for concrete requirements.
5. Concrete Reinforcing Steel Institute (CRSI): Manual of Standard Practice.
6. National Ready Mixed Concrete Association (NRMCA): Check List for Certification of Ready Mix Concrete Production Facilities.

C. Testing: Refer to Section 01 45 29 – TESTING LABORATORY SERVICES.

## 1.5 GUARANTEE

A. Provide in required form for a period of 2 years from date of acceptance by Owner.

## 1.6 DELIVERY

A. Deliver undamaged products to job in manufacturer's sealed containers and original bundles with tags and labels intact.

## PART 2 - PRODUCTS

### 2.1 FORMWORK

A. Forms:

1. Lumber: Construction grade Douglas Fir. Hand select at exposed finishes to produce smooth, true surfaces.

2. Plywood: APA B-B Plyform, Class 1 or better, mill oiled and edge sealed; thickness as required to achieve true plane surfaces with forming system used, minimum 5/8 inch thickness.
- B. Fasteners: As required; of sufficient strength and character to maintain formwork in place while placing concrete.
- C. Form Release Agent: Colorless mineral oil which will not stain the concrete or impair natural bonding characteristics of coating intended for use on concrete.

## **2.2 REINFORCEMENT**

- A. Reinforcement Bars: ASTM A615, deformed; Grade 60 unless noted otherwise. ASTM A706 for all bars to be welded and where shown.
- B. Reinforcing Supports:
1. General: Metal chairs, bolsters, bar supports, or spacers, sized and shaped for strength and support during concrete placement.
  2. Footings: Bottom bars supported with concrete blocks.
- C. Tie Wire: 16 gage annealed type.

## **2.3 TIE WIRE**

- A. 16 gage annealed type.

## **2.4 CONCRETE**

- A. Cement: Portland cement; ASTM C150, Type I or II, per ACI 318 Section 3.2
- B. Aggregates:
1. General: ASTM C33, except as modified by this Section and per CBC Section 1903A.3.
- C. Water: Clean and free from deleterious amounts of acids, alkalis, scale, or organic materials; CBC Section 1903A.4.
- D. Admixtures:
1. Water Reducing and Retarding Admixture: ASTM C494, type D.
  2. Water Reducing Admixture (cool weather): ASTM C494, type A.
  3. Mid-range Water Reducing Admixture: Master Builders "Polyheed" or approved equal.
  4. Air Entrainment Admixture: ASTM C260.
  5. Fly Ash: ASTM C618, Class N or F. Class C not permitted.
  6. Integral Color:

- a. Acceptable Products:
  - i. Davis Colors Liquid Pigment, as manufactured by Davis Colors or equal.
  - ii. Chromix Liquid Admixture, as manufactured by L.M. Scofield Company or equal.
  - iii. ColorFlo Liquid Color, as manufactured by Solomon Colors, Inc. or equal.
- b. Match existing concrete color

## **2.5 EXPANSION JOINT MATERIALS**

A. Expansion Joint in Concrete (EJ-C): ASTM D 1751, preformed; ½ inch thick, unless otherwise shown.

B. Removable Expansion Joint Cap:

- 1. Acceptable Products:
  - a. Sandell's Removable Expansion Joint Cap, as manufactured by Sandell Construction Solutions or equal.
  - b. Snap-Cap, as manufactured by W. R. Meadows, Inc. or equal.
  - c. Model No. EXPJ-006, as manufactured by Right/Pointe Company or equal.
- 2. Alternate Products: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- 3. Use at expansion joints in pavement and other horizontal surfaces
- 4. Size: 1/2 inch wide, 1 inch deep.

## **2.6 SEALANT FOR JOINTS AND CRACKS**

A. Acceptable Products: Sikaflex-2c NS, as manufactured by Sika Corp or equal; two component polyurethane, or per vapor control manufacturer's recommendation.

## **2.7 DESIGN AND MIXING**

A. Mix Designs:

- 1. Mix designs shall be prepared at contractor's expense by a registered civil engineer experienced in concrete mix design in accordance with CBC Section Chapter 19A. Identify mixes by design strength, intended use, and placement restrictions, such as "pump mix" or "hot weather mix".
- 2. Site Concrete (concrete not shown on structural drawings): 3000 psi at 28 days; 1 inch maximum aggregate size; 0.50 maximum water to cement ratio. Exposed concrete to have 6% air entrainment.
- 3. Slump:
  - a. Flatwork: 3 inches plus or minus 1 inch. Exception: mixes using mid-range water reducing admixture shall have a 2 inch maximum slump before dosing and 6 inches maximum slump after dosing.

4. Water Reducing Admixture: Water reducing and retarding admixture (type D) is required for all concrete to be placed on days when the daily high temperature is expected to exceed 80 degrees Fahrenheit. Water reducing admixture (type A) may be substituted in mixes to be placed on cooler days.
5. **Flatwork: Design mix for flatwork must include Collated Fibrillated Polypropylene Fiber in amounts not less than 1.5, or more than 1.6 pounds of fiber per cubic yard; 1 pound per cubic yard of multifilament fibers in concrete containing coloring.**

B. Mixing of Concrete:

1. General: Concrete shall be transit mixed per CBC Chapter 19A and ASTM C94. Mix until there is uniform distribution of material and mass is uniform and homogeneous; mixer must be discharged completely before the mixer is recharged.
2. Ready-Mix Concrete: Mix and deliver in accordance with the requirements set forth in CBC Section 1905A.8.
  - a. Approved inspector of the testing laboratory shall check the first batching at the start of the work and furnish mix proportions to the licensed Weighmaster.
  - b. Licensed Weighmaster to positively identify materials as to quantity and to certify to each load by ticket.
  - c. Ticket shall be transmitted to Project Inspector by truck driver with load identified thereon. Inspector will not accept load without load ticket identifying mix and will keep daily record of pours, identifying each truck, its load and time of receipt and will transmit 2 copies of record to authority having jurisdiction.
  - d. A minimum of 1 set of 2 cylinders shall be taken and tested for each 50 cubic yards of concrete or fraction thereof.
3. Admixtures: Verify compatibility of concrete admixtures when multiple admixtures are used in a specific mix. Proportion and mix in accordance with manufacturers written instructions.
4. **Collated Fibrillated Polypropylene Fiber not permitted in job mixed concrete.**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Notify Architect and Structural Engineer at least 48 hours prior to placing of concrete.
- B. Environmental Requirements: Per ACI 305R and ACI 306R.
- C. Take field measurements; report variance between plan and field dimensions.

- D. Store cement in weather tight building, permitting easy inspection and identification. Protect from dampness; lumpy or stale cement will be rejected.
- E. Protect finish surfaces adjacent to locations scheduled for placement of concrete. Inspect forming placed against existing work and establish a tight, leak-proof seal before concrete is poured. Replace finish work defaced by concrete placement operations.

### 3.3 INSTALLATION

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Install to allow application of subsequent finish materials within specified tolerances.
- C. Formwork:
  - 1. General:
    - a. Workmanship: Provide formwork required to produce smooth concrete; straight, plumb and true to plane. Concrete out of line, level or plumb will be rejected.
    - b. Material: Provide straight, true and sound form material, able to withstand deformation due to loading and the effects of moist curing. Do not reuse warped or delaminated materials that require patching of contact surfaces.
    - c. Construction: Construct forms to shapes, lines, grades and dimensions indicated; tight to prevent leakage, properly braced and tied together to maintain position and shape. Form bevels, grooves and recesses to neat, straight lines; chamfer corners where indicated. Provide for easy removal without hammering, wedging or prying against concrete.
    - d. Adjustment: Tighten forms, posts and shores during and immediately after concrete placement; readjust as required to maintain grades, levels and camber.
    - e. Exposed Finish: At vertical surfaces exposed to view and other conditions where formed surface will be visible, formwork shall be crafted to produce finished concrete without further work such as sacking or patching. Finish shall be is smooth, true to plane, uniform in appearance, and free irregularities and defects at time of stripping. Small air pockets less than ¼ inch in diameter will not be considered defective. Vertical Surfaces: Provide formwork required to produce finished concrete that is smooth, true to plane, uniform appearance, and free irregularities and defects at time of stripping. Small air pockets less than ¼” in diameter will not be considered a defect.
  - 2. Embedded Components:
    - a. General: Install straight, level and plumb prior to concrete placement; brace, anchor and support items to prevent displacement or distortion.
    - b. Inserts: Coordinate work of other Sections in setting bolts, anchors, and other components, as required.
    - c. Formed Openings: Provide slots, recesses, chases and sleeves where required for work to be imbedded in or pass through concrete.
  - 3. Anchor Bolts: Install as shown.

4. Form Coating:

- a. General: Before placement of reinforcing steel, coat exposed face of forms to prevent moisture absorption from concrete and facilitate removal of forms; seal all cut edges.
- b. Re-use: Thoroughly clean and recoat form material acceptable for re-use.

D. Reinforcement:

1. Fabrication: Do not bend or straighten reinforcement in manner that will injure material. Bars with kinks or bends not shown, and heating of bars for bending is not permitted.
2. Placement:
  - a. Reinforcement shall be accurately placed at locations indicated on the drawings within required tolerances and providing required clearances. Reinforcement shall be secured prior to placement of concrete such that tolerances and clearances are maintained. Coverage shall be in accordance with CBC Section 1907A.7.
  - b. Provide minimum center to center distance between parallel bars 2-1/2 times diameter, 1-1/2 inches or 2-1/2 times maximum size coarse aggregate. Wire bar lap together; splice reinforcing steel with lap of 69 diameters, unless otherwise shown.

E. Expansion Joints:

- a. Location: As shown. If not shown at exterior locations, place at 20 feet on center.
- b. Flush Sealant: Unless noted otherwise, hold expansion joint material 1 inch back from finish surface. Provide sealant flush with finish surface.
- c. Depressed Sealant: Where shown as drainage channel, depress expansion joint to provide 1/2 inch deep recess after sealant is applied.

F. Cast-In-Place Concrete:

1. General: Placement of forms, inserts and reinforcements are subject to approval of Architect. Notify Architect and Structural Engineer at least 48 hours prior to placement of concrete.
2. Cleaning:
  - a. General: Remove dirt, wood chips, sawdust and other debris before concrete pour; use compressed air at inaccessible areas. Remove all water from excavations.
  - b. Reinforcing: Clean reinforcement and other embedded items of substances that might impair bonding, prior to placement of concrete.
  - c. Previously Placed Concrete: Roughen to 1/4 inch amplitude; clean with steel brush prior to applying bonding agent.
3. Placing of Concrete:
  - a. General: Maintain records for placement of all concrete. Place concrete in dry conditions; keep excavations free of water, ice, loose soil or debris.

- b. Weather Requirements: Per ACI 305R (Hot) and ACI 306R (Cold). Hot weather is defined as any period in which temperature exceeds 85 degrees F.
  - c. Transportation: Handle concrete from mixer to place of deposit as rapidly as possible; using methods to prevent separation or loss of ingredients. Deposit in final position; avoid rehandling or flowing. Do not place partially hardened concrete in work. Do not wheel placement containers directly on top of reinforcing steel.
  - d. Placement:
    - i. General: Place concrete continuously between predetermined expansion, control and construction joints. Do not break or interrupt placement of concrete in manner that cause cold joints to occur.
    - ii. Footings: Place footings in one continuous pour.
    - iii. Concrete Slabs: Lay slabs to required lines and grades, in pattern shown. Water subgrade at exterior concrete the night before placement; dampen again immediately before placement; standing water not allowed.
4. Compacting:
- a. General: Thoroughly work concrete around reinforcement, embedded components and into corners of forms. Consolidate concrete by internal vibration, only. Do not puddle, tamp or vibrate concrete which has already taken initial set or continue long enough cause segregation of material.
  - b. Slabs: Consolidate concrete on grade by spading and puddling and internal vibration.
  - c. Formwork: Consolidate concrete in forms with high speed internal vibrators.
5. Flatness:
- a. Typical Interior Slabs: True to 1/8 inch in 10 feet when measured with a 10 foot straight edge. Slabs to receive finish flooring may be patched with approved hydraulic cement to required flatness. Polished concrete floors and other exposed concrete floors shall be removed and replaced if they do not meet the flatness requirements per ASTM E1155.
  - b. Exterior Slabs: as required to avoid "bird baths" and meet accessibility maximum slopes; true to maximum 1/8 inch in 10 feet.
6. Concrete Finishes:
- a. Slab Finish:
    - i. General: Uniformly spread, screed and float concrete.
    - ii. Float: Apply at tile setting beds, where shown.
    - iii. Trowel: Apply 2 steel troweling operations at surfaces to receive carpet, resilient materials, thinset tile and where left exposed. Finish interior exposed concrete to achieve burnished surface.

- iv. Broom (BRF): Apply medium broom finish at exterior exposed surfaces, perpendicular to direction of traffic flow. Apply medium broom finish at slopes less than 5% at the designated path of travel; apply heavy broom finish at slopes greater than 5%.
  - v. Decorative Concrete: Take great care to prepare slab for [polishing] [stamping] [imprinting]. [Refer to Section 03 35 33 – Stamped Concrete Finishing.] [Control joints and other detail work shall be straight, true, and precisely finished to be consistent with the appearance of the polished concrete finish. All requirements of this specification will be strictly enforced in area to receive polished concrete.
7. Joints:
- a. Exterior Joints: Mark off exposed joints, where indicated, with 1/2 inch radius by 1 1/2 inch deep joint tool. Markings to be clean cut, straight and square with respect to border. Tool edges of exposed expansion and control joints, border edges, and wherever concrete adjoins other material or vertical surfaces.
  - b. Horizontal Construction Joints: Keep exposed concrete face of construction joints continuously moist after initial set until placement of concrete; thoroughly clean contact surface by exposing solidly embedded aggregate, or by other method that will assure proper bonding.
8. Curing:
- a. General: Refer to ACI 308. Protect concrete from premature drying for minimum 5 days following pour.
  - b. Exterior Slabs: Cover and cure with membrane curing compound as soon as slab can take foot traffic, or approved method; upon completion wash clean.
  - c. Concrete in Forms: Keep wet until forms are stripped.
9. Removal of Forms: Remove without damage to concrete surfaces.
- a. Sequence and timing of form removal shall insure complete safety of concrete structure.
  - b. Forms shall remain in place for not less than the following periods of time. These periods represent cumulative number of days during which temperature of air in contact with concrete is 60 degrees F and above.
    - i. Vertical Forms of Foundations, Walls and All Other Forms Not Covered Below: 7 days.
    - ii. Slab Edge Screens or Forms: 5 days.
    - iii. Concrete Columns and Beams: 14 days.
10. Sealant: Fill all interior slab joints with sealant. Fill all expansion joints with sealant. Fill all cracks in areas to receive adhered flooring with sealant.
11. Defective Concrete:
- a. General: Remove or cut out defective concrete and repair before concrete is completely cured, as directed by Architect.
  - b. Defective Concrete is:

- i. General: Concrete not meeting specified 28-day strength.
  - ii. Finish: Concrete not matching the specified finish.
  - iii. Durability and Appearance: Concrete containing rock pockets, voids, spalls, cracks, exposed reinforcing, or other defects.
  - iv. Construction: Concrete out of line, level, flatness, plumb, or location.
  - v. Deleterious Materials: Concrete containing embedded wood or other debris.
  - vi. Unsatisfactory Patching: Concrete that was not patched under Architect's direction or patching that does not meet the specification for new concrete.
  - vii. Embedded Items: Concrete not containing required embedded items.
- c. Patching:
- i. General: Repair minor defective work with approved patching material.
  - ii. Patching of serious defects affecting the strength or appearance of the concrete are unsatisfactory, will not be accepted and shall be completely removed and replaced.
  - iii. Preparation: Chip out minor defective areas to a minimum depth of 1 inch, with edges perpendicular to surface. Wet area at least 6 inches around surface to be patched to prevent absorption of water from patching mortar.
  - iv. Repair: Coat with cement wash mix consisting of neat cement and solution of specified bonding agent. Immediately apply patching mortar consisting of 1 part cement to 3 parts fine aggregate mixed with solution with minimum water required for placement.
  - v. Finishing: Match adjoining surfaces; provide protective covering; keep wet for at least 7 days.
  - vi. Structural Repairs: Any repairs to concrete involving structural strength or integrity are subject to the approval of the Architect.

### **3.4 FIELD QUALITY CONTROL**

- A. General: Per CBC, Section 1704A.4; agency selected and paid for by Owner.
- B. Field Testing:
  - 1. General: The following testing will be performed by the Owner's testing lab in accordance with ASTM procedures. Test cylinders are to be provided by the contractor.
  - 2. Cylinders: Make, cure, and store 1 set of 3 cylinders, for each 50 cubic yards (or not less than once for each 2,000 square feet of surface area for slabs or walls) of each concrete mix being placed not less than once per day per ASTM C31. Test cylinders per ASTM C39. Test first cylinder at the age of 7 days and the other at 28 days; cylinder for 28-day test will not be broken if cylinder for 7-day test meets 28-day strength. Hold third cylinder for 56 day test, if required. Additional samples for 7-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.

3. Slump: Perform one slump test, per ASTM C143, for each 15 cubic yards of concrete placed and for each cylinder taken.
  4. Reinforcement: Make 1 tensile test and 1 bend test of specimen taken from each 10 tons of steel delivered to the site.
- C. Retesting: Cost of retests or coring because of low strength, or defective concrete will be paid for by Owner and deducted from the contract cost.

### **3.5 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

**END SECTION 03 30 00**

**END DIVISION 3 – CONCRETE**

## **DIVISION 4 – MASONRY**

### **04 21 13 BRICK MASONRY**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes brick masonry and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's data and installation instructions for review.
- B. Shop Drawings: Submit manufacture and installation details for reinforcing, including fastenings, for review prior to fabrication of work. Show arrangements and assemblies as required for fabrication and placement of reinforcement for masonry work.
- C. Samples: Submit 2 minimum 2 x 2-inch samples for each color specified available colors for each material submitted for masonry units and color mortar. Match existing color.
- D. Certificates:
  - 1. Certify that products meet or exceed specified requirements.
  - 2. Mill Certificates: Submit certification of producer's mill analysis, tensile and bend tests for reinforcement steel.
- E. Test Reports: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
- F. Installer Qualifications: If requested, provide evidence that installers meet the requirements of Article 1.4.
- G. Closeout Submittals:
  - 1. O & M Manuals: Maintenance instructions.
  - 2. Guarantee: Provide completed form per Article 1.5.

##### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.

## 1.5 GUARANTEE

- A. Provide in required form for a period of 1 year from date of acceptance by Owner.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. Pile masonry units on plant platforms in dry location. Protect masonry units during freezing weather with tarpaulins or other suitable material.

## PART 2 - PRODUCTS

### 2.1 BUILDING BRICK

- A. General: ASTM C62; solid units.
- B. Acceptable Products: as manufactured by H.C. Muddox Company or equal.
- C. Alternate Products: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- D. Type, Size and Shape: Modular; Jumbo; 11-1/2 inches long x 3-1/2 inches high x 3 inches deep. Match existing color.
- E. **Colors:**
  - 1. Match existing color.

### 2.2 REINFORCEMENT AND ANCHORAGE

- A. Acceptable Manufacturers:
  - 1. Dur-O-Wall, Inc. or equal
  - 2. Hohmann and Bernard, Inc. or equal
- B. Alternate Manufacturers: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- C. Masonry Reinforcing and Accessories: As shown.
- D. Reinforcing Steel: ASTM A615; refer to Section 03 30 00 - CONCRETE.
- E. Veneer Anchors and Ties:
  - 1. General: Heavily galvanized metal of acceptable design.

### 2.3 MORTAR AND GROUT

- A. Cement: ASTM C 150, Type I or II, grey color.

- B. Hydrated Lime: ASTM C 207, Type S; per UBC Standard 21-13.
- C. Aggregate:
  - 1. Grout: ASTM C 404.
  - 2. Mortar: ASTM C 144; natural sand, light grey color.
- D. Water: Clean and potable.
- E. Admixture:
  - 1. Acceptable Products:
    - a. Sika Grout Aid Type II, as manufactured by the Sika Corp. or equal
    - b. Comparable products manufactured by Master Builders, Inc. or equal
- F. Colors: Match Existing

## 2.4 MIXES

- A. Mortar:
  - 1. General: Per CBC Section 2103A.3.
  - 2. Ready Mixed Mortar: ASTM C1142.
  - 3. Strength: Provide minimum 28 day strength of 1,800 pounds per square inch.
  - 4. Mixing: Thoroughly mix mortar ingredients per ASTM C 270 in quantities needed for immediate use. Maintain sand uniformly damp immediately before the mixing process. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration. Do not use anti-freeze compounds to lower the freezing point of mortar. If water is lost by evaporation, re-temper only within 1 hour of mixing. Use mortar within 1 hour after mixing.
- B. Grout:
  - 1. General: Ready mixed grout per ASTM C94, mixed in accordance with ASTM C 476, fine grout (UBC Standard 21-13) as required.
  - 2. Strength:
    - a. General: Provide minimum 28 day strength of 2,000 psi.
  - 3. Admixtures: Per manufacturer's instructions; mix uniformly. Do not use anti-freeze compounds to lower the freezing point of grout.
- C. Partial Sack Batches: Not permitted.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Inserts: Verify that anchors, inserts, etc., placed under other Sections have been properly installed.

### **3.2 PREPARATION**

- A. Pre-Installation Conference: Convene 1 week prior to commencing work of this section; confirm scheduling and coordination requirements.
- B. Take field measurements; report variance between plan and field dimensions.
- C. Environmental Requirements:
  - 1. Cold Weather: Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and for 48 hours after completion of masonry work.
  - 2. Hot Weather: Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and for 48 hours after completion of masonry work.
- D. Protection:
  - 1. General: Protect masonry surfaces not being worked on during construction. When rain is imminent and work is discontinued, cover tops of masonry walls exposed to weather with a well-secured waterproof membrane.
  - 2. Stains: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove grout, mortar, or soil immediately on contact with masonry. Protect base of walls from rain-splashed mud and mortar splatter with coverings on ground and over wall surface.
  - 3. Loading:
    - a. General: Do not apply uniform floor or roof loading for at least 48 hours after construction of masonry walls or columns.
    - b. Concentrated Loads: Do not apply concentrated loads for at least 4 days after construction of masonry walls or columns.
- E. Surface Preparation: Clean surfaces to be in contact with mortar or grout free of deleterious materials.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Reinforcement and Anchorage:
  - 1. Multiple Wythe Unit Masonry: Install horizontal joint reinforcement 16 inches on center. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend

minimum 16 inches each side of opening. Place joint reinforcement continuous in first and second joint below top of walls. Lap joint reinforcement ends minimum 6 inches. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position. Embed anchors concrete. Embed anchorages in every sixth brick. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.

C. Coursing:

1. General: Establish lines, levels, and coursing indicated. Protect from displacement. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
2. Brick Units:
  - a. Bond: Match Existing
  - b. Coursing: 3 units and 3 mortar joints to equal 8 inches.
3. Mortar Joints: Match Existing

D. Placing and Bonding:

1. General: Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work. Buttering corners of joints or excessive furrowing of mortar joints are not permitted. Remove excess mortar as work progresses. Interlock intersections and external corners. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
2. Cutting: Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
3. Structural Isolation:
  - a. Vertical: Isolate masonry partitions from vertical structural framing members with a control joint as shown.
  - b. Horizontal: Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

E. Weeps: Install weeps in veneer at 24 inches on center horizontally and at bottom of walls.

F. Masonry Flashings: Extend flashings at foundation walls. Turn flashing up minimum 8 inches and bed into mortar joint of masonry backing. Lap end joints minimum 6 inches and seal watertight. Turn flashing, fold, and seal at corners, bends, and interruptions.

G. Control and Expansion (EJ-M) Joints in Masonry (CJ-M): Do not continue horizontal joint reinforcement through control and expansion joints. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

H. Tolerances:

1. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.

2. Maximum Variation from Plane of Wall: 1/4 inch in 10'-0".
  3. Maximum Variation from Plumb: 1/4 inch per story.
  4. Maximum Variation from Level Coursing: 1/8 inch in 3 feet and 1/4 inch in 10'-0"; 1/2 inch in 30'-0".
  5. Maximum Variation of Joint Thickness: 1/8 inch in 3'-0".
  6. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch.
- I. Cutting and Fitting: Cut and fit for chases, pipes, conduit, sleeves, grounds. Coordinate with other Sections of work to provide correct size, shape, and location. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
  - J. Parging: Dampen masonry walls prior to parging. Scarify each parging coat to ensure full bond to subsequent coat. Parge masonry walls in 2 uniform coats of mortar to a total thickness of 3/4 inch. Steel trowel surface smooth and flat with a maximum surface variation of 1/8 inch per foot. Strike top edge of parging at 45 degrees.

### **3.4 FIELD QUALITY CONTROL**

- A. Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
- B. Retesting: Make necessary corrections to non-conforming work; retest at Contractor's expense.

### **3.5 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. Remove mortar droppings while still fresh. Dry brush exposed masonry at the end of each day's work and after final pointing to remove mortar spots; use cleaning solution as required to provide a uniformly clean surface.
- C. At completion of work, thoroughly saturate walls with water and clean with high pressure water. Remove unused materials and debris, including scaffolds and implements when complete.

**END SECTION 04 21 13**

**PART 1 - GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes concrete unit masonry and related work as shown and specified.

**1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications, data, and installation instructions for review.
- B. Shop Drawings: Submit manufacturer's installation details for reinforcing per ACI, including fastenings, for review prior to fabrication of work. Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties, and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.
- C. Test Reports: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
- D. Certificates:
  - 1. General: Certify that products meet or exceed specified requirements.
  - 2. Mill Certificates: Submit certification of producer's mill analysis, tensile and bend tests for reinforcement steel.
  - 3. Integral Water Repellent Admixture: Concrete unit masonry producer certified by the integral water repellent admixture manufacturer.
- E. Closeout Submittals:
  - 1. O & M Manuals: Maintenance instructions.

**1.4 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. American Concrete Institute (ACI):
    - a. ACI 315: Details and Detailing of Concrete Reinforcement.
    - b. ACI 530: Building Code Requirements for Masonry Structures.
    - c. ACI 530.1: Specifications for Masonry Structures.

2. American Society of Testing Materials (ASTM): Materials and testing standards as identified throughout this Section.
  3. National Concrete Masonry Association (NCMA): TEK Bulletin No. 28.
  4. Underwriters Laboratory (UL): Fire Resistance Directory.
- B. Testing:
1. Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
  2. Retesting: Agency selected and paid for by the Owner; retesting paid for by Contractor.
  3. Masonry Testing:
    - a. General: Comply with CBC Chapter 17A and Section 2105A.
    - b. Concrete Masonry Units: Test each type, class, and grade of concrete masonry unit.
    - c. Mortar Tests: Each type.
    - d. Grout Tests: Each type.
- C. Fire Performance Characteristics: Provide materials and construction identical to those of assemblies whose fire resistance has been determined per ASTM E 119.
- D. Source Limitations:
1. General: Obtain masonry materials from 1 manufacturer for each different product required.
  2. Masonry Units: Uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, for each continuous surface or visually related surfaces.
  3. Mortar Materials: Ingredients of uniform quality, including color for exposed masonry, for each cementitious component and from one source and producer for each aggregate.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. Pile masonry units on plant platforms in dry location. Protect masonry units during freezing weather with tarpaulins or other suitable material.
- B. Moisture Absorption of Concrete Masonry Units: Limit during delivery and until time of installation to the maximum percentage specified for units for the average annual relative humidity available through the National Weather Service, West Region Climate Center.

## **PART 2 - PRODUCTS**

### **2.1 CONCRETE MASONRY UNITS**

- A. Acceptable Products:
  - 1. Basalite Blocks, as manufactured by Pacific Coast Building Products, Inc.
- B. Alternate Products: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- C. General: Hollow load-bearing block units (CMU1); ASTM C 90, Grade N, light weight.
- D. Mortar and Grout:
  - 1. Cement: ASTM C 150, Type I or II, grey color.
  - 2. Hydrated Lime: ASTM C 207, Type S; per CBC Standard 21-13.
  - 3. Aggregate:
    - a. Grout: ASTM C 404.
    - b. Mortar: ASTM C 144; natural sand color.
  - 4. Water: Clean and potable.
  - 5. Grout Water-Reducing Admixture:
    - a. Acceptable Products:
      - i. Sika Grout Aid Type II, as manufactured by the Sika Corp. or equal
      - ii. Comparable products manufactured by the Euclid Chemical Company or equal
  - 6. Mortar Integral Water Repellent Admixtures:
    - a. General: Liquid polymeric admixture; site mixed.
    - b. Dry-Block Mortar Admixture, as manufactured by Grace Construction Products or equal.
    - c. RainBloc for Mortar, as manufactured by ACM Chemistries, Inc. or equal.
    - d. Rheopel Mortar Admixture, as manufactured by BASF Construction Chemicals, LLC or equal.
    - e. Sikamix W-10, as manufactured by Sika Corp. or equal.
    - f. Alternate Products: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- E. Masonry Reinforcing:
  - 1. Reinforcement Bars: ASTM A 615, deformed; No. 4 and smaller Grade 40, No. 5 and larger Grade 60.

2. Concrete Inserts: Refer to Section 03 30 00 - CONCRETE. Advise concrete installer of specific requirements regarding his placement of inserts which are to be used by the masonry installer for anchoring of masonry work.
3. Miscellaneous Masonry Accessories:
  - a. Nonmetallic Expansion Joint Strips: Premolded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, width and thickness as shown.
  - b. Premolded Control Joint Strips: Styrene-butadiene rubber compound complying with ASTM D 2000, Designation 2AA-805, designed to fit standard sash block and to maintain lateral stability in masonry wall.
  - c. Bond Breaker Strips: 15 pound asphalt roofing felt per ASTM D 226, Type I.
- F. Accessories: Nylon or polypropylene sash cord wicks, 1/4-inch diameter.
- G. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.
- H. Water Sealer: Refer to Section 07 19 00 – WATER REPELLENTS.

## 2.2 MIXES

- A. Mortar:
  1. General: Per CBC Section 2103A.8, Type S using the property specification.
  2. Ready Mixed Mortar: ASTM C 1142, Type RS.
  3. Strength: Provide minimum 28 days strength of 1,800 pounds per square inch.
  4. Mixing: Thoroughly mix mortar ingredients per ASTM C 270 in quantities needed for immediate use. Maintain sand uniformly damp immediately before the mixing process. Add admixtures in accordance with manufacturer's instructions. Provide uniformity of mix and coloration. Do not use anti-freeze compounds to lower the freezing point of mortar. If water is lost by evaporation, re-temper only within 1 hour of mixing. Use mortar within 1 hour after mixing.
- B. Grout:
  1. General: Ready mixed grout per CBC 2103A.12.
  2. Strength:
    - a. General: Provide minimum 28 day strength of 2,000 pounds per square inch.
  3. Admixtures: Per manufacturer's instructions; mix uniformly. Admixture per Paragraph 2.1.G.5 shall be used in all grout. Do not use anti-freeze compounds to lower the freezing point of grout.
- C. Partial Sack Batches: Not permitted.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Verify that anchors, inserts, etc., placed under other Sections have been properly installed.

### **3.2 PREPARATION**

- A. Take field measurements; report variance between plan and field dimensions.
- B. Environmental Requirements:
  - 1. Cold Weather: Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and for 48 hours after completion of masonry work.
  - 2. Hot Weather: Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and for 48 hours after completion of masonry work.
- C. Protection:
  - 1. Protect masonry surfaces not being worked on during construction. When rain is imminent and work is discontinued, cover tops of masonry walls exposed to weather with a well-secured waterproof membrane.
  - 2. Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove grout, mortar, or soil immediately on contact with masonry. Protect base of walls from rain-splashed mud and mortar splatter with coverings on ground and over wall surface.
  - 3. Loading:
    - a. General: Do not apply uniform floor or roof loading for at least 48 hours after construction of masonry walls or columns.
    - b. Concentrated Loads: Do not apply concentrated loads for at least 4 days after construction of masonry walls or columns.
- D. Surface Preparation: Clean surfaces to be in contact with mortar or grout free of deleterious materials.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified. Establish lines, levels, and coursing indicated. Protect from displacement. Maintain masonry courses to uniform dimension.

B. Temporary Formwork:

1. General: Provide formwork and shores as required for temporary support of masonry elements. Design, erect, support, brace, and maintain as required.
2. Construction: Conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar, grout, or concrete (if any). Brace, tie and support as required to maintain position and shape during construction and curing of masonry.
3. Form Removal:
  - a. General: Do not remove forms and shores until reinforced masonry member has hardened sufficiently to carry its own weight and all other reasonable temporary loads that may be placed on it during construction.
  - b. Removal Time: 7 days, minimum.

C. Placing and Bonding:

1. General: Lay hollow masonry units with face shell bedding on head and bed joints. Buttering corners of joints or furrowing of mortar joints is not permitted. Remove excess mortar as Work progresses. Interlock intersections and external corners. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
2. Cutting Masonry Units: Use dry cutting motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Wherever possible use full-size units without cutting.
3. Wetting: **DO NOT WET CONCRETE MASONRY UNITS.**
4. Bond: **Common running.**
5. Mortar Joints: Raked; form vertical and horizontal joints of uniform thickness. Install mortar per ASTM C 270. Place mortar in masonry unit bed joints back 1/4 inch from edge of unit grout spaces, bevel back and upward. Permit mortar to cure 7 days before placing grout. Remove excess mortar from grout spaces.

D. Reinforcement and Anchorage:

1. General: Clean reinforcement of all rust, mill scale, earth, ice or other materials that will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not specifically shown or required for installation.
2. Placement: Position reinforcement accurately, as shown, before grouting; support and secure vertical bars against displacement. Lap reinforcement ends minimum 12 inches. Maintain position within 1/2 inch of dimensioned position. Provide a clear distance between masonry unit surfaces and reinforcing of not less than one bar diameter.
3. Vertical Reinforcement: Place before laying masonry units. Tie vertical reinforcement to matching dowels at base of masonry and thread masonry units over or around reinforcement. Support vertical reinforcement at 10'-0" intervals, maximum. Where vertical bars are shown in close proximity, provide a

clear distance between bars of not less than the nominal bar diameter or 1 inch (whichever is greater). For columns, piers and pilasters, provide a clear distance between vertical bars as shown, but not less than 1-1/2 times the nominal bar diameter or 1-1/2 inches, whichever is greater. Provide lateral ties as shown.

4. Horizontal Reinforcement: Place as the masonry units are laid in bond beam units. Depth of bond beam channel below the top of the unit shall be a minimum of 1-1/2 inches, with a minimum width of 3 inches.

E. Built-in Work:

1. General: As work progresses, install built-in and other items to be installed in the work and furnished by other Sections. Install items plumb and level.
2. Fabricated Metal Frames: Bed anchors in adjacent mortar joints; fill frame voids solid with grout. Fill adjacent masonry cores with grout.

F. Control and Expansion Joints:

1. General: Provide vertical and horizontal expansion, control, and isolation joints, as shown.
2. Sealants and Joint Fillers: Refer to Section 07 92 00 - JOINT SEALERS.

G. Grouting:

1. General: Install grout per CBC Section 2104A.5.1.2. Work grout into masonry cores and cavities to eliminate voids. Do not displace reinforcement while placing grout.
2. Low Lift Grouting: Place first lift of grout to a height of 16 inches and rod for grout consolidation. Place subsequent lifts in 8 inch increments and rod for grout consolidation.
3. High Lift Grouting:
  - a. Cleanouts: Provide opening no less than 4 inches high at the bottom of each cell to be grouted by cutting one face shell of masonry unit. Clean out masonry cells and cavities of loose material and mortar droppings. Permit complete water drainage. After cleaning and cell inspection, seal openings with masonry units.
  - b. Double Wythe Walls: Omit every second masonry unit in one of the wythes for clean out and cell inspection purposes. Construct vertical grout barriers or dams between the masonry wythes, with masonry units every 30'-0" maximum.
  - c. Grouting: Pump grout into spaces; maintain water content in grout to intended slump without aggregate segregation. Limit grout lift to 60 inches and rod for grout consolidation.
4. Embedded Items: Place in masonry as necessary for work of other trades. Grout solidly in place with not less than 1 inch of grout surrounding inserts.
5. Curing: Maintain masonry continuously moist for at least 3 days after laying.

- H. Lintels: As shown; do not splice reinforcing bars. Allow masonry lintels to attain specified strength before removing temporary supports.

I. Masonry Flashings:

1. Per Section 07 62 00 – SHEET METAL FLASHING AND TRIM.
2. Install weeps for all flashing at 16 inches on center maximum at top of first block above grade and above all wall openings. Install wicks as masonry is laid, cut flush after mortar has set.

J. Construction Tolerances:

1. Install to allow application of subsequent finish materials within specified tolerances.
2. Variation From Alignment of Columns: 1/4 inch, maximum.
3. Variation From Unit to Adjacent Unit: 1/32 inch, maximum.
4. Variation From Plane of Wall: Maximum of 1/4 inch in 10'-0" and ½ inch in 20'-0" or more.
5. Variation From Plumb: Maximum of 1/4 inch per story non-cumulative; ½ inch in 2 stories or more.
6. Variation From Level Coursing: Maximum of 1/8 inch in 3'-0" and 1/4 inch in 10'-0"; ½ inch in 30'-0".
7. Variation of Joint Thickness: 1/16 inch in 3'-0", maximum.

K. Repairing and Pointing:

1. General: Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.
2. Pointing: During the tooling of joints, enlarge voids or holes, except weep holes, and completely fill with mortar. Point-up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance.

### 3.4 FIELD QUALITY CONTROL

A. Field Testing:

1. Mortar and Grout:
  - a. General: Tested for compression per CBC 2105A.3.
  - b. Samples: At beginning of masonry work, at least 1 test sample of mortar and grout shall be taken on 3 successive working days, and at 1 week intervals thereafter. Mortar samples shall be made in 2 inch x 4 inch cylinders. Additional samples will be taken for each day's work.
  - c. Grout Prisms: Provide 4 x 4 x 8 inches, made with masonry molds; break molds away after grout has set, but before it has hardened. Test specimens in vertical position, at age of 7 days and at age of 28 days.
2. Test Cores: Take a minimum of 2 cores, and an additional 2 cores for each additional 5,000 square feet of grouted masonry walls, at points selected by Architect in compliance with CBC 2105A.4. Owner will pay for coring and testing of walls, but Contractor will repair walls cored at no extra cost. In event more

than 2 cores are required to be taken to establish acceptability of work as result of low or questionable tests or suspected faulty workmanship, costs of coring in excess of 2 cores will be paid by Owner and backcharged to Contractor.

B. Retesting: Make necessary corrections to non-conforming Work; retest at Contractor's expense.

### **3.5 CLEANING AND SEALING (OF NON PAINTED MASONRY)**

A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

B. Masonry Cleaning:

1. Remove mortar droppings while still fresh. Dry brush exposed masonry at the end of each day's work and after final pointing to remove mortar spots; use cleaning solution as required to provide a uniformly clean surface per NCMA TEK Bulletin No. 28.

2. At completion of work, thoroughly saturate walls with water and clean with high pressure water.

C. Water Sealing: Apply per approved manufacturers recommendations. INFINISEAL DB or equal. Inspector of Record and/or Contractor's Superintendent shall confirm quantity of material being applied to masonry per manufacturer's installation.

**END SECTION 04 22 00**

**END DIVISION 4 – MASONRY**

## **DIVISION 5 – METALS**

### **05 50 00 METAL FABRICATIONS**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes metal fabrications and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications and data for review.
- B. Shop Drawings: Submit manufacture installation details, including fastenings, for review.
- C. Installer Qualifications: If requested, provide evidence that installers meet the requirements of Article 1.4.
- D. Closeout Submittals: Provide completed Guarantee form per Article 1.5.

##### **1.4 QUALITY ASSURANCE**

- A. Welding: Performed by certified welders per AWS and CBC.
- B. Installer Qualifications: Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.

##### **1.5 GUARANTEE**

- A. Provide in required form for a period of 2 year from date of acceptance by Owner.

#### **PART 2 - PRODUCTS**

##### **2.1 FERROUS METALS**

- A. Steel Plates, Shapes, and Bars: ASTM A 36.
- B. Steel Pipe: ASTM A 53, Type E or S, Grade B.
- C. Steel Tube: Cold-formed per ASTM 500 or hot-formed per ASTM A501

## **2.2 FASTENERS**

- A. General: Hexagon head bolts, hex nuts, screws, washers, and other fastenings necessary for proper erection of work. Hot dipped galvanized steel fastenings for exterior steel work.
- B. Exposed in Finished Surfaces: Tamperproof countersunk Phillips flat head screws, unless shown otherwise; match adjacent surface finish.

## **2.3 NON-SHRINK GROUT**

- A. Per ASTM C-1107, consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- B. Alternate Products: No known equals; proposed equals are subject to substitution process per Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.

## **2.4 PLASTIC CEMENT**

- A. FS SS-C-153, Type 1, bituminous asphalt base.

## **2.5 PRIMER**

- A. General: Fast-curing, lead- and chromate-free, corrosion inhibitive, modified-alkyd primer.
- B. Primer: Certified to pass 200 hours salt spray test per ASTM D2247 and 500 hour humidity test per ASTM B117.
- C. Paint Top Coats: Verify compatibility. Refer to Section 09 90 00 - PAINTING AND COATING.

## **2.6 FINISHES**

- A. Galvanizing:
  - 1. General: Hot-dip process per ASTM A123. Minimum 2 ounces coating per square foot (G85).
  - 2. Repair Compound: Zinc-based solder per ASTM A780 (zinc-based alloy rod).
- B. Shop Painting: Per SSPC standards.

## **2.7 FABRICATION**

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible.
- B. General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- C. Miter corners and edges unless otherwise shown. Make members true to length so assembling may be done without fillers. Bends, twists, open joints in finished members, or projecting edges or corners at connections will not be permitted. Miter, cope, and block carefully to produce tight hairline joints. Provide lugs, clips, connections, bolts, and fastenings necessary to complete fabrication.

- D. Exposed Steel: Comply with ASIC Architecturally Exposed Structural Steel fabrication requirements.
- E. Fabricating with Galvanized Material: Fabrications to be painted or concealed may be fabricated from galvanized materials. Treat all welds, cut ends, and any surfaces where galvanizing has been removed or damage with specified repair compound to the specified thickness.
- F. Galvanized Final Finish: Fabrications for galvanized final finish shall be fabricated out of ungalvanized material per ASTM A385 – “Providing High Quality Zinc Coatings” and hot-dip galvanized in one finished piece after fabrication. Fabrications to have galvanized final finish shall not be field welded.
- G. Welding: Use sequence welding to minimize distortion and heat stresses. Weld by shielded electric arc process per AWS. Use continuous welding along entire area of contact, unless detailed otherwise. Grind all welds smooth on exposed surfaces. Spot welding not permitted on exposed surfaces.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Take field measurements; report variance between plan and field dimensions.

### **3.2 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required carefully for installing metal fabrications. Fit work at job before finishing. No burning in field permitted.
- C. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- D. Drill holes for fasteners to exact diameter as recommended by fastener manufacturer. Oversized holes or holes not properly located that produce misalignment of fastener will be rejected.
- E. Fit exposed connections accurately together to form hairline joints. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- F. Replace, or repair parts damaged or injured during erection in an acceptable manner.
- G. Galvanizing: Treat areas damaged during fabrication or erection with specified repair compound to restore zinc coating to a minimum of 2 ounces per square foot.

### **3.3 ADJUSTING AND CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

- B. At completion clean exposed surfaces in a manner that will not damage finish.
- C. Field Touch-up: Touch-up damaged surfaces and field welds of steel, scheduled to be painted, per SSPC standards.
- D. Touchup Painting: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint are specified in Section 09 90 00 - PAINTING AND COATING.

**END SECTION 05 50 00**

**END DIVISION 5 – METAL FABRICATIONS**

## **DIVISION 6 – WOOD, PLASTICS AND COMPOSITES**

### **06 10 00 ROUGH CARPENTRY**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes rough carpentry and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Product Data: Manufacturer's specifications, data, and installation instructions for review.
- B. Samples: If specifically requested.
- C. Certificates:
  - 1. Pressure Treatment: Submit mill certificate verifying compliance as specified, for each shipment received, in addition to a stamp on each piece of lumber, from an approved independent inspecting agency operating under the overview of the ALSC.
  - 2. Lumber Grades: Where lumber and plywood is exposed to view and clear finished, provide Certificates in lieu of grade stamping and trademarks.
- D. Closeout Submittals:

##### **1.4 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. American Forest and Paper Association (AFPA): National Design Specification for Wood Construction.
  - 2. American Lumber Standards Committee (ALSC): Grading Standards.
  - 3. American National Standards Institute (ANSI):
    - a. Mat-Formed Wood Particleboard: ANSI A208.
    - b. Basic Hardboard: ANSI/AHA A135.4.
  - 4. American Plywood Association (APA): Standard Grading Rules.
  - 5. American Wood Preservers Association (AWPA): Standard U1, preservative and fire retardant treatments.

6. National Institute of Standards and Technology (NIST): PS-20.
7. Redwood Inspection Service (RIS): Standard Specifications for Grades of California Redwood Lumber.
8. West Coast Lumber Inspection Bureau (WCLIB): Standard Grading Rules No. 17.
9. Western Wood Products Association (WWPA): Western Lumber Grading Rules.

## **PART 2 - PRODUCTS**

### **2.1 GRADING**

- A. General: NIST PS-20 and applicable lumberman's association rules, as approved by authority having jurisdiction, under which each lumber species is produced.
- B. Grade Marking:
  1. Lumber: CBC Standard 23-1; each piece of lumber, factory marked with official grade mark of grading agency or independent agency operating under the overview of ALSC.
  2. Plywood: CBC Standard 23-2 and PS 1; each panel legibly identified for type, grade and species by APA grade mark.

### **2.2 LUMBER**

- A. General: Sizes dressed as shown, surfaced 4 sides; 19% maximum moisture content; air or kiln dried. Lumber 3 inches nominal and thicker shall be free of Heart Center.
- B. Lumber Grades:
  1. General: Douglas Fir-Larch; up to 4 inch nominal thickness - No. 2; over 4 inch nominal thickness - No. 1.
  2. Miscellaneous Framing:
    - a. Douglas Fir-Larch: Blocking, nailers, furring, bridging and stripping; No. 2 grade.
- C. Plywood: U.S. Product Standard PS 1
- D. Wood Treatment:
  1. General: Factory applied treatment, unless noted otherwise.
  2. Acceptable Manufacturers:
    - a. California Cascade-Woodland, Inc. or equal.
    - b. J. H. Baxter Company or equal.
  3. Alternate Manufacturers: Proposed equals are subject to substitution process per Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.

4. Wood Preservative
  - a. Pressure Treatment: AWWA Standard U1 using water borne preservative.
  - b. Surface Application: Clear type.

## **2.3 ROUGH HARDWARE**

### **A. Hangers, Clamps, Straps and Anchors:**

1. General: Types as shown.
2. Acceptable Manufacturers:
  - a. Simpson Strong Tie Co., Inc. or equal.
  - b. USP Structural Connectors, a Gibraltar Industries Company or equal.
3. Alternate Manufacturers: Comparable products with current ICC-ES approval and equal or greater rated load capacity, manufactured by USP Lumber Connectors. Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS. Submit ICC-ES Report approval for review for all alternate products.

### **B. Special Fabrications: Refer Section 05 50 00 - METAL FABRICATIONS.**

### **C. Fasteners:**

1. Nails: ASTM F1667, common wire; hot dip galvanized for pressure preservative treated work, exterior work, and as shown. Gun nails shall be full size with full heads and are subject to approval of architect. Box or sinker nails are not permitted.
2. Bolts and Nuts: ASTM A307, Grade A, including supplementary requirement S1; galvanized for exterior work.
3. Wood Screws: ANSI/ASME Standard B18.6.1; galvanized for exterior work.
4. Lag Screws: ANSI/ASME Standard B18.2.1; galvanized for exterior work.
5. Washers: Malleable iron or standard cut steel with steel lock washer; galvanized at exterior work.
6. Specialty Fasteners: Galvanized.
  - a. Acceptable Manufacturers:
    - i. Hilti, Inc. or equal.
    - ii. ITW Ramset/Readhead or equal.
7. Alternate Manufacturers: Comparable products with current ICC-ES approval and equal or greater rated load capacity; proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
8. Expansion Bolts: Kwik Bolt III or equal at masonry; Kwik Bolt TZ or equal at concrete.

9. Concrete Screws: Kwik Con II or equal.
10. Powder Actuated Fasteners: Hilti shot pin XU or equal; 2 7/8 inch length.

## **2.4 ADHESIVE**

- A. General: Per APA-AFG-01 for plywood floor sheathing.
- B. Acceptable Products: EnerBond SF, as manufactured by Wind-lock.
- C. Alternate Products: No known equals; proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.

## **2.5 CAULKING**

- A. Refer to Section 07 92 00 - JOINT SEALERS.

# **PART 3 - EXECUTION**

## **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

## **3.2 PREPARATION**

- A. Coordinate work specified elsewhere that affects the work of this Section.
- B. Take field measurements; report variance between plan and field dimensions.
- C. Protection:
  1. Security and Safety: Provide temporary protection and enclosures as required.
  2. Temporary Bracing: Provide bracing adequate to keep structure stable, plumb and in line; keep in place until permanent framing is completed. Provide bracing capable of supporting loads imposed by stockpiled material, erection equipment and other loads, during construction.

## **3.3 GENERAL ERECTION**

- A. Coordinate placement of anchors, inserts, etc., in concrete and masonry. Establish locations, lines, levels and provide cutting, patching and fitting as required to accommodate built-in Work specified in other Sections.
- B. Use new lumber; re-use not permitted unless authorized in writing by the Architect. Select lumber in a manner that allowable knots and obvious minor defects do not interfere with placement of bolts, nailing or structural connections.
- C. Layout as shown; set plates, nailing blocks, anchors, grounds, etc., as required.

- D. Brush apply 2 coats of preservative treatment on site-sawn cuts in pressure treated lumber. Allow preservative to dry prior to erecting members.
- E. Fasteners:
1. Nails: Per CBC Table 2304.9.1 unless otherwise noted. Space groups of nails no closer together than required penetration and not closer than one half of the required penetration from cut ends or edges of lumber. Prevent splitting due to nailing drill holes for nails no more than 0.75 diameter of nail. Where nails of normal length may penetrate through exposed work, use nail of specified diameter and shorter length. Bolts and Nuts: Use steel pieces as template for location of holes; drill holes 1/16-inch larger than diameter of bolts; tighten nuts or rods and bolts at time of installation. Re-tighten before covering up and just before final inspection and acceptance of the work; at exposed work, cut protruding bolt ends off to within 1/8-inch of nut and file off burrs.
  2. Washers: Install at bolts, nuts or lag screws bearing on wood; not required under heads of carriage bolts.
  3. Screws:
    - a. General: Hammering or driving in place not permitted. Use soap to lubricate screw threads, if required.
    - b. Lag Screws: Drill holes of same diameter and depth as shank; drill holes for threaded portion of screw no larger than 3/4 shank diameter.
    - c. Wood Screws: Drill lead holes for shank and threaded portions, hole diameter 7/8 of shank or thread root diameter.
  4. Powder Actuated Fasteners:
    - a. General: Install where shown or required; **DO NOT** install in structural connections required to carry computed stresses.
    - b. Application: Per Article 28, Powder-Actuated Tools, Paragraph 1685, of Title 8, CCR.

### 3.4 INSTALLATION

- A. General:
1. Structural Members:
    - a. General: Set level and plumb, in correct position; place horizontal members level, with crown side up.
    - b. Glue Laminated Beams: Provided under Section 06 18 13 - GLUE-LAMINATED BEAMS; do not erect until fabrication inspector's certificates have been reviewed by the Architect. Cut to length. No other cutting or notching is permitted, except as shown, or with written approval of the Architect.
    - c. Fabricated Wood Joists: Provided under Section 06 17 00 – SHOP FABRICATED STRUCTURAL WOOD. No cutting of flanges permitted; holes in web shall conform to manufacturer's requirements.

2. Framing Members: Construct full length without splices; notching permitted only with approval of the Architect.
3. Blocking:
  - a. General: Provide as shown and where necessary to obtain required lines and levels in finished surface and to provide solid nailing. Secure blocking plumb and rigid; use wood shims wherever necessary to form true and even plane for finish materials.
  - b. Firestopping: Provide per CBC at interior and exterior walls at intersection with floor, ceiling and roof, and at all hollow concealed spaces. Install minimum 2-inch nominal material by width of enclosed spaces within partition in continuous row to prevent vertical and horizontal draft. Maximum concealed air space of 10'-0" in any direction.
  - c. Backing: Provide blocking within walls where anchorage is required for equipment and accessories shown.
4. Recessed Fixtures: Frame openings for panel boxes and other equipment, as required for fixtures provided.

**B. Wall Framing:**

1. General: Wood studs as shown; frame openings with multiple studs at sides and headers as shown.
2. Framing for Piping: Provide proper clearances; furr partitions as required. At pipe 1-1/2 inches diameter, or less, set pipe in center of plate using neat holes; no notching allowed. Holes in plates less than 5-1/2 inches in width, not allowed.
3. Sheathing:
  - a. Orientation: Secure with long dimension parallel to studs, with joints located over studs or solid blocking and end joints staggered; nailing as shown.
  - b. Joints: Minimum 1/16-inch space at end joints and 1/8-inch at edge joints.
  - c. Penetrations: Penetration of structurally required sheathing to accommodate electrical or mechanical requirements must be approved in writing by the Architect.

**C. Miscellaneous Framing:**

1. General: Provide nailers, backing, and stripping as necessary to obtain required lines and levels in finished surface. Secure plumb and rigid; use wood shims where required. Provide backing required for wall or ceiling hung fixtures and equipment.
2. Caulking:
  - a. Energy Compliance: Apply during framing operations as required by CBC.
  - b. Sound-Rated Partitions: Install sole plates on double bead of acoustical sealant.
  - c. Thresholds: Set in full bed.
3. Ventilating Holes: Provide in indicated sizes where shown.

4. Mechanical and Electrical: Provide curbs, backing and blocking, as required for mechanical and electrical fixtures and equipment.

### **3.5 TOLERANCES**

- A. Install to allow application of subsequent finish materials within specified tolerances.

### **3.6 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. At completion clean exposed surfaces in a manner that will not damage finish.

**END SECTION 06 10 00**

**END DIVISION 6 – WOOD, PLASTICS AND COMPOSITES**

## **DIVISION 7 – THERMAL AND MOISTURE PROTECTION**

### **07 62 00 SHEET METAL FLASHING AND TRIM**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes flashing and sheet metal and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications, data, and installation instructions for review.
- B. Shop Drawings: Submit manufacture and installation details, including fastenings, for review.
- C. Samples: If specifically requested.
- D. Installer Qualifications: If requested, provide evidence that installers meet the requirements of Article 1.4.
- E. Closeout Submittals: Provide completed Guarantee form per Article 1.5.

##### **1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings. If a specific detail is not shown, use a detail from the SMACNA Manual appropriate to that condition.

##### **1.5 GUARANTEE**

- A. Provide in required form for a period of 2 years from date of acceptance by Owner.

##### **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Stack preformed material to prevent twisting, bending or abrasion; slope to ensure drainage.

## **PART 2 - PRODUCTS**

### **2.1 GALVANIZED SHEET METAL**

- A. Per ASTM A653, Grade A, G90 zinc coating; 24 gage minimum, core steel.

### **2.2 FASTENERS**

- A. General: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- B. Nails:
  - 1. General: FS FF-N-105
  - 2. Steel: Hot-dipped galvanized, annular thread, size as required.
  - 3. Concrete: Flat head, size as required.
- C. Rivets: 1/8 inch diameter; solid type.
- D. Washers: Lead or neoprene, where required.

### **2.3 SOLDER**

- A. General: ASTM B32; 50/50 type; lead free.
- B. Flux: FS A-A-51145D.

### **2.4 GALVANIZING REPAIR TREATMENT**

- A. Zinc Alloy Rod: Zinc-based solder Per ASTM A780.

### **2.5 PROTECTIVE COATINGS**

- A. Asphaltic Primer: ASTM D41
- B. Bituminous Paint: FS TT-C-494, Type II; bituminous.
- C. Backing Paint: Galvanized steel primer as specified in Section 09 90 00- PAINTING AND COATING.

### **2.6 SEALING TAPE**

- A. General: No. 606 Architectural Sealant Tape, as manufactured by Protective Treatments, Inc. or equal
- B. Alternate Manufacturers: No known equals; proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.

### **2.7 SEALANTS**

- A. Per FS TT-S-230, non-hardening, non-sagging.

## **2.8 REGLETS**

- A. General: Type STX, unless shown otherwise, manufactured by the Fry Reglet Corp. or equal; galvanized with butyl rubber sealer and removable snap-in base flashing.
- B. Corners: One piece pre-fabricated with minimum 18 inch long legs.

## **2.9 FABRICATION**

- A. General: Form sections from galvanized sheet metal, per referenced standards, true to shape, accurate in size, square, and free from distortion or defects. Form pieces in single length sheets, not to exceed 10'-0" in length. Hem exposed edges on underside 1/2 inch; miter and factory solder inside and outside corners. If a specific detail is not shown, use a detail from the SMACNA "Architectural Sheet Metal Manual" appropriate to that condition.
- B. Seams: Drive cleat or lock.
- C. Cleats: Minimum 2 inches wide, interlockable with sheet.
- D. Vertical Faces: Bottom edge formed outward 1/4 inch and hemmed to form drip.
- E. Flashing Toe: Extend toe 2 inches over roofing; return and brake edges.
- F. Soldering: Solder shop formed metal joints. Spot weld for permanent alignment. Solder joints water-tight. After soldering, remove flux; wipe and wash solder joints clean.
- G. Assemblies:
  - 1. Parapet Caps and Closures
  - 2. Pipe Chase: 14 gage as shown, with turnouts; weld and grind seams smooth. Miter offset spout ends that terminate over splash pans or splash blocks. Provide 1/8 inch thick x 1-1/2 inch wide galvanized metal straps. Color per exterior elevations.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Take field measurements; report variance between plan and field dimensions.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.

B. Underlayment:

1. General: Apply 1 layer of felt underlayment over surfaces as shown; lap all edges 6 inches minimum, in direction of slope.
2. Self-Adhered Flashing: Install as shown.

C. Application:

1. General: Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Fit sheet metal tight in place; secure using concealed fasteners. Apply plastic cement compound between metal flashings and felt flashings. Spot weld and solder metal joints watertight.
2. Expansion and Contraction: Allow for expansion and contraction over an ambient temperature range up to 150 degrees F; distortions resulting from fastening or expansion and contraction stresses not acceptable
3. Dissimilar Metals: Isolate with heavy coat of bituminous paint. Coat all sheet metal in contact with roofing felts.

D. Components:

1. Reglets: Install as shown; set flashing; spot weld and solder joints watertight.
2. Site Fabricated Seams: Install drive cleat seams per SMACNA.

E. Sealants: As shown; per manufacturer's directions.

F. Galvanizing Repair Treatment: Repair damaged zinc coating with specified repair compound, as required.

### 3.4 CLEANING

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

**END SECTION 07 62 00**

## 07 92 00 JOINT SEALANTS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes joint sealers and related work as shown and specified.

#### 1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, data, and installation instructions for review.
- B. Certificates: Submit certification that sealants proposed for use comply with the Contract Documents.
- C. Installer Qualifications: If requested, provide evidence that installers meet the requirements of Article 1.4.
- D. Closeout Submittals:
  - 1. Provide completed Guarantee form per Article 1.5.

#### 1.4 QUALITY ASSURANCE

- A. General: The manufacturer of the sealant used shall have been in the business of manufacturing the specified types of such sealants for not less than 10 years.
- B. Installer Qualifications: Minimum of 5 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.
- C. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by Federal and State EPA regulations.
- D. Compatibility with Substrate: Verify that caulking and sealants used are compatible with joint materials.
- E. Joint Tolerances: Comply with manufacturer's joint width to depth ratio limitations.
- F. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by state and local regulations.

#### 1.5 GUARANTEE

- A. Provide in required form for a period of 2 years from date of final acceptance by Owner.
- B. Provide material in manufacturer's standard form for a period of 5 years from date of acceptance by owner.

## **PART 2 - PRODUCTS**

### **2.1 JOINT SEALANTS**

- A. Acceptable Manufacturers:
  - 1. Tremco, Inc. or equal
  - 2. Sika or equal
  - 3. Pecora Corp. or equal
- B. Alternate Manufacturers: Proposed equals are subject to substitution process per Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- C. Exterior Joints:
  - 1. Vertical Surfaces: Non-sag polyurethane; Dymeric 240 FC.
  - 2. Horizontal Paving Joints: Self-leveling polyurethane; THC 900 or Sikaflex 2cSL; interior and exterior.
- D. Joint Cleaner: Provide cleaner recommended by sealant manufacturer for specific joint surface and condition.
- E. Joint Primer and Sealer: As recommended by sealant manufacturer for each condition.
- F. Bond Breaker Tape: Pressure sensitive polyethylene tape.
- G. Sand at Masonry: ASTM C144; silica.
- H. Other Materials: Manufacturer's standard for items required or type best suited for intended use.
- I. Colors:
  - 1. Exposed Joints: Match adjacent surface. Match Existing.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Environmental Requirements: Do not apply materials when temperature is below 40 degrees F, or under extreme temperature conditions when joint width is expanded or contracted beyond normal conditions.
- B. Surfaces: Prepare joints in accordance with manufacturer's recommended instruction to ensure maximum adhesion. Prime as required, protecting adjacent exposed surfaces.
- C. Sealants: Prepare sealant as required, including proper mixing of multicomponent sealants.
- D. Protect surfaces adjacent to joints to receive sealant. Cover joints in walking surfaces with heavy duty, non-staining tape, until material has dried.

### **3.2 EXAMINATION**

- A. General: Carefully examine before beginning work; report defects.
- B. Substrate: Inspect surfaces to insure that no bond-breaker materials contaminate the surface to which the sealant is to adhere and to ensure that unsound substrates are repaired.
- C. Storage: Per manufacturer's recommendations for proper precautions for shelf life, temperature, humidity and similar storage factors to ensure the fitness of the material when installed.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Prevent three-sided adhesion. Provide sealant depth of 1/2 joint width; minimum depth of 1/4 inch; maximum of 1/2 inch, unless otherwise required by the manufacturer.
- C. Backer Rod: Install using blunt or rounded tools to insure uniform (plus or minus 1/8 inch) depth without puncturing material. Oversize backer rod minimum of 33% for closed cell type, minimum of 50% for open cell type, unless otherwise required by the manufacturer.
- D. Thin Brick Joints: Provide sanded finish at sealed joints in or adjacent to thin brick to match appearance of thin brick mortar joints.

### **3.4 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. At completion clean exposed surfaces in a manner that will not damage finish.

**END SECTION 07 92 00**

**END DIVISION 7 – THERMAL AND MOISTURE PROTECTION**

**DIVISION 8 – OPENINGS**

**NONE**

**END DIVISION 8 – OPENINGS**

## **DIVISION 9 – FINISHES**

### **09 90 00 PAINTING AND COATING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes the following and related work as specified and shown:
  - 1. Paints.
  - 2. Stains.
  - 3. Painting materials.

##### **1.3 SUBMITTALS**

- A. Product Data: Submit manufacturer's specifications, data, and installation instructions for review.
- B. Match Existing
  - 1. Field Samples:
    - a. General: In place, on material scheduled to be finished, illustrating coating color, texture and finish. Locate where directed; accepted sample may remain as part of the Work.
    - b. Size: 8'-0" x 8'-0" panel, or 1 entire unit as scheduled to be finished.
- C. Certificates: Submit statement of VOC compliance with local regulations.
- D. Closeout:
  - 1. Extra Stock: Deliver 1% or a minimum of 1 unopened gallon of each color, type and surface texture of paint installed. Label each container with color, type, texture and room locations.
  - 2. Guarantee: Provide completed form per Article 1.5.

##### **1.4 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. American Society of Testing Materials (ASTM): Conform to ASTM D16 for interpretation of terms used in this Section.
  - 2. National Paint and Coatings Association (NPCA): Guide to U.S. Government Paint Specifications.

3. Painting and Decorating Contractors of America (PDCA): Painting - Architectural Specifications Manual.
4. Steel Structures Painting Council (SSPC): Steel Structures Painting Manual.

B. Qualifications:

1. Applicator: Specializing in performing the work of this Section with minimum 3 years documented experience.
2. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by state and local regulations.

## 1.5 GUARANTEE

- A. Provide in required form for a period of 2 years from date of final acceptance by Owner. Color and finish appearance shall remain unchanged throughout entire guarantee period.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Acceptable Paint and Stain Manufacturers

1. Dunn-Edwards Paint Corporation or equal
2. Kelly-Moore Company or equal
3. Frazee Industries, Inc. or equal
4. Sherwin-Williams or equal
5. AkzoNobel Glidden Professional (formerly ICI Dulux) or equal
6. PPG or equal

B. Alternate Manufacturers: Proposed equals are subject to substitution process per Section 01 33 00 - PRODUCT SUBMITTALS AND SUBSTITUTIONS.

C. Container Identification: Identify container with manufacturer's name, and include description of type of paint, brand name, lot number, brand code and color designation.

D. Paint Materials:

1. General: Provide ready mixed products, except field catalyzed coatings. Provide accessory materials such as linseed oil, shellac, thinners, cleaners and other materials not specifically indicated but required to achieve finishes specified.
2. Patching Material: Bondex latex filler.

3. Caulking Compound: Acrylic Latex manufactured by Tremco Inc., or approved equal.
4. Primers, Paints and Stains: Refer to Paint Schedules at end of this section for specific product requirements.

## **2.2 MIXING**

- A. General: Mix paints at the factory; do not alter or reduce materials except as directed by manufacturer.
- B. Colors: As selected by Architect from manufacturer's full range; factory mix match. No tinting of finish coats will be allowed at job site unless specifically approved by Architect.
- C. Mildew Resistance: Add fungicidal agent to paint per manufacturer's recommendations; approximately 4 ounces per gallon. Add agent at the factory; clearly indicate on label that paint is mildew resistant.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. General: Examine conditions of surfaces in place before beginning work; report defects.
- B. Shop Applied Primer: Test for compatibility with subsequent cover materials.
- C. Storage:
  1. General: Store in properly ventilated separate structure not less than 50'-0" from any other structure on the site.
  2. Temperature: Maintain minimum of 45 degrees F and a maximum of 90 degrees F.
  3. Fire Prevention: Take necessary precautions to prevent fire; remove paint-soiled rags and waste from building each day or store in metal containers with covers in the paint storage structure.
- D. Protection: Protect adjacent surfaces not scheduled for paint finish from damage resulting from painting operations.
- E. Surface Preparation:
  1. General: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing. Correct defects and clean surfaces that affect work of this section. Use Shellac to seal marks that may bleed through surface finishes.
  2. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
  3. Galvanized Surfaces: Remove surface contamination and oils; wash with solvent. Apply coat of etching primer.

4. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand/power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
5. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Verify compatibility of specified primer and paint with shop applied primer.

### **3.2 PREPARATION**

#### **A. Environmental Requirements:**

1. Relative Humidity Requirements: Do not apply exterior coatings during rain or snow, or when the relative humidity exceeds 85%.
2. Temperature:
  - a. General: Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the manufacturer.
  - b. Exterior Paints: 50 degrees F minimum during and for 48 hours after application; do not apply when temperature is over 85 degrees F, except in protected or shaded areas.
  - c. Interior Paints: 65 degrees F for minimum of 48 hours before, during and for 48 hours after application.
3. Ventilation: Provide adequate ventilation of all interior spaces during application and curing of all painting products.
4. Lighting Level: Provide minimum 80 foot candles measured at mid-height of room.

### **3.3 APPLICATION**

#### **A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified in Paint Schedules at end of this Section.**

#### **B. Performance:**

1. General: Apply each coat to uniform finish, slightly darker than preceding coat unless otherwise approved. As a minimum, dry film thickness of each coat shall meet manufacturer's specification.
2. Metal Surfaces: Sand lightly between coats to achieve required finish. Vacuum clean surfaces free of loose particles; use tack cloth just prior to applying next coat. Allow applied coat to dry before next coat is applied.
3. Clear Finishes: Tint fillers to match wood; work fillers into the grain before set and wipe excess from surface.

### **3.4 CLEANING**

- A. General: Upon completion, remove masking materials, reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing, and thoroughly clean all exposed surfaces per manufacturer's instructions. Keep premises free from accumulation of waste and debris. At completion of work remove surplus materials and debris.
- B. Touch-up: After detailed inspection of paint work, touch up or refinish abraded, stained or otherwise disfigured work, as required by the Architect.
- C. Cleaning: Remove containers, rags and debris from the site; observe special care in control or disposal of flammable materials.

### 3.5 PAINT SCHEDULES

EXTERIOR SURFACES								
SURFACE	PAINT TYPE	COATS	MANUFACTURER'S PAINT NUMBERS					
			DUNN-EDWARDS	KELLY-MOORE	FRAZEE	SHERWIN-WILLIAMS	GLIDDEN PROF.	PPG
Steel, Unprimed	Red Oxide Primer	1	BRPR00-1-RO)	1710	661	B66W310	4020	90-712
	Acrylic	2	SSHL50	1250	124	A100-A8	2406	90-1210
Steel, Shop Primed; [Existing Painted]	Metal Primer	Touch-up	BRPR00	1725	561	B66W310	4020	90-712
	Acrylic	2	SSHL50	5885	124	A100-A8	2406	90-1210
Steel, Galvanized	Galvanized Iron Primer	1	Rustoleum Bulls Eye 123	1711	661	B66W310	4020	90-712
	Acrylic	2	SSHL50	5885	124	A110-A8	2406	90-1210
Aluminum, Mill Finish	Acrylic Metal Primer	1	UGPR00	1725	168	B66W310	4020	90-712
	Acrylic	2	SSHL50	5885	124	A100-A8	2406	90-1210

INTERIOR SURFACES – 2010 CALGreen/2009 LEED									
SURFACE	PAINT TYPE	COATS	MANUFACTURER'S PAINT NUMBERS						
			DUNN-EDWARDS	KELLY-MOORE/	FRAZEE	SHERWIN-WILLIAMS/	GLIDDEN PROF./	PPG	SAFE COAT
<b>Wood, Electrical Back Boards</b>	Acrylic	2	Aristoglo 74V					42-7	
Steel, Unprimed	Red Oxide Primer	1	BRPR00(white) BRPR00-1-R) (red)	5725-120			B66W310	4020	90-712
	Enamel	2	EVSH50	1650			B31-2600/	1415	9-500
Steel, Primed;	Red Oxide Primer	Touch-up	BRPR00(white) BRPR00-1-R) (red)	5725-120			B66W310	4020	90-712
	Enamel	2	EVSH50	1650			B31-2600/	1415	9-500
Steel, Galvanized	Acrylic Galv. Primer	1	UGPR00	1725			B66W310	4020	90-712
	Enamel	2	EVSH50	1650			B31-2600/	1415	9-500
Aluminum, Mill Finish	Acrylic Metal Primer	1	UGPR00	1725			B66W310	4020	90-712
	Enamel	2	EVSH50	1650			B31-2600/	1415	9-500

**END SECTION 09 90 00**  
**END DIVISION 9 – FINISHES**

**DIVISION 10 – SPECIALTIES**

**NONE**

**END DIVISION 10 – SPECIALTIES**

**DIVISION 11 – EQUIPMENT**

**NONE**

**END DIVISION 11 – EQUIPMENT**

**DIVISION 12 – FURNISHINGS**

**NONE**

**END DIVISION 12 – FURNISHINGS**

**DIVISION 13 – SPECIAL CONSTRUCTION**

**NONE**

**END DIVISION 13 – SPECIAL CONSTRUCTION**

**DIVISION 14 – CONVEYING EQUIPMENT**

**NONE**

**END DIVISION 14 – CONVEYING EQUIPMENT**

## **DIVISION 16 – ELECTRICAL**

### **16050 BASIC MATERIAL**

#### **PART 1 - GENERAL**

##### **1.1 SUMMARY**

- A. This Section includes the following:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Common electrical installation requirements.

##### **1.2 DEFINITIONS**

- A. ATS: Acceptance Testing Specifications.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. NBR: Acrylonitrile-butadiene rubber.

##### **1.3 SUBMITTALS**

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

##### **1.4 QUALITY ASSURANCE**

- A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."

##### **1.5 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:
  - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  - 3. To allow right of way for piping and conduit installed at required slope.
  - 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed.
- D. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### **2.2 SLEEVES FOR RACEWAYS AND CABLES**

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Consider retaining first paragraph below if raceways or cables penetrate exterior walls below grade.
- C. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- E. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

### **2.3 SLEEVE SEALS**

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers:
    - a. Advance Products & Systems, Inc. or equal
    - b. Calpico, Inc. or equal
    - c. Metraflex Co. or equal
    - d. Pipeline Seal and Insulator, Inc. or equal

2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## **PART 3 - EXECUTION**

### **3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION**

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to raceways and piping systems installed at a required slope.

### **3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."
- C. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- D. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- E. Rectangular Sleeve Minimum Metal Thickness:
  1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
  2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- F. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

- G. Edit first paragraph below as required for 2-inch (50-mm) extension above floor.
- H. Cut sleeves to length for mounting flush with both surfaces of walls.
- I. Extend sleeves installed in floors 2 inches above finished floor level.
- J. Edit paragraph below as required for Project design conditions and seismic criteria status.
- K. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed or unless seismic criteria require a different clearance.
- L. Retain first paragraph below if external sealing is required.
- M. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- N. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- O. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with firestop materials.
- P. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- Q. Aboveground, Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- R. Underground, Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing mechanical sleeve seals.

### **3.3 SLEEVE-SEAL INSTALLATION**

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### **3.4 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

### **3.5 FIELD QUALITY CONTROL**

- A. Inspect installed sleeve and sleeve-seal installations and associated firestopping for damage and faulty work.

**END SECTION 16050**

**PART 1 - GENERAL****1.1 PRINCIPAL WORK IN THIS SECTION**

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions and conditions at the jobsite.
- C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

**1.2 SUBMITTALS**

- A. Refer to Section 01 33 00 - Submittals and Deviations.
- B. Submit O&M (Operation and Maintenance) manuals in accordance with Section 01 77 00 and as herein specified.
- C. Submit Manufacturers data and shop drawings.
  - 1. Qualification Data: For firms and persons specified in "Quality Assurance" Article.
  - 2. Field Test Reports: Submit written test reports to include the following:
    - a. Test procedures used.
    - b. Test results that comply with requirements.
    - c. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

**1.3 REFERENCE STANDARDS**

- A. California Building Code current at time of permit issuance.
- B. Title 24 California Code of Regulations.
- C. ADA – Americans with Disabilities Act.

**1.4 QUALITY ASSURANCE**

- A. Refer to Section 01 43 00 – Quality Control.
- B. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the International Electrical Testing Association and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  1. Comply with UL 467.
- D. Comply with CEC; for overhead-line construction and medium-voltage underground construction, comply with IEEE C2.
- E. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

## **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01 50 00 - Product Delivery, Storage and Handling.

## **1.6 JOB CONDITIONS**

- A. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

## **1.7 GUARANTEE / WARRANTY**

- A. Refer to Section 01 77 00 - Record Documents and Project Closeout.

## **1.8 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
- B. Complete instructions regarding maintenance of the materials, finishes, etc.
- C. Comply with Section 01 77 00 Record Documents and Project Closeout.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Single source responsibility, specified items shall be from one manufacturer for each product type.
- B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
  1. Grounding Conductors, Cables, Connectors, and Rods:
    - a. Copperweld Corp. or equal
    - b. Erico Inc.; Electrical Products Group or equal
    - c. Framatome Connectors/Burndy Electrical or equal
    - d. Ideal Industries, Inc. or equal

- e. ILSCO or equal
  - f. Kearney/Cooper Power Systems or equal
  - g. O-Z/Gedney Co.; a business of the EGS Electrical Group or equal
  - h. Reviewed equivalent by Owner or equal
- 2. Substitutions and deviations shall require Owner's approval and shall be given in letterform.
  - 3. Refer to Division 1.
  - 4. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
  - D. Refer to drawings, details, and other related specification section whether listed or not.
  - E. Details shall set basic requirements for size and configuration of systems.

## 2.2 GROUNDING CONDUCTORS

- A. For insulated conductors, comply with Division 16 Section "Conductors and Cables."
- B. Material: copper.
- C. Equipment Grounding Conductors: Insulated with green-colored insulation.
- D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.
- E. Grounding Electrode Conductors: Stranded cable.
- F. Concrete Encased Electrode: #4 bare copper, minimum 25 feet.
- G. Underground Conductors: Bare, tinned, solid, unless otherwise indicated.
- H. Bare Copper Conductors: Comply with the following:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Assembly of Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
- I. Copper Bonding Conductors: As follows:
  - 1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, 1/4 inch in diameter.

2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
  3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
- J. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

## **2.3 CONNECTOR PRODUCTS**

- A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.
- B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.
- C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

## **2.4 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad steel.
  1. Size: 5/8 inches in diameter by 96 inches in length.
- B. Test Wells: Provide handholes

# **PART 3 - EXECUTION**

## **3.1 INSPECTION / EXAMINATION**

- A. Verification of Conditions:
  1. Examine areas and conditions under which work is to be performed.
  2. Identify conditions detrimental to proper or timely completion of work and coordinate with general contractor to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.

## **3.2 COORDINATION**

- A. Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

## **3.3 PREPARATION**

- A. Refer to Section 01 31 00 - Project Coordination.

### 3.4 APPLICATION

- A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.
- B. In raceways, use insulated equipment grounding conductors.
- C. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells.
- D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.
- E. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.
- F. Underground Grounding Conductors: Use copper conductor, No. 2 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.

### 3.5 EQUIPMENT GROUNDING CONDUCTORS

- A. Comply with CEC, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by CEC are indicated.
- B. Install insulated equipment grounding conductor with circuit conductors for the following items, in addition to those required by CEC:
  - 1. Feeders and branch circuits.
  - 2. Flexible raceway runs.
- C. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- D. Nonmetallic Raceways: Install an equipment grounding conductor in all nonmetallic raceways unless they are designated for telephone or data cables.

### 3.6 INSTALLATION

- A. Ground Rods: If supplemental grounding rods are required, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
  - 1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
  - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.
- B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor

locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

- D. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.
- E. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.

### 3.7 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
  - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
  - 2. Make connections with clean, bare metal at points of contact.
  - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
  - 4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
  - 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.
- D. Noncontact Metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.
- E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.
- F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A.
- G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

- H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

### **3.8 FIELD QUALITY CONTROL**

- A. Testing: Contractor shall perform the following field quality-control testing:
  - 1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
  - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
  - 3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
    - a. Equipment Rated 500 kVA and Less: 10 ohms.
    - b. Manhole Grounds: 10 ohms.
  - 4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify County promptly and include recommendations to reduce ground resistance.

### **3.9 GRADING AND PLANTING**

- A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Section "Landscaping." Maintain restored surfaces. Restore disturbed paving as indicated.

### **3.10 PROTECTION AND CLEAN UP**

- A. Keep areas of work free from debris as work progresses.
  - 1. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- B. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- C. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no cost to the Owner.
- D. After completion of work in this section, remove all erection equipment and implements of service, and debris.

1. Leave entire area in a neat, clean, acceptable condition.
- E. Provide record drawings in accordance with Section 01 77 00 - Record Documents and Project Closeout.
- F. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01700 - Record Documents and Project Closeout.

**END SECTION 16060**

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.
  - 2. Construction requirements for concrete bases.
- B. Related Sections include the following:
  - 1. Division 16 Section "Raceways and boxes" for products and installation requirements necessary for compliance.

**1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of 5 times the applied force.

**1.5 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Steel slotted support systems.

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

## **1.6 QUALITY ASSURANCE**

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

## **1.7 COORDINATION**

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 7 Section "Roof Accessories."

## **PART 2 - PRODUCTS**

### **2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS**

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit or equal
    - b. Cooper B-Line, Inc.; a division of Cooper Industries or equal
    - c. ERICO International Corporation or equal
    - d. GS Metals Corp or equal
    - e. Thomas & Betts Corporation or equal
    - f. Unistrut; Tyco International, Ltd. or equal
  3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  6. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- (14-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c., in at least 1 surface.
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit or equal
    - b. Cooper B-Line, Inc.; a division of Cooper Industries or equal
    - c. Fabco Plastics Wholesale Limited or equal
    - d. Seasafe, Inc. or equal
  3. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
  4. Fitting and Accessory Materials: Same as channels and angles.
  5. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

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

## **2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES**

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with single-bolt conduit clamps using spring friction action for retention in support channel.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### **3.2 SUPPORT INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).
- C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.
  - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
  - 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69 or Spring-tension clamps.
  - 7. To Light Steel: Sheet metal screws.

8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

- D. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### **3.3 INSTALLATION OF FABRICATED METAL SUPPORTS**

- A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

### **3.4 CONCRETE BASES**

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 2500 psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 3 Section "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base.
  1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

### **3.5 PAINTING**

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touchup: Comply with requirements in Division 9 painting Sections for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**END SECTION 16073**

**PART 1 - GENERAL****1.1 PRINCIPAL WORK IN THIS SECTION**

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions at the jobsite.
- C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. This Section includes electrical identification materials and devices required to comply with ANSI C2, CEC, OSHA standards, and authorities having jurisdiction.

**1.2 REFERENCE STANDARDS**

- A. California Building Code current at time of permit issuance.
- B. Title 24 California Code of Regulations.
- C. ADA – Americans with Disabilities Act.

**1.3 SUBMITTALS**

- A. Refer to Section 01 33 00 - Submittals and Deviations.
- B. Submit O&M (Operation and Maintenance) manuals in accordance with Section 01700 and as herein specified.
- C. Submit Manufacturers data and shop drawings for each electrical identification product indicated.

**1.4 QUALITY ASSURANCE**

- A. Refer to Section 01 43 00 – Quality Control
- B. Comply with ANSI C2.
- C. Comply with CEC.

**1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01 50 00 - Product Delivery, Storage and Handling.

**1.6 JOB CONDITIONS**

- A. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

## **1.7 GUARANTEE / WARRANTY**

- A. Refer to Section 01 77 00 - Record Documents and Project Closeout.

## **1.8 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
- B. Complete instructions regarding maintenance of the materials, finishes, etc.
- C. Comply with Section 01 77 00 Record Documents and Project Closeout.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Single source responsibility, specified items shall be from one manufacturer for each product type.
- B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings or equal:
  - 1. Refer to documents and as herein specified.
  - 2. Reviewed equivalent by Owner.
    - a. Substitutions and deviations shall require Owner's approval and shall be given in letterform.
    - b. Refer to Division 1, Section 01 33 00 – Submittals and Deviatitons.
    - c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
- D. Refer to drawings, details, and other related specification section whether listed or not.
- E. Details shall set basic requirements for size and configuration of systems.

### **2.2 RACEWAY AND CABLE LABELS**

- A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
  - 1. Color: Black letters on orange field.
  - 2. Legend: Indicates voltage and service.
- B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend overlaminated with a clear, weather- and chemical-resistant coating.

- C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.
- D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
  - 1. Not less than 6 inches wide by 4 mils thick.
  - 2. Compounded for permanent direct-burial service.
  - 3. Embedded continuous metallic strip or core.
  - 4. Printed legend indicating type of underground line.
- F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- G. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.
- H. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.
- I. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.
- J. Brass or Aluminum Tags: 2 by 2 by 0.05-inch metal tags with stamped legend, punched for fastener.

### **2.3 NAMEPLATES AND SIGNS**

- A. Safety Signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.
- B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
  - 1. Engraved legend with black letters on white face.
  - 2. Punched or drilled for mechanical fasteners.
- C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. 1/4-inch grommets in corners for mounting.
- E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

## **2.4 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Cable Ties: Fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength: 50 lb minimum.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: According to color-coding.
- B. Paint: Formulated for the type of surface and intended use.
  - 1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
  - 2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
  - 3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
  - 4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION / EXAMINATION**

- A. Verification of Conditions:
  - 1. Examine areas and conditions under which work is to be performed.
  - 2. Identify conditions detrimental to proper or timely completion of work and coordinate with general contractor to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.

### **3.2 COORDINATION**

- A. Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

### **3.3 PREPARATION**

- A. Refer to Section 01040 - Project Coordination.

### **3.4 INSTALLATION**

- A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

- B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.
- C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before applying.
- E. Install painted identification according to manufacturer's written instructions and as follows:
  - 1. Clean surfaces of dust, loose material, and oily films before painting.
  - 2. Prime surfaces using type of primer specified for surface.
  - 3. Apply one intermediate and one finish coat of enamel.
- F. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
  - 1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
  - 2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
  - 3. Apply the following colors to the systems listed below:
    - a. Fire Alarm System: Red
    - b. Mechanical and Electrical Supervisory System: Green and blue
    - c. Telecommunication System: Green and yellow
- G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.
- H. Circuit Identification Labels on Boxes: Install labels externally.
  - 1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
  - 2. Concealed Boxes: Plasticized card-stock tags.
  - 3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.
- I. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker.

- J. Color-Coding of Secondary Phase Conductors: Use the following colors for feeder and branch-circuit phase conductors:
1. 208/120-V Conductors:
    - a. Phase A: Black.
    - b. Phase B: Red.
    - c. Phase C: Blue.
  2. Colors for 480/277-V Circuits:
    - a. Phase A: Brown.
    - b. Phase B: Orange.
    - c. Phase C: Yellow.
  3. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
    - a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch- wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
- K. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
1. Legend: 1/4-inch- steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
  2. Tag Fasteners: Nylon cable ties.
  3. Band Fasteners: Integral ears.
- L. Apply identification to conductors as follows:
1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
  2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
  3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.
- M. Apply warning, caution, and instruction signs as follows:
1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.

N. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with 1/2-inch- high lettering on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Electrical switchgear and switchboards.
4. Disconnect switches.
5. Enclosed circuit breakers.
6. Push-button stations.
7. Control devices.

### **3.5 PROTECTION AND CLEAN UP**

1. Refer to Section 01710 - Protection and Cleaning.
2. Keep areas of work free from debris as work progresses.
  - a. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- B. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- C. After completion of work in this section, remove all erection equipment and implements of service, and debris.
  1. Leave entire area in a neat, clean, acceptable condition.
- D. Provide record drawings in accordance with Section 01 77 00 - Record Documents and Project Closeout.
- E. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01 77 00 - Record Documents and Project Closeout.

**END SECTION 16075**

**PART 1 - GENERAL****1.1 PRINCIPAL WORK IN THIS SECTION**

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions at the jobsite.
- C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

**1.2 REFERENCE STANDARDS**

- A. California Building Code current at time of permit issuance
- B. Title 24 California Code of Regulations
- C. Refer to specifications, including, but not limited to Section 01080.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

**1.3 SUBMITTALS**

- A. Refer to Section 01 33 00 – Submittals and Deviations.
- B. Submit O & M (operation and Maintenance) manuals in accordance with Section 01700 and as herein specified.
- C. Submit Manufacturer's data and shop drawings.
  - 1. Product Data: For each type of product indicated.
  - 2. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

**1.4 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

## **1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01 50 00 - Product Delivery, Storage and Handling.

## **1.6 JOB CONDITIONS**

- A. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

## **1.7 GUARANTEE / WARRANTY**

- A. Refer to Section 01 77 00 - Record Documents and Project Closeout.

## **1.8 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
  - 1. Complete instructions regarding maintenance of the materials, finishes, etc.
  - 2. Comply with Section 01 77 00 Record Documents and Project Closeout.

## **1.9 RELATED WORK / SECTIONS**

- A. Related Sections include, but are not limited to the following:
  - 1. Section 16130 "Raceways and Boxes" for conduit, tray, and box requirements.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Single source responsibility, specified items shall be from one manufacturer for each product type.
- B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
  - 1. Refer to documents and as herein specified.
  - 2. Reviewed equivalent by Owner.
    - a. Substitutions and deviations shall require Owner's approval and shall be given in letterform.
    - b. Refer to Division 1, Section 01 33 00 – Submittals and Deviatons.
    - c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
- D. Refer to drawings, details, and other related specification section whether listed or not.

- E. Details shall set basic requirements for size and configuration of systems.

## **2.2 CONDUCTORS AND CABLES**

- A. Available Manufacturers:
  - 1. American Insulated Wire Corp.; a Leviton Company or equal
  - 2. General Cable Corporation or equal
  - 3. Senator Wire & Cable Company or equal
  - 4. Southwire Company or equal
- B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.
- C. Conductor Material: Copper complying with NEMA WC 5, not less than 98% conductivity. Solid conductor for No. 10 AWG and smaller, stranded for No. 8 AWG and larger.
- D. Conductor Insulation Types: Type THHN-THWN or XHHW complying with NEMA WC 5.
- E. Conductors shall be UL labeled, be color coded and be marked with gauge, type and manufacturer's name on 24" on center. Where stranded wire is used, solid pigtail shall be used for connection to screw terminals of receptacles, switches, etc.

## **2.3 CONNECTORS AND SPLICES**

- A. Available Manufacturers:
  - 1. AFC Cable Systems, Inc. or equal
  - 2. AMP Incorporated/Tyco International or equal
  - 3. Hubbell/Anderson or equal
  - 4. O-Z/Gedney; EGS Electrical Group LLC or equal
  - 5. 3M Company; Electrical Products Division or equal
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION / EXAMINATION**

- A. Verification of Conditions:
  - 1. Examine areas and conditions under which work is to be performed.

2. Identify conditions detrimental to proper or timely completion of work and coordinate with general contractor to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.

### **3.2 COORDINATION**

- A. Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.

### **3.3 PREPARATION**

- A. Refer to Section 01 31 00 - Project Coordination.

### **3.4 CONDUCTOR AND INSULATION APPLICATIONS**

- A. Service Entrance: Type XHHW, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspace: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.
- H. Underground Feeders and Branch Circuits: Type THHN-THWN, single conductors in raceway.
- I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.
- J. Fire Alarm Circuits: Power-limited, fire-protective, signaling circuit cable in raceway.
- K. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- L. Class 2 Control Circuits: Power-limited cable, concealed in building finishes.

### **3.5 INSTALLATION**

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Minimum wire size for power and lighting circuits shall be #12 AWG unless otherwise noted. Increase homeruns to #10 for 20 ampere, 120/208 volt circuits longer than 75 feet and for 20 ampere 277/480 circuits longer than 200 feet.
- F. When conductors are increased for voltage drop considerations, the conductors shall terminate in one of the following means:
  - 1. Provide larger breaker frame or panel
  - 2. Provide oversized lugs
  - 3. Splice pigtail at panel or box, only with approval of County.
- G. Support cables according to Division 16 Section "Basic Electrical Materials and Methods."
- H. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."
- I. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

### **3.6 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### **3.7 FIELD QUALITY CONTROL**

- A. Cable shall be delivered to the jobsite in original unbroken packages and shall be approved for use by the inspector prior to installation.
- B. Testing: Perform the following field quality-control testing:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
  - 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.
- C. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.

2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

### **3.8 PROTECTION AND CLEAN UP**

- A. Refer to Section 01 77 00 - Protection and Cleaning.
- B. Keep areas of work free from debris as work progresses.
  1. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- D. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Owner and at no cost to the Owner.
- E. After completion of work in this section, remove all erection equipment and implements of service, and debris.
  1. Leave entire area in a neat, clean, acceptable condition.
- F. Provide record drawings in accordance with Section 01700 - Record Documents and Project Closeout.
- G. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01 77 00 - Record Documents and Project Closeout.

**END SECTION 16120**

**PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 7 Section "Through-Penetration Firestop Systems" for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
  - 2. Division 16 Section "Seismic Controls for Electrical Work" for seismic restraints and bracing of raceways, boxes, enclosures, and cabinets.
  - 3. Division 16 Section "Wiring Devices" for devices installed in boxes and for floor-box service fittings.

**1.2 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. RMC, RSC, RMC: Rigid Metallic Conduit, Rigid Steel, Rigid Metallic Conduit.
- C. ENT: Electrical nonmetallic tubing.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. RNC: Rigid nonmetallic conduit.

**1.3 SUBMITTALS**

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.
- C. Shop Drawings: Signed and sealed by a qualified professional engineer.
  - 1. Design Calculations: Calculate requirements for selecting seismic restraints.
  - 2. Detail assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

- D. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:
  - 1. Ceiling suspension assembly members.
  - 2. Method of attaching hangers to building structure.
  - 3. Size and location of initial access modules for acoustical tile.
  - 4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  
- E. Manufacturer Seismic Qualification Certification: Submit certification that enclosures, cabinets, accessories, and components will withstand seismic forces defined in Division 16 Section "Seismic Controls for Electrical Work." Include the following:
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

## **1.4 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
  
- B. Comply with CEC.

## **1.5 COORDINATION**

- A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

## **2.2 METAL CONDUIT AND TUBING**

- A. Available Manufacturers:
  - 1. AFC Cable Systems, Inc. or equal
  - 2. Alflex Inc. or equal
  - 3. Anamet Electrical, Inc.; Anaconda Metal Hose or equal
  - 4. Electri-Flex Co. or equal
  - 5. Grinnell Co./Tyco International; Allied Tube and Conduit Div. or equal
  - 6. O-Z Gedney; Unit of General Signal or equal
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. Plastic-Coated Steel Conduit and Fittings: NEMA RN 1.
- E. Plastic-Coated IMC and Fittings: NEMA RN 1.
- F. EMT and Fittings: ANSI C80.3.
  - 1. Fittings: Steel, set screw or compression type.
- G. FMC: Zinc-coated steel.
- H. LFMC: Flexible steel conduit with PVC jacket.
- I. Fittings: NEMA FB 1; compatible with conduit and tubing materials.

## **2.3 NONMETALLIC CONDUIT AND TUBING**

- A. Available Manufacturers:
  - 1. Anamet Electrical, Inc.; Anaconda Metal Hose or equal
  - 2. Cantex Inc. or equal
  - 3. Condux International or equal
  - 4. Electri-Flex Co. or equal
  - 5. Lamson & Sessions; Carlon Electrical Products or equal
  - 6. RACO; Division of Hubbell, Inc. or equal
  - 7. Spiralduct, Inc./AFC Cable Systems, Inc. or equal

- B. ENT: NEMA TC 13.
- C. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.
- D. ENT and RNC Fittings: NEMA TC 3; match to conduit or tubing type and material.
- E. LFNC: UL 1660.

## **2.4 METAL WIREWAYS**

- A. Available Manufacturers:
  - 1. Square D or equal
  - 2. Hoffman or equal
  - 3. Wiremold Company (The); Electrical Sales Division or equal
- B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with CEC.
- E. Wireway Covers: Hinged type.
- F. Finish: Manufacturer's standard enamel finish.

## **2.5 NONMETALLIC WIREWAYS**

- A. Available Manufacturers:
  - 1. Hoffman or equal
  - 2. Lamson & Sessions; Carlon Electrical Products or equal
  - 3. Wiremold Company (The); Electrical Sales Division or equal
- B. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with CEC.

## **2.6 SURFACE RACEWAYS**

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating and paint to match adjacent surface.

1. Available Manufacturers:
  - a. Airey-Thompson Sentinel Lighting; Wiremold Company (The) or equal
  - b. Thomas & Betts Corporation or equal
  - c. Walker Systems, Inc.; Wiremold Company (The) or equal
  - d. Wiremold Company (The); Electrical Sales Division or equal
  
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.
  1. Available Manufacturers:
    - a. Butler Manufacturing Co.; Walker Division.
    - b. Hubbell, Inc.; Wiring Device Division.
    - c. Lamson & Sessions; Carlon Electrical Products.
    - d. Panduit Corp.
    - e. Walker Systems, Inc.; Wiremold Company (The).
    - f. Wiremold Company (The); Electrical Sales Division.
  
- C. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

## **2.7 BOXES, ENCLOSURES, AND CABINETS**

- A. Available Manufacturers:
  1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc. or equal
  2. Emerson/General Signal; Appleton Electric Company or equal
  3. Erickson Electrical Equipment Co. or equal
  4. Hoffman or equal
  5. Hubbell, Inc.; Killark Electric Manufacturing Co. or equal
  6. O-Z/Gedney; Unit of General Signal or equal
  
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
  
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.
  
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
  
- E. Floor Boxes: Cast metal, fully adjustable, rectangular.

- F. Floor Boxes: Nonmetallic, nonadjustable, round.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.
- J. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

## **2.8 FACTORY FINISHES**

- A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

## **PART 3 - EXECUTION**

### **3.1 RACEWAY APPLICATION**

- A. Outdoors:
  - 1. Exposed: Rigid steel or IMC.
  - 2. Concealed: Rigid steel or IMC.
  - 3. Underground, Single Run: RNC.
  - 4. Underground, Grouped: RNC.
  - 5. Underground: Schedule 40 PVC.
  - 6. Stub-ups from below grade to above grade: Schedule 80 PVC
  - 7. Pull boxes: PVC 40 terminated with endbells
  - 8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 9. Boxes and Enclosures: NEMA 250, Type 3R.
- B. Indoors:
  - 1. Exposed: RMC or EMT.

2. Concealed: EMT.
  3. Stub-ups through concrete floor or slab: double wrapped rigid steel or PVC coated rigid steel.
  4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFMC in damp or wet locations.
  5. Damp or Wet Locations: Rigid steel conduit.
  6. Indoor Exposed or Damp Wet Locations: RMC.
  7. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
    - a. Damp or Wet Locations: NEMA 250, Type 4, nonmetallic.
- C. Minimum Raceway Size: 3/4-inch trade size, except 1" for outdoor RNC underground.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Do not install aluminum conduits embedded in or in contact with concrete.

### **3.2 INSTALLATION**

- A. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- B. Complete raceway installation before starting conductor installation.
- C. Support raceways as specified in Division 16 Section "Basic Electrical Materials and Methods." Conduit shall be supported with two hole straps and shall be anchored as follows:
  1. Wood using lag bolts or screws
  2. Concrete using insert or expansion bolt
  3. Brick using expansion bolt
  4. Hollow masonry using toggle bolts.
- D. Straps shall be steel. Expanders and shields shall be steel.
- E. Install temporary closures to prevent foreign matter from entering raceways.

- F. All pull boxes shall be installed in accessible spaces. Do not install in finished areas unless approved by the county.
- G. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.
- H. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated. Provide no more than 270 degrees total bends between boxes or cabinets.
- I. Conduits shall terminate at a box or cabinet with a compression connector with insulated throat and insulated bushing for EMT. Provide plastic bell ends for PVC conduit.
- J. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
  - 1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.
- K. Conduits 1-1/2" and larger are to be installed in subgrade. Conduits 1-1/4" and smaller may be installed on subgrade, no more than one conduit high. Conduit crossing to occur below subgrade. Secure all conduits to prevent "floating" during concrete pour.
- L. Raceways Embedded in Slabs: Install in middle 1/3 of slab thickness where practical and leave at least 2 inches of concrete cover.
  - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
  - 2. Space raceways laterally to prevent voids in concrete.
  - 3. Run conduit larger than 1-inch trade size parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  - 4. Change from nonmetallic tubing or conduit to rigid steel conduit, or IMC before rising above the floor.
- M. Install exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
  - 1. Run parallel or banked raceways together on common supports.
  - 2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- N. Conduit installed above an acoustical ceiling shall be at least 12 inches above the grid.
- O. Install all utility conduits as per requirements from that utility. Coordinate installation of utility conduits with utility representative.
- P. Join raceways with fittings designed and approved for that purpose and make joints tight.
  - 1. Use insulating bushings to protect conductors.
- Q. Tighten compression type fittings with suitable tools.

- R. Terminations:
1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.
  2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.
  3. All conduits metal connected to panels and switchboards shall have a ground lug bushing connected to the equipment ground bus.
- S. Underground conduits to be a minimum of 24" below final grade to top of topmost conduit. Provide minimum 3" sand bedding at bottom of trench. Maintain separation of conduits per trench detail. Minimum size of underground conduit, outside of foundation, to be 1 inch. Minimum size within foundation to be ¾ inch.
- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- U. Telephone and Signal System Raceways: In addition to above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.
- V. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  2. Where otherwise required by CEC.
- W. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; PVC wrapped FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections. Grout or seal to provide a watertight penetration. RSC through slab shall be wrapped with PVC tape or PVC coated RSC.
- X. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use LFMC in damp or wet locations. Install separate ground conductor across flexible connections.
- Y. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.
- Z. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

### 3.3 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

### **3.4 CLEANING**

- A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

**END SECTION 16130**

## 16231.1 DIESEL ENGINE GENERATOR

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for standby power supply with the following features:
  - 1. Adjust list below to suit Project.
  - 2. Diesel engine.
  - 3. Unit-mounted cooling system.
  - 4. Unit-mounted and Remote-mounting control and monitoring.
  - 5. Performance requirements for sensitive loads.
  - 6. Load banks.
  - 7. Outdoor enclosure.
- B. Related Sections include the following:
  - 1. List below only products and equipment that the reader might expect to find in this Section but are specified elsewhere.
  - 2. Section 16415 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

#### 1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
  - 1. Thermal damage curve for generator.
  - 2. Time-current characteristic curves for generator protective device.

- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
  2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
  4. Wiring Diagrams: Power, signal, and control wiring.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that day tank, engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces per local and state requirements.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Source quality-control test reports.
1. Certified summary of prototype-unit test report.
  2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
  3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
  4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
  5. Report of sound generation.
  6. Report of exhaust emissions showing compliance with applicable regulations.

- 7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- C. Field quality-control test reports.
- D. Warranty: Special warranty specified in this Section.

## **1.6 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. Include the following:
  - 1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

## **1.7 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
  - 2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
  - 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

## **1.8 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
  - 1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
  - 2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.

- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with ASME B15.1.
- G. Comply with NFPA 37.
- H. Comply with NFPA 70.
- I. Comply with NFPA 99.
- J. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- K. Comply with UL 2200.
- L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
- M. Noise Emission: Comply with applicable state and local government requirements for maximum noise level at adjacent property boundaries due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

## **1.9 PROJECT CONDITIONS**

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Owner's written permission.
- B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
  - 1. Ambient Temperature: 5 to 40 deg C Minus 15 to plus 40 deg C.
  - 2. Relative Humidity: 0 to 95 percent.
  - 3. Altitude: Sea level to 2000 feet.

## **1.10 COORDINATION**

- A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

## **1.11 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 2 years from date of Substantial Completion.

## 1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Caterpillar; Engine Div. or equal
  - 2. Onan/Cummins Power Generation; Industrial Business Group or equal

### 2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
  - 1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.
- C. Capacities and Characteristics:
  - 1. Power Output Ratings: Nominal ratings as indicated.
  - 2. Output Connections: Three-phase, four wire.
  - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D. Generator-Set Performance:
  - 1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
  - 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
  - 3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.

4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.
  - a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.
2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.
  - a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

## 2.3 ENGINE

- A. Fuel: Fuel oil.
- B. Rated Engine Speed: 1800 rpm.
- C. Lubrication System: The following items are mounted on engine or skid:
  1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
  2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
  3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Engine Fuel System:
  1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
  2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
- E. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
  1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
  4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
  5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
    - a. Rating: 50-psig maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- F. Cooling System: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump.
  1. Configuration: horizontal air discharge.

2. Radiator Core Tubes: Aluminum.
  3. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
  5. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  6. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- G. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
1. Minimum sound attenuation of 25 dB at 500 Hz.
  2. Sound level measured at a distance of 10 feet from exhaust discharge after installation is complete shall be 85 dBA or less.
- H. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- I. Starting System: 12V - electric, with negative ground.
1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
  2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
  3. Cranking Cycle: As required by NFPA 110 for system level specified.
  4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
  5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
  6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
  7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
  8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:

- a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
- b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
- c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
- d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
- e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
- f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

## 2.4 FUEL OIL STORAGE

- A. Base-Mounted Fuel Oil Tank: Factory installed and piped, complying with UL 142 fuel oil tank. Features include the following:
  - 1. Tank level indicator.
  - 2. Capacity: Fuel for 24 hours continuous operation at 100 percent rated power output.
  - 3. Vandal-resistant fill cap.
  - 4. Containment Provisions: Comply with requirements of authorities having jurisdiction.

## 2.5 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

- D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.
- E. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:
1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
  2. Current and Potential Transformers: Instrument accuracy class.
- F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
1. AC voltmeter.
  2. AC ammeter.
  3. AC frequency meter.
  4. DC voltmeter (alternator battery charging).
  5. Engine-coolant temperature gage.
  6. Engine lubricating-oil pressure gage.
  7. Running-time meter.
  8. Ammeter-voltmeter, phase-selector switch(es).
  9. Generator-voltage adjusting rheostat.
  10. Fuel tank derangement alarm.
  11. Fuel tank high-level shutdown of fuel supply alarm.
  12. Generator overload.
- G. Indicating and Protective Devices and Controls:
1. AC voltmeter.
  2. AC ammeter.
  3. AC frequency meter.
  4. DC voltmeter (alternator battery charging).
  5. Engine-coolant temperature gage.

6. Engine lubricating-oil pressure gage.
  7. Running-time meter.
  8. Ammeter-voltmeter, phase-selector switch(es).
  9. Generator-voltage adjusting rheostat.
  10. Start-stop switch.
  11. Overspeed shutdown device.
  12. Coolant high-temperature shutdown device.
  13. Coolant low-level shutdown device.
  14. Oil low-pressure shutdown device.
  15. Fuel tank derangement alarm.
  16. Fuel tank high-level shutdown of fuel supply alarm.
  17. Generator overload.
- H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- I. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.
- J. Provide a complete and operational package for remotely monitoring generator. System shall have the following features:
1. Software is web based with graphical interface.
  2. Send emails on alarm conditions.
  3. Display emulates operation of remote annunciator.
- K. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
1. Overcrank shutdown.
  2. Coolant low-temperature alarm.
  3. Control switch not in auto position.
  4. Battery-charger malfunction alarm.
  5. Battery low-voltage alarm.

- L. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.
  - 1. Engine high-temperature shutdown.
  - 2. Lube-oil, low-pressure shutdown.
  - 3. Overspeed shutdown.
  - 4. Remote emergency-stop shutdown.
  - 5. Engine high-temperature prealarm.
  - 6. Lube-oil, low-pressure prealarm.
  - 7. Fuel tank, low-fuel level.
  - 8. Low coolant level.
- M. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.
- N. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

## **2.6 GENERATOR OVERCURRENT AND FAULT PROTECTION**

- A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.
  - 1. Tripping Characteristic: Designed specifically for generator protection.
  - 2. Trip Rating: As indicated on drawings.
  - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
  - 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
  - 1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
  - 2. Trip Settings: Selected to coordinate with generator thermal damage curve.
  - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
  - 4. Mounting: Adjacent to or integrated with control and monitoring panel.

- C. Generator Circuit Breaker: Insulated-case, electronic-trip type; 100 percent rated; complying with UL 489.
  - 1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
  - 2. Trip Settings: Selected to coordinate with generator thermal damage curve.
  - 3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
  - 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- D. Generator Disconnect Switch: Molded-case type, 100 percent rated.
  - 1. Rating: Matched to generator output rating.
  - 2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.
- E. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
  - 1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
  - 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
  - 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
  - 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.
- F. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

## **2.7 GENERATOR, EXCITER, AND VOLTAGE REGULATOR**

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H or Class F.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.

- F. Enclosure: Dripproof.
- G. Instrument Transformers: Mounted within generator enclosure.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
  - 1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.
- I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.
- K. Subtransient Reactance: 12 percent, maximum.

## 2.8 LOAD BANK

- A. Description: Permanent, outdoor, weatherproof, remote-controlled, forced-air-cooled, resistive unit capable of providing a balanced 3-phase, delta-connected load to generator set at 40 percent rated-system capacity. Unit shall be capable of selective control of load in 25 percent steps and with minimum step changes of approximately 5 and 10 percent available.
- B. Resistive Load Elements: Corrosion-resistant chromium alloy with ceramic and steel supports. Elements shall be double insulated and designed for repetitive on-off cycling. Elements shall be mounted in removable aluminized-steel heater cases.
- C. Reactive Load Elements: Epoxy-encapsulated reactor coils.
- D. Load-Bank Heat Dissipation: Integral fan with totally enclosed motor shall provide uniform cooling airflow through load elements. Airflow and coil operating current shall be such that, at maximum load, with ambient temperature at the upper end of specified range, load-bank elements operate at not more than 50 percent of maximum continuous temperature rating of resistance elements.
- E. Load Element Switching: Remote-controlled contactors switch groups of load elements. Contactor coils are rated 120 V. Contactors shall be located in a separate NEMA 250, Type 3R enclosure within load-bank enclosure, accessible from exterior through hinged doors with tumbler locks.
- F. Contactor Enclosures: Heated by thermostatically controlled strip heaters to prevent condensation.
- G. Load-Bank Enclosures: NEMA 250, Type 3R, complying with NEMA ICS 6. Louvers at cooling-air intake and discharge openings shall prevent entry of rain and snow. Openings for airflow shall be screened with 1/2-inch- (13-mm-) square, galvanized-steel mesh
- H. Protective Devices: Power input circuits to load banks shall be fused, and fuses shall be selected to coordinate with generator circuit breaker. Fuse blocks shall be located in contactor enclosure. Cooling airflow and overtemperature sensors shall automatically shut down and lock out load bank until manually reset. Safety interlocks on access panels and doors shall disconnect load power, control, and heater circuits. Fan motor shall be separately protected by overload and short-circuit devices. Short-circuit devices shall be noninterchangeable fuses with 200,000-A interrupting capacity.

- I. Remote-Control Panel: Separate from load bank in NEMA 250, Type 1 enclosure with a control power switch and pilot light, and switches controlling groups of load elements.
- J. Control Sequence: Control panel may be preset for adjustable single-step loading of generator during automatic exercising.

## **2.9 OUTDOOR GENERATOR-SET ENCLOSURE**

- A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
- B. Description: Prefabricated or preengineered walk-in enclosure with the following features:
  - 1. Construction: Galvanized-steel, metal-clad, integral structural-steel-framed building erected on concrete foundation.
  - 2. Structural Design and Anchorage: Comply with ASCE 7 for wind loads.
  - 3. Space Heater: Thermostatically controlled and sized to prevent condensation.
  - 4. Louvers: Equipped with bird screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust, birds, and rodents.
  - 5. Hinged Doors: With padlocking provisions.
  - 6. Ventilation: Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.
  - 7. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
  - 8. Muffler Location: Within enclosure.
- C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
  - 1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
  - 2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
- D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.
  - 1. AC lighting system and connection point for operation when remote source is available.
  - 2. DC lighting system for operation when remote source and generator are both unavailable.

- E. Convenience Outlets: Factory wired GFCI. Arrange for external electrical connection.

## **2.10 VIBRATION ISOLATION DEVICES**

- A. As provided by generator manufacture for an IBC seismically certified package.

## **2.11 SOURCE QUALITY CONTROL**

- A. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
  1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
  2. Full load run.
  3. Maximum power.
  4. Voltage regulation.
  5. Transient and steady-state governing.
  6. Single-step load pickup.
  7. Safety shutdown.
  8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
  9. Report factory test results within 10 days of completion of test.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.
- B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.

- C. Install packaged generator set as recommended by generator manufacture for an IBC-Certified package.
- D. Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

### **3.3 CONNECTIONS**

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.
- B. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.
- C. Connect engine exhaust pipe to engine with flexible connector.
- D. Ground equipment according to Section 16060 "Grounding and Bonding."
- E. Connect wiring according to Section 16120 "Conductors and Cables."

### **3.4 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- C. Contractor shall supply required fuel for testing and refill tank to 100% capacity after testing is complete.
- D. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- E. Tests and Inspections:
  - 1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
  - 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
    - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.
    - b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
    - c. Verify acceptance of charge for each element of the battery after discharge.

- d. Verify that measurements are within manufacturer's specifications.
- 4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
- 5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
- 6. Exhaust Emissions Test: Comply with applicable government test criteria.
- 7. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
- 8. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
- F. Coordinate tests with tests for transfer switches and run them concurrently.
- G. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
- H. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- I. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- J. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- K. Remove and replace malfunctioning units and retest as specified above.
- L. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
- M. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- N. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.
  - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
  - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  - 3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### **3.5 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators.

**END SECTION 16231.1**

## 16231.2 PROPANE ENGINE GENERATOR

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for standby power supply with the following features:
  - 1. Gas engine.
  - 2. Unit-mounted cooling system.
  - 3. Unit-mounted and Remote-mounting control and monitoring.
  - 4. Performance requirements for sensitive loads.
  - 5. Outdoor enclosure.
- B. Related Sections include the following:
  - 1. Section 16415 "Transfer Switches" for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

#### 1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.
- B. LP: Liquid petroleum.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
  - 1. Thermal damage curve for generator.
  - 2. Time-current characteristic curves for generator protective device.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.

2. Design Calculations: Signed and sealed by a qualified professional engineer. Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
3. Vibration Isolation Base Details: Signed and sealed by a qualified professional engineer. Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include base weights.
4. Wiring Diagrams: Power, signal, and control wiring.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Manufacturer Seismic Qualification Certification: Submit certification that engine-generator set, batteries, battery racks, accessories, and components will withstand seismic forces per local and state requirements.
  1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    - b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Qualification Data: For manufacturer.
- C. Source quality-control test reports.
  1. Certified summary of prototype-unit test report.
  2. Certified Test Reports: For components and accessories that are equivalent, but not identical, to those tested on prototype unit.
  3. Certified Summary of Performance Tests: Certify compliance with specified requirement to meet performance criteria for sensitive loads.
  4. Report of factory test on units to be shipped for this Project, showing evidence of compliance with specified requirements.
  5. Report of sound generation.
  6. Report of exhaust emissions showing compliance with applicable regulations.
  7. Certified Torsional Vibration Compatibility: Comply with NFPA 110.
- D. Field quality-control test reports.

- E. Warranty: Special warranty specified in this Section.

## **1.6 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals.
  - 1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.

## **1.7 MAINTENANCE MATERIAL SUBMITTALS**

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Fuses: One for every 10 of each type and rating, but no fewer than one of each.
  - 2. Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
  - 3. Filters: One set each of lubricating oil, fuel, and combustion-air filters.

## **1.8 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
  - 1. Maintenance Proximity: Not more than four hours' normal travel time from Installer's place of business to Project site.
  - 2. Engineering Responsibility: Preparation of data for vibration isolators and seismic restraints of engine skid mounts, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.
- B. Manufacturer Qualifications: A qualified manufacturer. Maintain, within 200 miles of Project site, a service center capable of providing training, parts, and emergency maintenance repairs.
- C. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL), and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- D. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- F. Comply with ASME B15.1.

- G. Comply with NFPA 37.
- H. Comply with NFPA 70.
- I. Comply with NFPA 99.
- J. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- K. Comply with UL 2200.
- L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
- M. Noise Emission: Comply with applicable state and local government requirements for maximum noise level due to sound emitted by generator set including engine, engine exhaust, engine cooling-air intake and discharge, and other components of installation.

## **1.9 PROJECT CONDITIONS**

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
  - 1. Notify Owner no fewer than two days in advance of proposed interruption of electrical service.
  - 2. Do not proceed with interruption of electrical service without Owner's written permission.
- B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
  - 1. Ambient Temperature: 5 to 40 deg C Minus 15 to plus 40 deg C.
  - 2. Relative Humidity: 0 to 95 percent.
  - 3. Altitude: Sea level to 2000 feet.

## **1.10 COORDINATION**

- A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

## **1.11 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 2 years from date of Substantial Completion.

## 1.12 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 2 months' full maintenance by skilled employees of manufacturer's designated service organization. Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Caterpillar; Engine Div. or equal
  - 2. Onan/Cummins Power Generation; Industrial Business Group or equal

### 2.2 ENGINE-GENERATOR SET

- A. Factory-assembled and -tested, engine-generator set.
- B. Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
  - 1. Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.
- C. Capacities and Characteristics:
  - 1. Power Output Ratings: Nominal ratings as indicated, with capacity as required to operate as a unit as evidenced by records of prototype testing.
  - 2. Output Connections: Three-phase, three wire.
  - 3. Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D. Generator-Set Performance:
  - 1. Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
  - 2. Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
  - 3. Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.

4. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
5. Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.
6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

E. Generator-Set Performance for Sensitive Loads:

1. Oversizing generator compared with the rated power output of the engine is permissible to meet specified performance.
  - a. Nameplate Data for Oversized Generator: Show ratings required by the Contract Documents rather than ratings that would normally be applied to generator size installed.
2. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.
3. Transient Voltage Performance: Not more than 10 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within 0.5 second.
4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.
5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
6. Transient Frequency Performance: Less than 2-Hz variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within three seconds.
7. Output Waveform: At no load, harmonic content measured line to neutral shall not exceed 2 percent total with no slot ripple. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 300 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or other generator system components.
9. Excitation System: Performance shall be unaffected by voltage distortion caused by nonlinear load.
  - a. Provide permanent magnet excitation for power source to voltage regulator.

10. Start Time: Comply with NFPA 110, Type 10, system requirements.

## 2.3 ENGINE

- A. Fuel: LP/Propane-gas
- B. Rated Engine Speed: 1800 rpm.
- C. Lubrication System: The following items are mounted on engine or skid:
  1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
  2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
  3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Engine Fuel System:
  1. Main Fuel Pump: Mounted on engine. Pump ensures adequate primary fuel flow under starting and load conditions.
  2. Relief-Bypass Valve: Automatically regulates pressure in fuel line and returns excess fuel to source.
  3. LP-Gas Vapor-Withdrawal) System:
    - a. Carburetor.
    - b. Secondary Gas Regulators.
    - c. Fuel-Shutoff Solenoid Valves.
    - d. Flexible Fuel Connectors.
- E. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.
- F. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
  1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.

4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
  5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
    - a. Rating: 50-psig (345-kPa) maximum working pressure with coolant at 180 deg F (82 deg C), and noncollapsible under vacuum.
    - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- G. Cooling System: Closed loop, liquid cooled, with remote radiator and integral engine-driven coolant pump.
1. Configuration: Horizontal air discharge.
  2. Radiator Core Tubes: Aluminum
  3. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
  4. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
  5. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
  6. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
- H. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
1. Minimum sound attenuation of 25 dB at 500 Hz.
  2. Sound level measured at a distance of 10 feet (3 m) from exhaust discharge after installation is complete shall be 85 dBA or less.
- I. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- J. Starting System: 12V electric, with negative ground.
1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
  2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
  3. Cranking Cycle: As required by NFPA 110 for system level specified.
  4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.

5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35-A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:
  - a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
  - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 deg C to plus 60 deg C to prevent overcharging at high temperatures and undercharging at low temperatures.
  - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
  - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
  - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
  - f. Enclosure and Mounting: NEMA 250, Type 1, wall-mounted cabinet.

## 2.4 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.

- D. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common wall-mounted control and monitoring panel.
- E. Configuration: Operating and safety indications, protective devices, basic system controls, engine gages, instrument transformers, generator disconnect switch or circuit breaker, and other indicated components shall be grouped in a combination control and power panel. Control and monitoring section of panel shall be isolated from power sections by steel barriers. Panel features shall include the following:
1. Wall-Mounting Cabinet Construction: Rigid, self-supporting steel unit complying with NEMA ICS 6. Power bus shall be copper. Bus, bus supports, control wiring, and temperature rise shall comply with UL 891.
  2. Current and Potential Transformers: Instrument accuracy class.
- F. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 1 system, and the following:
1. AC voltmeter.
  2. AC ammeter.
  3. AC frequency meter.
  4. DC voltmeter (alternator battery charging).
  5. Engine-coolant temperature gage.
  6. Engine lubricating-oil pressure gage.
  7. Running-time meter.
  8. Ammeter-voltmeter, phase-selector switch(es).
  9. Generator-voltage adjusting rheostat.
  10. Fuel tank derangement alarm.
  11. Fuel tank high-level shutdown of fuel supply alarm.
  12. Generator overload.
- G. Indicating and Protective Devices and Controls:
1. AC voltmeter.
  2. AC ammeter.
  3. AC frequency meter.
  4. DC voltmeter (alternator battery charging).
  5. Engine-coolant temperature gage.

6. Engine lubricating-oil pressure gage.
  7. Running-time meter.
  8. Ammeter-voltmeter, phase-selector switch(es).
  9. Generator-voltage adjusting rheostat.
  10. Start-stop switch.
  11. Overspeed shutdown device.
  12. Coolant high-temperature shutdown device.
  13. Coolant low-level shutdown device.
  14. Oil low-pressure shutdown device.
  15. Fuel tank derangement alarm.
  16. Fuel tank high-level shutdown of fuel supply alarm.
  17. Generator overload.
- H. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- I. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals.
- J. Provide a complete and operational package for remotely monitoring generator. System shall have the following features:
1. Software is web based with graphical interface.
  2. Send emails on alarm conditions.
  3. Display emulates operation of remote annunciator.
- K. Retain one of first two paragraphs and associated subparagraphs below or delete all. The Evaluations discuss what will be obtained by selecting first paragraph and subparagraphs. Coordinate with Drawings.
- L. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
1. Overcrank shutdown.
  2. Coolant low-temperature alarm.
  3. Control switch not in auto position.

4. Battery-charger malfunction alarm.
  5. Battery low-voltage alarm.
- M. Common Remote Audible Alarm: Signal the occurrence of any events listed below without differentiating between event types. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset.
1. Engine high-temperature shutdown.
  2. Lube-oil, low-pressure shutdown.
  3. Overspeed shutdown.
  4. Remote emergency-stop shutdown.
  5. Engine high-temperature prealarm.
  6. Lube-oil, low-pressure prealarm.
  7. Fuel tank, low-fuel level.
  8. Low coolant level.
- N. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.
- O. Remote Emergency-Stop Switch: Flush; wall mounted, unless otherwise indicated; and labeled. Push button shall be protected from accidental operation.

## **2.5 GENERATOR OVERCURRENT AND FAULT PROTECTION**

- A. Generator Circuit Breaker: Molded-case, electronic-trip type; 100 percent rated; complying with UL 489.
1. Tripping Characteristics: Adjustable long-time and short-time delay and instantaneous.
  2. Trip Settings: Selected to coordinate with generator thermal damage curve.
  3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
  4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B. Generator Disconnect Switch: Molded-case type, 100 percent rated.
1. Rating: Matched to generator output rating.
  2. Shunt Trip: Connected to trip switch when signaled by generator protector or by other protective devices.

- C. Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
  - 1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
  - 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
  - 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
  - 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.
- D. Ground-Fault Indication: Comply with NFPA 70, "Emergency System" signals for ground-fault. Integrate ground-fault alarm indication with other generator-set alarm indications.

## **2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR**

- A. Comply with NEMA MG 1.
- B. Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C. Electrical Insulation: Class H or Class F.
- D. Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E. Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F. Enclosure: Dripproof.
- G. Instrument Transformers: Mounted within generator enclosure.
- H. Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
  - 1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.
- I. Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- J. Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

## 2.7 OUTDOOR GENERATOR-SET ENCLOSURE

- A. Description: Vandal-resistant, weatherproof steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure.
- B. Description: Prefabricated enclosure with the following features:
  - 1. Construction: Galvanized-steel, metal-clad, integral structural-steel-framed building erected on concrete foundation.
  - 2. Structural Design and Anchorage: Comply with ASCE 7 for wind loads.
  - 3. Space Heater: Thermostatically controlled and sized to prevent condensation.
  - 4. Louvers: Equipped with bird screen and filter arranged to permit air circulation when engine is not running while excluding exterior dust, birds, and rodents.
  - 5. Hinged Doors: With padlocking provisions.
  - 6. Ventilation: Louvers equipped with bird screen and filter arranged to permit air circulation while excluding exterior dust, birds, and rodents.
  - 7. Thermal Insulation: Manufacturer's standard materials and thickness selected in coordination with space heater to maintain winter interior temperature within operating limits required by engine-generator-set components.
  - 8. Muffler Location: Within enclosure.
- C. Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
  - 1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
  - 2. Automatic Dampers: At engine cooling-air inlet and discharge. Dampers shall be closed to reduce enclosure heat loss in cold weather when unit is not operating.
- D. Interior Lights with Switch: Factory-wired, vaporproof-type fixtures within housing; arranged to illuminate controls and accessible interior. Arrange for external electrical connection.
  - 1. AC lighting system and connection point for operation when remote source is available.
  - 2. DC lighting system for operation when remote source and generator are both unavailable.
- E. Convenience Outlets: Factory wired, GFCI. Arrange for external electrical connection.

## 2.8 VIBRATION ISOLATION DEVICES

- A. As provided by generator manufacture for an IBC seismically certified package.

## **2.9 FINISHES**

- A. Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

## **2.10 SOURCE QUALITY CONTROL**

- A. Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
  - 1. Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.
- B. Project-Specific Equipment Tests: Before shipment, factory test engine-generator set and other system components and accessories manufactured specifically for this Project. Perform tests at rated load and power factor. Include the following tests:
  - 1. Test components and accessories furnished with installed unit that are not identical to those on tested prototype to demonstrate compatibility and reliability.
  - 2. Full load run.
  - 3. Maximum power.
  - 4. Voltage regulation.
  - 5. Transient and steady-state governing.
  - 6. Single-step load pickup.
  - 7. Safety shutdown.
  - 8. Provide 14 days' advance notice of tests and opportunity for observation of tests by Owner's representative.
  - 9. Report factory test results within 10 days of completion of test.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.
- B. Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 INSTALLATION**

- A. Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B. Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- C. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping and specialties.
- D. Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.
- E. Connect engine exhaust pipe to engine with flexible connector.
- F. Connect fuel piping to engines with a gate valve and union and flexible connector.
  - 1. LP-gas piping, valves, and specialties for gas piping as required by propone vendor.
  - 2. Ground equipment according to Section 16060 "Grounding and Bonding."
- G. Connect wiring according to Section 16120 "Conductors and Cables."

### **3.3 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- C. Perform tests and inspections and prepare test reports.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
  - 1. Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 2. NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
  - 3. Battery Tests: Equalize charging of battery cells according to manufacturer's written instructions. Record individual cell voltages.
    - a. Measure charging voltage and voltages between available battery terminals for full-charging and float-charging conditions. Check electrolyte level and specific gravity under both conditions.

- b. Test for contact integrity of all connectors. Perform an integrity load test and a capacity load test for the battery.
  - c. Verify acceptance of charge for each element of the battery after discharge.
  - d. Verify that measurements are within manufacturer's specifications.
4. Battery-Charger Tests: Verify specified rates of charge for both equalizing and float-charging conditions.
  5. System Integrity Tests: Methodically verify proper installation, connection, and integrity of each element of engine-generator system before and during system operation. Check for air, exhaust, and fluid leaks.
  6. Exhaust-System Back-Pressure Test: Use a manometer with a scale exceeding 40-inch wg (120 kPa). Connect to exhaust line close to engine exhaust manifold. Verify that back pressure at full-rated load is within manufacturer's written allowable limits for the engine.
  7. Exhaust Emissions Test: Comply with applicable government test criteria.
  8. Voltage and Frequency Transient Stability Tests: Use recording oscilloscope to measure voltage and frequency transients for 50 and 100 percent step-load increases and decreases, and verify that performance is as specified.
  9. Harmonic-Content Tests: Measure harmonic content of output voltage under 25 percent and at 100 percent of rated linear load. Verify that harmonic content is within specified limits.
  10. Noise Level Tests: Measure A-weighted level of noise emanating from generator-set installation, including engine exhaust and cooling-air intake and discharge, at four locations and compare measured levels with required values.
- E. Coordinate tests with tests for transfer switches and run them concurrently.
  - F. Test instruments shall have been calibrated within the last 12 months, traceable to standards of NIST, and adequate for making positive observation of test results. Make calibration records available for examination on request.
  - G. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - H. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - I. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
  - J. Remove and replace malfunctioning units and retest as specified above.
  - K. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.
  - L. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation resistances, time delays, and other values and observations. Attach a label or tag to each tested component indicating satisfactory completion of tests.

- M. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each power wiring termination and each bus connection. Remove all access panels so terminations and connections are accessible to portable scanner.
1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
  2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  3. Record of Infrared Scanning: Prepare a certified report that identifies terminations and connections checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### **3.4 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Section 01820 "Demonstration and Training."

**END SECTION 16231.2**

**PART 1 - GENERAL****1.1 PRINCIPAL WORK IN THIS SECTION**

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions and conditions at the jobsite.
- C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. This Section includes individually mounted enclosed switches and circuit breakers used for the following:
  - 1. Service disconnecting means.
  - 2. Feeder and branch-circuit protection.
  - 3. Motor and equipment disconnecting means.

**1.2 REFERENCE STANDARDS**

- A. California Building Code current at time of permit issuance
- B. Title 24 California Code of Regulations
- C. ADA – Americans with Disabilities Act
- D. Refer to specifications, including, but not limited to Section 01080.

**1.3 DEFINITIONS**

- A. GFCI: Ground-fault circuit interrupter.
- B. RMS: Root mean square.
- C. SPDT: Single pole, double throw.

**1.4 SUBMITTALS**

- A. Refer to Section 013300 – Submittals and Deviations.
- B. Submit O&M (Operation and Maintenance) manuals in accordance with Section 01700 and as herein specified.
- C. Submit Manufacturer's data and shop drawings.
  - 1. Product Data: For each type of switch, circuit breaker, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

2. Shop Drawings: For each switch and circuit breaker.
  - a. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
    - i. Enclosure types and details for types other than NEMA 250, Type 1.
    - ii. Current and voltage ratings.
    - iii. Short-circuit current rating.
    - iv. UL listing for series rating of installed devices.
    - v. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
  - b. Wiring Diagrams: Power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
- D. Manufacturer Seismic Qualification Certification: Submit certification that enclosed switches and circuit breakers, accessories, and components will withstand seismic forces defined in Division 16 Section "Seismic Controls for Electrical Work." Include the following:
  1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in "Quality Assurance" Article.
- F. Field Test Reports: Submit written test reports and include the following:
  1. Test procedures used.
  2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- G. Manufacturer's field service report.
- H. Maintenance Data: For enclosed switches and circuit breakers and for components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Closeout Procedures," include the following:

1. Routine maintenance requirements for components.
2. Manufacturer's written instructions for testing and adjusting switches and circuit breakers.
3. Time-current curves, including selectable ranges for each type of circuit breaker.

## **1.5 QUALITY ASSURANCE**

- A. Refer to Section 014300 – Quality Control.
- B. Testing Agency Qualifications: Testing agency that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
  1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NEMA AB 1 and NEMA KS 1.
- E. Comply with CEC.
- F. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

## **1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01630 - Product Delivery, Storage and Handling.

## **1.7 JOB CONDITIONS**

- A. Environmental Limitations: Rate equipment for continuous operation under the following conditions, unless otherwise indicated:
- B. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
- C. Altitude: Not exceeding 1,000 feet.

## **1.8 GUARANTEE / WARRANTY**

- A. Refer to Section 01000 – Division 1 – General Requirements.
- B. Refer to Section 01700 - Record Documents and Project Closeout.

## **1.9 RELATED WORK / SECTIONS**

- A. Related Sections include but are not limited to the following:

1. Section 16140 - Wiring Devices, for attachment plugs, receptacles, and toggle switches used for disconnecting means.
2. Section 16441 - Switchboards, for individually enclosed, fusible switches used as feeder protection.
3. Section 16491 - Fuses, for fusible devices.

### **1.10 EXTRA MATERIALS**

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
- B. Spares: For the following:
- C. Potential Transformer Fuses: 2
- D. Control-Power Fuses: 2
- E. Fuses and Fusible Devices for Fused Circuit Breakers: 2
- F. Fuses for Fused Switches: 2
- G. Fuses for Fused Power-Circuit Devices: 2
- H. Spare Indicating Lights: 6 of each type installed.

### **1.11 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
  1. Complete instructions regarding maintenance of the materials, finishes, etc.
  2. Comply with Section 017700 - Record Documents and Project Closeout.

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURERS**

- A. Single source responsibility, specified items shall be from one manufacturer for each product type.
- B. Acceptable manufacturers shall be one of the following and as herein listed and in Drawings:
  1. Fusible Switches:
    - a. Square D Co. or equal
    - b. Eaton Corp.; Cutler-Hammer Products or equal
    - c. General Electric Co.; Electrical Distribution & Control Division or equal
    - d. Siemens Energy & Automation, Inc. or equal

2. Molded-Case Circuit Breakers:
    - a. Square D Co. or equal
    - b. Eaton Corp.; Cutler-Hammer Products or equal
    - c. General Electric Co.; Electrical Distribution & Control Division or equal
    - d. Klockner-Moeller or equal
    - e. Siemens Energy & Automation, Inc. or equal
  3. Combination Circuit Breaker and Ground-Fault Trip:
    - a. Square D Co. or equal
    - b. Eaton Corp.; Cutler-Hammer Products or equal
    - c. General Electric Co.; Electrical Distribution & Control Division or equal
    - d. Siemens Energy & Automation, Inc. or equal
  4. Molded-Case, Current-Limiting Circuit Breakers:
    - a. Square D Co. or equal
    - b. Eaton Corp.; Cutler-Hammer Products or equal
    - c. General Electric Co.; Electrical Distribution & Control Division or equal
    - d. Siemens Energy & Automation, Inc. or equal
  5. Integrally Fused, Molded-Case Circuit Breakers:
    - a. Square D Co. or equal
    - b. Eaton Corp.; Cutler-Hammer Products or equal
    - c. General Electric Co.; Electrical Distribution & Control Division or equal
    - d. Siemens Energy & Automation, Inc. or equal
  6. Reviewed equivalent by Owner.
    - a. Substitutions and deviations shall require Owner's approval and shall be given in letterform.
    - b. Refer to Division 1, Section 01000 and Section 01300 – Submittals and Deviaitons.
    - c. Proposed alternate products must be equal in terms of chemical composition, color, finish, configuration, performance standards, etc.
- C. All products and materials indicated shall be installed according to current listed specification requirements and manufacturers specifications/recommendations.
- D. Refer to drawings, details, and other related specification section whether listed or not.

- E. Details shall set basic requirements for size and configuration of systems.

## **2.2 ENCLOSED SWITCHES**

- A. Enclosed, Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle.
- B. Enclosed, Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, with clips to accommodate specified fuses, lockable handle with two padlocks, and interlocked with cover in closed position.

## **2.3 ENCLOSED CIRCUIT BREAKERS**

- A. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
  - 1. Lugs: Mechanical style suitable for number, size, trip ratings, and material of conductors.
  - 2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
  - 3. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.

## **2.4 ENCLOSURES**

- A. NEMA AB 1 and NEMA KS 1 to meet environmental conditions of installed location.
  - 1. Outdoor Locations: NEMA 250, Type 3R.
  - 2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
  - 3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
  - 4. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7C.

## **2.5 FACTORY FINISHES**

- A. Manufacturer's standard prime-coat finish ready for field painting.
- B. Finish: Manufacturer's standard paint applied to factory-assembled and -tested enclosures before shipping.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION / EXAMINATION**

- A. Verification of Conditions:
  - 1. Examine areas and conditions under which work is to be performed.
  - 2. Identify conditions detrimental to proper or timely completion of work and coordinate with general contractor to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.

- B. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 COORDINATION**

- A. Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
- B. Coordinate layout and installation of switches, circuit breakers, and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels. Verify switching locations and fusing size with equipment manufacture.

### **3.3 PREPARATION**

- A. Refer to Section 01040 – Project Coordination.

### **3.4 INSTALLATION**

- A. Comply with mounting and anchoring requirements specified in Division 16 Section "Seismic Controls for Electrical Work."
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

### **3.5 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."
- B. Enclosure Nameplates: Label each enclosure with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

### **3.6 CONNECTIONS**

- A. Install equipment grounding connections for switches and circuit breakers with ground continuity to main electrical ground bus.
- B. Install power wiring. Install wiring between switches and circuit breakers, and control and indication devices.
- C. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.7 FIELD QUALITY CONTROL**

- A. Prepare for acceptance tests as follows:
- B. Test insulation resistance for each enclosed switch, circuit breaker, component, and control circuit.

- C. Test continuity of each line- and load-side circuit.
- D. Testing: After installing enclosed switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
- E. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
- F. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- G. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each enclosed switch and circuit breaker. Open or remove doors or panels so connections are accessible to portable scanner.
- H. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each unit 11 months after date of Substantial Completion.
- I. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
- J. Record of Infrared Scanning: Prepare a certified report that identifies switches and circuit breakers checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.8 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges.

### 3.9 PROTECTION AND CLEAN UP

- A. On completion of installation, inspect interior and exterior of enclosures. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.
- B. Keep areas of work free from debris as work progresses.
  - 1. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- C. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- D. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Owner** and at no cost to the **Owner**.
- E. After completion of work in this section, remove all erection equipment and implements of service, and debris.
  - 1. Leave entire area in a neat, clean, acceptable condition.

- F. Provide record drawings in accordance with Section 01700 - Record Documents and Project Closeout.
- G. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01700 - Record Documents and Project Closeout.

**END SECTION 16410**

# 16415 TRANSFER SWITCH

## PART 1 - GENERAL

### 1.1 PRINCIPAL WORK IN THIS SECTION

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions and conditions at the jobsite.
- C. Provide materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. Automatic Transfer Switch
- E. This Specification covers the supply of a (2) two complete operational automatic transfer switch systems rated:
  - 1. "ATS-A" - 100 Amps, 277/480 Volts, 3 Phase, 60HZ, 3 Pole
  - 2. "ATS-B" - 600 Amps, 277/480 Volts, 3 Phase, 60HZ, 4 Pole, switched neutral.

### 1.2 REFERENCE STANDARDS

- A. California Building Code current at time of permit issuance
- B. Title 24 California Code of Regulations
- C. ADA – Americans with Disabilities Act
- D. Refer to specifications, including, but not limited to Section 01080.

### 1.3 PERFORMANCE

- A. General
  - 1. The units shall be manufactured in accordance with this specification and applicable NEC, IEC, NEMA, UL, and ANSI standards.
  - 2. Supplier shall be responsible for ensuring the compatibility of all components of the units.
  - 3. The units shall be free of defects in material and workmanship.
  - 4. Shall be ASCO 7000 Series or approved equal.
- B. Related industry standards
  - 1. CSA-C22.2 No.178-1978 Automatic Transfer Switches
  - 2. UL-1008 Automatic Transfer Switches
  - 3. NEMA-No ICS 10 Industrial Control and Systems AC Transfer Switch Equipment

**1.4 SUBMITTALS**

- A. Refer to Section 01300 – Submittals and Deviations.
- B. Submit O & M (operation and Maintenance) manuals in accordance with Section 01700 and as herein specified.
- C. Submit Manufacturer’s data and shop drawings.

**1.5 QUALITY ASSURANCE**

- A. Refer to Section 014300 – Quality Control.

**1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01630 - Product Delivery, Storage and Handling.

**1.7 JOB CONDITIONS**

- A. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.

**1.8 RATINGS & CONSTRUCTION****A. AUTOMATIC TRANSFER SWITCH**

- 1. Rating of the automatic transfer switch “ATS-A” shall be minimum 100 ampere, 277/480VAC, 3 PHASE, 60 HZ, 3 Wire.
- 2. Rating of the automatic transfer switch “ATS-B” shall be minimum 600 ampere, 277/480VAC, 3 PHASE, 60 HZ, 4 Wire.
- 3. The entire enclosed unit shall be rated for 100% continuous operation without de-rating. The current rating shall be based on all classes of load including resistive, and motor loads.
- 4. Fault withstand current rating of the complete assembly shall be 65 Kamps RMS asymmetrical. The interrupting and closing rating shall be equal to or exceed the required withstand rating. This rating shall be obtained with standard upstream molded case circuit breaker protection. Transfer switches requiring upstream protection of fuses located outside the transfer switch shall not be acceptable.
- 5. The automatic transfer switch shall be tested and certified as a complete unit in accordance with the following standards and shall bear the applicable certification label:UL-1008 Automatic Transfer Switches
- 6. The complete assembly shall be mounted in a NEMA 1 enclosure.
- 7. All materials and parts used in the unit shall be new, of current manufacture, of best industrial grade, and free from defects and imperfections.
- 8. The transfer switch mechanism shall provide a simple means of manual operation using only components which are permanently affixed in the operating position.

9. The unit shall permit manual operation of the transfer switch while the system is energized and carrying rated load. Transfer switches which require all sources of power to be de-energized prior to manual load transferring shall not be acceptable.
10. All internal control devices used in the automatic transfer switch shall be capable of being de-energized and isolated from the system by use of an accessible isolation plug for servicing procedures as required.
11. The automatic transfer switch design shall provide front accessible components and wiring for easy serviceability. Power or control connections which are not readily serviceable while the transfer switch is mounted in its enclosure are not acceptable.
12. All internal bussing and wiring to be copper.
13. All power contacts used shall operate in a quick-make / quick-break manner, the speed of which shall be independent of supply voltage and / or speed of operation of manual means.

## **1.9 FUNCTIONAL REQUIREMENTS**

### **A. General description**

#### **1. Automatic transfer switch**

- a. The automatic transfer switch shall automatically transfer the load to the generator supply in the event of a utility supply failure and return the load to the utility supply upon restoration. The automatic transfer switch power switching devices shall be mechanically and electrically interlocked to prevent the utility and generator supplies from being interconnected.

### **B. Sequence of operation**

1. Note: For specific device settings refer to section "Control features."
2. When the voltage on any phase of the utility supply is below preset levels of rated voltage for a preset time delay, a contact shall close to initiate starting of the generator set.
3. The load shall transfer to the generator supply when the generator voltage and frequency have reached acceptable preset levels and the warm-up time delay has expired.
4. When the utility supply is restored to above preset levels of rated voltage on all phases, the load shall be retransfer to the utility supply following expiry of the utility return timer.
5. The load shall immediately retransfer to the utility supply (if within acceptable limits) should the generator supply fail prior to expiry of the utility transfer delay.
6. The generator set shall continue to operate following a load transfer for a cool down delay period, then a contact shall open to stop the generator set.
7. An "on load" test mode may be initiated which shall cause a simulated utility failure condition and transfer the load to the generator set as per the normal sequence.
8. The load shall immediately retransfer to the utility supply (if within acceptable limits) should the generator supply fail during a test mode.

C. Control features

1. Transfer switch control power must be obtained from the source being transferred to. The controls shall not require any connection to external power sources. Transfer switches requiring power from the engine starting (or other) battery are not acceptable.
2. A control circuit isolation plug shall be provided to isolate all control circuitry inside the transfer switch to facilitate maintenance procedures. When isolated, there shall be no voltage present on the control circuitry.
3. The transfer switch controller shall be microprocessor based and shall contain all voltage and frequency sensing, timing functions, and metering.
4. The transfer switch controller software program shall include a 3 level security password system for access to all programming functions. Specific password levels shall be provided for “read only”, “read/write” and “master”. All programming set points for voltage, frequency and time delays shall be software programmable from the front panel mounted keypad, and all parameters shall be displayed in alpha numeric format.
5. The transfer switch controller shall include an operator interface liquid crystal display (LCD) which is door mounted. The LCD shall display the following information:
  - a. System Time
  - b. Transfer switch position
  - c. Utility supply metering-3 phase voltage and frequency
  - d. Generator supply metering-3 phase voltage and frequency
  - e. Timer countdown display
  - f. Test mode operation indication
6. Digital metering provided by the transfer switch controller shall have an accuracy of +-1% for all voltage and frequency readings. Frequency shall be displayed to at least one decimal. Three phase line to line voltages shall be displayed for both generator and utility supplies.
7. Three phase under voltage sensing shall be provided for both utility and generator supplies. The under voltage sensing function shall be programmable as follows:
  - a. Under voltage pick-up 70-100% of nominal, factory set at 90%.
  - b. Under voltage dropout 70-100% of nominal, factory set at 80%.
  - c. Under voltage delay 0 - 10 seconds, factory set at 1 second.
8. Frequency sensing shall be provided for the generator supply to permit load transfer to the generator supply if within nominal limits. The generator frequency sensing function shall be programmable as follows:
  - a. Under frequency 40.0 - 60.0HZ, factory set at 57.0HZ.

- b. Under frequency time delay 0-10 seconds, factory set at 5 seconds.
  - c. Over frequency 50.0 - 70.0HZ, factory set at 63.0HZ .
  - d. Over frequency time delay 0-10 seconds, factory set at 5 seconds.
9. An engine start contact shall be provided which shall close to initiate starting of the engine. The engine start contact shall be rated 10A, 277VAC, 28VDC resistive (maximum).
  10. A time delay on engine start shall be provided to delay the engine start signal after failure of the utility source. The time delay shall be programmable 0 - 60 seconds, factory set at 2 seconds.
  11. A time delay for engine warm-up shall be provided which permits transfer to the generator supply after generator voltage and frequency exceed acceptable limits. The time delay shall be programmable 0 - 1800 seconds, factory set at 2 seconds.
  12. A time delay for retransfer to utility shall be provided which permits transfer to the utility supply only after stable voltage conditions exist for the specified time period. The time delay shall be programmable 0 - 30 minutes, factory set at 2 minutes.
  13. A time delay for engine cooldown shall be provided which delays the engine stop signal after load has retransferred to the utility source until the time delay period expires. The time delay shall be programmable 0 - 30 minutes, factory set at 2 minutes.
  14. Provision for operator-initiated system test modes shall be provided. Test modes shall be programmable for "off load" testing (load does not transfer to generator) or "on load" testing (load does transfer to generator).
  15. An automatic exercise time function shall be provided for generator testing. A 24hour, 7 day, single occurrence programmable time clock shall be provided. The time clock shall be programmable for test start and stop times (i.e. "day of week", "hour of day", and "minute of day", and type of test (e.g. "on load" or "off load").
  16. Control logic shall be provided for immediate transfer to the utility supply (if within acceptable limits) should the generator set fail during any activated test mode.
  17. Pilot lights shall be provided with mimic bus to indicate load on utility status(green) and load on generator status(red). Pilot lights to be long life LED type.
  18. Diagnostic LED's shall be provided on the transfer switch controller to allow simple visual indication of transfer switch operating condition. Individual LED's shall be provided for the following functions;
    - a. Watchdog (CPU running)
    - b. Transfer to Utility supply signal initiated
    - c. Transfer to Generator supply signal initiated
    - d. Engine start signal initiated
  19. The transfer switch controller shall provide a lamp test function to test all LED lights and LCD display.

20. The transfer switch shall include a solid neutral block, fully rated with suitably rated cable connection lugs.
21. Neutral Position Delay (NDT)
  - a. A neutral position delay time function shall be provided to minimize the effect of out-of-phase transfer due to connected motor load. The time delay shall be programmable 0 - 60 seconds, factory set at 3 seconds.
22. Not used
23. Four Function Test Switch (FTS4)A four function test switch shall be provided on the door of the transfer switch. The switch positions shall provide the following control functions:
  - a. Auto - The engine/generator shall automatically operate during a utility power failure condition as per the sequence of operation.
  - b. Engine start -The engine/generator set shall immediately start and operate unloaded. Note: the load shall automatically transfer to the generator should a utility power failure condition occur.
  - c. Test -The engine/generator set shall immediately start and shall transfer on load upon expiration of the warm-up delay. Note: The transfer switch shall automatically retransfer the load back to the utility supply should the generator set fail on load.
  - d. Off -The generator set shall be disabled from automatic starting due to a utility power fail condition.
24. Utility Supply Auxiliary Contacts (AUX-U)
  - a. Auxiliary contacts shall be provided which operate when the utility source is on load.
  - b. A Quantity of 1 auxiliary contacts shall be supplied with a rating of 10A, 277VAC resistive Form-C.
25. Generator Supply Auxiliary Contacts (AUX-G)
  - a. Auxiliary contacts shall be provided which operate when the generator is on load.
  - b. A Quantity of 1auxiliary contacts shall be supplied with a rating of 10A, 277VAC resistive Form-C.
26. Over voltage Sensing (OVS) - Three phase over voltage sensing shall be provided for both utility and generator supplies. The voltage sensing function shall be programmable as follows:
  - a. Over voltage pickup 100 - 130% of nominal, factory set at 110%.
  - b. Over voltage dropout 100 - 130% of nominal, factory set at 108%.
  - c. Over voltage time delay 0 - 10 seconds, factory set at 5 seconds.
27. Utility Frequency Sensing (UOF) Frequency sensing shall be provided for the utility supply to permit load transfer to the utility supply if within acceptable limits. Utility frequency sensing shall be programmable as follows:
  - a. Under frequency 40.0 - 60.0HZ, factory set at 57.0HZ.

- b. Under frequency time delay 0-10 seconds, factory set at 5 seconds.
  - c. Over frequency 50.0 - 70.0HZ, factory set at 63.0HZ .
  - d. Over frequency time delay 0-10 seconds, factory set at 5 seconds.
28. Utility Available Light (UAL) - A pilot light shall be provided to indicate the availability of the utility supply condition. Pilot light is to be green, LED type.
29. Generator Available Light (GAL) - A pilot light shall be provided to indicate the availability of the generator supply condition. Pilot light is to be green, LED type.
30. Generator Power Available Contacts (GPA) - Auxiliary contacts shall be provided which operate when generator power is available. A Quantity of 1 auxiliary contacts shall be supplied with a rating of 10A, 277VAC resistive Form-C.
31. Remote Communication Port (COM) - A remote communication port shall be provided to remotely monitor and control the transfer switch. The communication port shall be RS 422 with type RJ 45 connection. Communication port can be used in conjunction with external communication interface module (CIM) with multiple ports, protocol and modem, or it may be used independently with customer supplied equipment.
32. Negative Sequence Voltage Relay (NSV) - Negative sequence voltage relay shall be provided to protect against re-generative voltage from large motors or transformers during single phasing conditions.

#### **1.10 GUARANTEE / WARRANTY**

- A. Refer to Division 1 – General Requirements.
- B. Refer to Section 017700 - Record Documents and Project Closeout.

#### **1.11 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
  - 1. Complete instructions regarding maintenance of the materials, finishes, etc.
  - 2. Comply with Section 017700 - Record Documents and Project Closeout.

**END SECTION 16415**

# 16441 SWITCHBOARDS

## PART 1 - GENERAL

### 1.1 PRINCIPAL WORK IN THIS SECTION

- A. Coordinate the work in this Section with related trades.
- B. Verify applicable dimensions and conditions at the jobsite.
- C. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to complete the work.
- D. This Section includes service and distribution switchboards rated 600 V and less.

### 1.2 REFERENCE STANDARDS

- A. California Building Code current at time of permit issuance
- B. Title 24 California Code of Regulations, California Electric Code
- C. ADA – Americans with Disabilities Act
- D. Refer to specifications, including, but not limited to Section 01080.

### 1.3 DEFINITIONS

- A. EMI: Electromagnetic interference
- B. GFCI: Ground-fault circuit interrupter
- C. RFI: Radio-frequency interference
- D. RMS: Root mean square
- E. SPDT: Single pole, double throw
- F. TVSS: Transient voltage surge suppressor

### 1.4 SUBMITTALS

- A. Refer to Section 013300 – Submittals and Deviations.
- B. Submit O & M (operation and Maintenance) manuals in accordance with Section 01700 and as herein specified.
- C. Submit Manufacturer's data and shop drawings.
  - 1. Product Data: For each type of switchboard, overcurrent protective device, ground-fault protector, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

2. Shop Drawings: For each switchboard and related equipment.
  - a. Dimensioned plans, elevations, sections, and details, including required clearances and service space around equipment. Show tabulations of installed devices, equipment features, and ratings. Include the following:
    3. Enclosure types and details for types other than NEMA 250, Type 1.
    4. Bus configuration, current, and voltage ratings.
    5. Short-circuit current rating of switchboards and overcurrent protective devices.
    6. Descriptive documentation of optional barriers specified for electrical insulation and isolation.
    7. Mimic-bus diagram.
    8. UL listing for series rating of installed devices.
    9. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
      - a. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.
- D. Manufacturer Seismic Qualification Certification: Submit certification that switchboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 16 Section "Seismic Controls for Electrical Work." Include the following:
  1. Basis of Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  2. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event."
  3. The term "withstand" means "the unit will remain in place without separation of internal and external parts during a seismic event and the unit will be fully operational after the event."
  4. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  5. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Samples: Representative portion of mimic bus with specified finish, for color selection.
- F. Qualification Data: Submit data for testing agencies indicating that they comply with qualifications specified in "Quality Assurance" Article.
- G. Field Test Reports: Submit written test reports and include the following:
  1. Test procedures used.

2. Test results that comply with requirements.
  3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.
- H. Manufacturer's field service report.
- I. Updated mimic-bus diagram reflecting field changes after final switchboard load connections have been made, for record.
- J. Maintenance Data: For switchboards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section "Contract Closeout," include the following:
1. Routine maintenance requirements for switchboards and all installed components.
  2. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
  3. Time-current curves, including selectable ranges for each type of overcurrent protective device.

## **1.5 QUALITY ASSURANCE**

- A. Refer to Section 01450 – Quality Control.
- B. Testing Agency Qualifications: Testing agency that is a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.
1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with NEMA PB 2.
- E. Comply with CEC.
- F. Switchboards shall be listed to UL 891.
- G. Product Selection for Restricted Space: Drawings indicate maximum dimensions for switchboards, including clearances between switchboards, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

## **1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Comply with Section 01630 - Product Delivery, Storage and Handling.
- B. Deliver in sections of lengths that can be moved past obstructions in delivery path.
- C. Store indoors in clean dry space with uniform temperature to prevent condensation. Protect from exposure to dirt, fumes, water, corrosive substances, and physical damage.

- D. If stored in areas subjected to weather, cover switchboards to provide protection from weather, dirt, dust, corrosive substances, and physical damage. Remove loose packing and flammable materials from inside switchboards; install electric heating (250-W per section) to prevent condensation.
- E. Handle switchboards according to NEMA PB 2.1.

## **1.7 JOB CONDITIONS**

- A. Field verify that all components, backing, etc. by others are installed correctly to proceed with installation of products as herein specified.
- B. Installation Pathway: Remove and replace access fencing, doors, lift-out panels, and structures to provide pathway for moving switchboards into place.
- C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Architect not less than seven days in advance of proposed utility interruptions. Identify extent and duration of utility interruptions.
  - 2. Indicate method of providing temporary utilities.
  - 3. Proceed with utility interruptions only after receiving Architect's written authorizations.
- D. Environmental Limitations: Rate equipment for continuous operation under the following, unless otherwise indicated:
  - 1. Ambient Temperature: Not exceeding 104 deg F.
  - 2. Altitude: Not exceeding 1,000 feet.
- E. Service Conditions: NEMA PB2, usual service conditions, as follows:
  - 1. Altitude not exceeding 1,000 feet.
  - 2. Ambient temperatures within limits specified.

## **1.8 GUARANTEE / WARRANTY**

- A. Refer to Section 01000 – Division 1 – General Requirements.
- B. Refer to Section 01700 - Record Documents and Project Closeout.

## **1.9 EXTRA MATERIALS**

- A. Spares: For the following:
  - 1. Potential transformer fuses.
  - 2. Control-poseur fuses.

3. Fuses and fusible devices for fused circuit breakers.
  4. Fuses for fused switches.
  5. Fuses for fused power-circuit devices.
- B. Spare Indicating Lights: Six of each type installed.

## **1.10 OPERATION AND MAINTENANCE DATA**

- A. Submit as part of project closeout:
1. Complete instructions regarding maintenance of the materials, finishes, etc.
  2. Comply with Section 01700 - Record Documents and Project Closeout.

## **1.11 RELATED WORK / SECTIONS**

- A. Related Sections include, but are not limited to the following:
1. Section 16491 - Fuses

## **PART 2 - PRODUCTS**

### **2.1 ACCEPTABLE MANUFACTURER**

- A. Custom switchboard/ATS as indicated on drawings, Industrial Electric MFG or equal
- B. Refer to drawings, details, and other related specification section whether listed or not.
- C. Details shall set basic requirements for size and configuration of systems.

### **2.2 MANUFACTURED UNITS**

- A. Front-Connected, Front-Accessible Switchboard: Fixed, individually mounted main device, panel-mounted branches, and sections front and rear aligned.
- B. Nominal System Voltage: 480Y/277 V.
- C. Main-Bus Continuous: Amperage as per drawings.

### **2.3 FABRICATION AND FEATURES**

- A. Enclosure Finish for Indoor Units: Factory-applied finish in manufacturer's standard gray finish over a rust-inhibiting primer on treated metal surface.
- B. Barriers: Between adjacent switchboard sections.
- C. Insulation and isolation for main and vertical buses of feeder sections.
- D. Bus Transition and Incoming Pull Sections: Matched and aligned with basic switchboard.

- E. Removable, Hinged Rear Doors and Compartment Covers: Secured by captive thumb screws, for access to rear interior of switchboard.
- F. Hinged Front Panels: Allow access to circuit-breaker, metering, accessory, and blank compartments.
- G. Buses and Connections: Three phase, four wire, unless otherwise indicated. Include the following features:
  - 1. Phase- and Neutral-Bus Material: Hard-drawn copper of 98 percent conductivity.
  - 2. Load Terminals: Insulated, rigidly braced, silver-plated, copper runback bus extensions equipped with pressure connectors for outgoing circuit conductors. Provide load terminals for future circuit-breaker positions at full ampere rating of circuit-breaker position.
  - 3. Ground Bus: 1/4-by-2-inch minimum size, drawn-temper copper of 98 percent conductivity, equipped with pressure connectors for feeder and branch-circuit ground conductors. For busway feeders, extend insulated equipment grounding cable to busway ground connection and support cable at intervals in vertical run. Ground bus shall extend the full length of the switchboard.
  - 4. Contact Surfaces of Buses: Silver plated.
  - 5. Main Phase Buses, Neutral Buses, and Equipment Ground Buses: Uniform capacity for entire length of switchboard's main and distribution sections. Provide for future extensions from both ends. All bussing shall be A-B-C type left to right, front to back, top to bottom.
  - 6. Isolation Barrier Access Provisions: Permit checking of bus-bolt tightness.
  - 7. Neutral Buses: 100 percent of the ampacity of the phase buses, unless otherwise indicated, equipped with pressure connectors for outgoing circuit neutral cables. Neutral bus shall be located within 20 inches from front of switchboard.
- H. Future Devices: Equip compartments with mounting brackets, supports, bus connections, and appurtenances at full rating of circuit-breaker compartment.
- I. All devices shall be fully rated. Series rating is not allowed.
- J. Bus-Bar Insulation: Factory-applied, flame-retardant, 105 deg C minimum tape wrapping of individual bus bars or flame-retardant, spray-applied insulation of same temperature rating.

## **2.4 OVERCURRENT PROTECTIVE DEVICES**

- A. Molded-Case Circuit-Breaker Features and Accessories: Standard frame sizes, trip ratings, and number of poles.
  - 1. Lugs: Compression style, suitable for number, size, trip ratings, and material of conductors.
  - 2. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
  - 3. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function

## **2.5 IDENTIFICATION**

- A. Mimic Bus: Continuously integrated mimic bus factory applied to front of switchboard. Arrange in single-line diagram format, using symbols and letter designations consistent with final mimic-bus diagram. Coordinate mimic-bus segments with devices in switchboard sections to which applied. Produce a concise visual presentation of principal switchboard components and connections.
- B. Each circuit breaker or load device shall be identified with laminated phenolic plate showing load served.
- C. Presentation Media: Painted graphics in color contrasting with equipment factory-finished background to represent bus and components, complete with lettered designations.
- D. Switchboard Arc Flash Hazard Rating
  - 1. Provide field marking to warn persons of potential electric arc flash hazards.
  - 2. The marking shall be so located so as to be clearly visible to qualified persons before examination, adjustment or servicing of the equipment.

## **PART 3 - EXECUTION**

### **3.1 INSPECTION / EXAMINATION**

- A. Verification of Conditions:
  - 1. Examine areas and conditions under which work is to be performed.
  - 2. Identify conditions detrimental to proper or timely completion of work and coordinate with general contractor to rectify. Prior to all work of this Section, carefully inspect and verify that the installed work of all other trades is complete to the point where this work may properly commence.
- B. Examine elements and surfaces to receive switchboards for compliance with installation tolerances and other conditions affecting performance.
  - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 COORDINATION**

- A. Contractor shall coordinate work as herein specified, in accordance with drawings and as required to complete scope of work with all related trades.
- B. Coordinate layout and installation of switchboards and components with other construction, including conduit, piping, equipment, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- C. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."

### **3.3 PREPARATION**

- A. Refer to Section 01040 - Project Coordination.

### **3.4 PROTECTION**

- A. Temporary Heating: Apply temporary heat to maintain temperature according to manufacturer's written instructions.

### **3.5 INSTALLATION**

- A. Install switchboards and accessories according to NEMA PB 2.1.
- B. The switchboard shall be plumb and true with all sections the same height.
- C. Support switchboards on concrete bases, 4-inch nominal thickness.
- D. Comply with mounting and anchoring requirements specified in Division 16 Section "Seismic Controls for Electrical Work."
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from switchboard units and components.
- F. Operating Instructions: Frame and mount the printed basic operating instructions for switchboards, including control and key interlocking sequences and emergency procedures. Fabricate frame of finished wood or metal and cover instructions with clear acrylic plastic. Mount on front of switchboards.

### **3.6 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Division 16 Section "Electrical Identification."
- B. Switchboard Nameplates: Label each switchboard compartment with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws.

### **3.7 CONNECTIONS**

- A. Install equipment grounding connections for switchboards with ground continuity to main electrical ground bus.
- B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### **3.8 FIELD QUALITY CONTROL**

- A. Prepare for acceptance tests as follows:
  - 1. Test insulation resistance for each switchboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.

- B. Testing Agency: Engage a qualified independent testing agency to perform specified testing, including of GFI setting and testing of main circuit breaker.
- C. Testing: After installing switchboards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
  - 1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Sections 7.1, 7.5, 7.6, 7.9, 7.10, 7.11, and 7.14 as appropriate. Certify compliance with test parameters.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each switchboard. Remove front panels so joints and connections are accessible to portable scanner.
  - 1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switchboard 11 months after date of Substantial Completion.
  - 2. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
  - 3. Record of Infrared Scanning: Prepare a certified report that identifies switchboards checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

### 3.9 ADJUSTING

- A. Set field-adjustable switches and circuit-breaker trip ranges.

### 3.10 PROTECTION AND CLEAN UP

- A. Refer to Section 01710 - Protection and Cleaning.
- B. On completion of installation, inspect interior and exterior of switchboards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.
- C. Keep areas of work free from debris as work progresses.
  - 1. Subcontractor will keep the work areas in a clean and safe condition so his rubbish, waste and debris do not interfere with the work of others.
- D. Protect work and materials of this Section prior to and during installation, and protect the installed work and materials of other trades.
- E. In the event of damage, immediately make all repairs and replacements necessary to the approval of the **Owner** and at no cost to the **Owner**.
- F. After completion of work in this section, remove all erection equipment and implements of service, and debris.

1. Leave entire area in a neat, clean, acceptable condition.
- G. Provide record drawings in accordance with Section 01700 - Record Documents and Project Closeout.
- H. Provide Guarantee / Warranties and Bonds as required in this specification section and as listed in Section 01700 - Record Documents and Project Closeout.

**END SECTION 16441**

**END DIVISION 16 – ELECTRICAL**

## **DIVISION 31 – EARTHWORK**

### **31 00 00 EARTHWORK AND TRENCHING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes earthwork and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Test Reports: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES

##### **1.4 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. Local Jurisdictions: Perform work in accordance with municipal agency and utility company standards and requirements.
  - 2. American Association of State Highway and Transportation Officials (AASHTO): Standards.
  - 3. American National Standards Institute (ANSI): Standards.
  - 4. American Society of Testing Materials (ASTM):
    - a. General: Materials and testing standards as identified throughout this Section.
    - b. ASTM D2487: Classification of Soils for Engineering Purposes.
  - 5. State of California, Department of Transportation: Standard Specifications.
  - 6. California Occupational Safety and Health Administration (CalOSHA): Construction Safety Orders.
  - 7. California State Industrial Accident Commission (CSIAC): Trench Construction Safety Orders.
  - 8. U.S. Occupational Safety and Health Administration (OSHA): Standards - 29 CFR, PART 1926 Safety and Health Regulations for Construction, Subpart P - Excavations.
  - 9. California Environmental Protection Agency Department of Toxic Substances Control (DTSC): Information Advisory Clean Imported Fill.
- B. Testing: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.

1. Geotechnical Engineer: A Geotechnical Engineer will be retained by the Owner to observe performance of and determine compliance with excavation, trenching, soil treatment, filling, backfilling and grading requirements; and perform testing.
2. Retesting: Paid for by School District and deducted from cost of Contract.

## **PART 2 - PRODUCTS**

### **2.1 FILL MATERIALS:**

- A. Engineered Fill: Approved native on-site materials supplemented with approved import material as needed. Imported soil must meet the guidelines established in the "Information Advisory for Clean Imported Fill" published by the DTSC. Approval of soil to be imported must be obtained prior to delivery to site.
  1. On-Site Fill: On-site native soil; free of organic or deleterious material; no rocks or lumps larger than 3 inches in any dimension.
- B. Trench Backfill: On-site native soil; free of organic or deleterious material; no rocks or lumps larger than.
- C. Aggregate Fill:
  1. General: Materials free of silt, clay, loam, shale, friable or soluble materials, debris, vegetation and foreign matter.
  2. Sand: ASTM C144.
  3. Drain Rock: Crushed rock, natural rock, or pea gravel. Grading: ½ inch minimum, 2 inches maximum.
  4. Aggregate Base: CalTrans Standard Specifications, Section 26, Class 2 aggregate base; ¾ inch maximum.
  5. Permeable: Class 2 permeable material per CalTrans Section 68 or mixture of coarse and fine aggregates as routinely proportioned for concrete mix design with 1 inch maximum aggregate per ASTM C33.
- D. Trench Bedding Materials: Refer to Section 33 00 00 – SITE UTILITIES, Section 33 40 00 – STORM DRAINAGE UTILITIES, or Division 16 – ELECTRICAL GENERAL REQUIREMENTS for bedding materials required for buried materials specified in their respective sections.
- E. Concrete Fill: Refer to Section 03 30 00 – CONCRETE.
- F. Topsoil:
  1. Native: Stripped or excavated material containing organics, free of roots, rocks larger than 1½ inch in least dimension, debris, vegetation and foreign matter. Top 6" inches of soil below existing grade is defined as native topsoil.
  2. Imported: Friable loam; free of roots, rocks larger than ½ inch, subsoil, debris, vegetation, and foreign matter, with an acidity range (pH) of 5.5 to 7.5, containing a minimum of 4 percent and a maximum of 25 percent inorganic matter.

## **2.2 WATER**

- A. Potable; free of deleterious materials.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. General: Verify site conditions shown, report all unidentified conditions to the Architect.
- B. Utilities: Verify locations of existing utilities by pot-holing. Examine site for unidentified utilities. Should such utilities be discovered, do not proceed until identified and instructions are received from responsible utility company.
- C. Archaeological Artifacts: Should any objects of possible historic interest be encountered during operations, halt work in area of discovery and immediately contact the Architect for notification of appropriate authorities.

### **3.2 PREPARATION**

- A. Environmental Requirements: Do not place, spread or compact fill material during unfavorable weather conditions. When work is interrupted by rain, do not proceed with fill operations until field tests indicate that moisture content and density of previously placed fill is satisfactory.
- B. Coordination: Keep Owner, Inspector, Architect, Testing Lab, and Geotechnical Engineer informed of progress of work and changes in schedule in order to facilitate Owner's verification engineered fill construction and unit price excavation.
- C. Layout:
  - 1. General: Establish lines, levels and grades; locate work, including existing underground utilities; set markers and stakes. Construction staking to be performed by civil engineer or land surveyor licensed by the State of California.
  - 2. Trees and Shrubs: Tag or identify existing plant life designated to remain.
- D. Protection:
  - 1. General: Erect and maintain barricades and protection facilities, as required.
  - 2. Bench Marks: Protect survey control points from damage or displacement.
  - 3. Utilities:
    - a. General: Maintain and protect existing utilities to remain. Schedule interruption of service required by work of this Section.
    - b. Location of Utilities: Should the location of existing utilities differ from location shown or are found to interfere with permanent facilities being constructed under this Section, immediately notify the Architect. Do not proceed until written instructions are received from the Architect.

- c. **Unknown Active Utility Lines:** Should unknown active utilities be encountered during work, halt operation, take such action required to assure that service is not interrupted, and promptly notify the Architect.
4. **Underpinning:** Underpin adjacent structures, including service utilities and pipe chases, as required to prevent damage or erosion by excavation work.
5. **Shoring, Sheeting, Lagging and Bracing:** Provide as required to maintain excavations and banks in a safe and stable condition and resist erosion.
6. **Plant protection:** Carefully protect existing trees and shrubs identified to remain per Section 01 56 39 – TEMPORARY TREE AND PLANT PROTECTION. Replace existing trees and shrubs outside construction area damaged by operations.
7. **Drainage:** Conduct grading operations in such a manner as to prevent surface water run-off from ponding in areas to be worked or from flowing into excavation or on to adjacent properties. Keep excavations and sub-grade area free from water during process of work, regardless of cause, source or nature of water. Direct or pump drainage to temporary drainage or collection system. Excess water interfering with progress of work shall be disposed of off site.
8. **Dust Control:** Wet as required.

### 3.3 PERFORMANCE

- A. **General:** Clear and grub site. Excavate, fill, compact, and grade to achieve finish grades, lines, levels and contours shown.
  1. **Subgrade Elevations:** Subgrade is defined as the top surface of subsoil immediately below any topsoil or aggregate fill. Determine subgrade elevations by subtracting the thickness of pavement section, topsoil, or slab and aggregate fill from the finish elevations shown.
  2. **Compaction:** ASTM D1557 Compaction Test method; value of optimum moisture content and density will be determined by Geotechnical Engineer, unless otherwise noted.
  3. **Moisture Condition:** Wet and mix soil to uniform moisture content of between 2 and 5 percent above the optimum moisture content or as required by Geotechnical Engineer on site. When moisture content is too high to achieve compaction, aerate by blading or other methods until moisture content is satisfactory.
- B. **Demolition:**
  1. **General:** Per Section 02 41 00 - DEMOLITION.
  2. **Existing Paving:** Remove concrete and asphalt concrete paving from site unless designated to remain.
  3. **Other Obstructions:** Remove abandoned utility lines, concrete foundations, etc. Backfill resulting holes as specified.
- C. **Clearing and Grubbing:**
  1. **General:** Remove surface vegetation, debris, and other deleterious materials in areas designated for construction.

2. Trees and Shrubs: Remove as indicated, including stumps, main root ball and root system as required.
3. Organic Soils: Soils high in organics shall be stockpiled for use as top soil.

D. Excavation:

1. General: Excavate, fill, compact, and grade to achieve finish grades, lines, levels and contours shown.
2. Subsoil: Excavate subsoil required for building foundations, slabs, construction operations and other work. Stockpile subsoil in designated area on site; remove excess subsoil not being reused from site. Protect stockpiled subsoil from erosion until removed for final placement
3. Topsoil:
  - a. Stripping: Excavate topsoil to condition specified, free of rocks and organic debris, from areas to be further excavated, re-landscaped, or re-graded; do not mix with foreign materials.
  - b. Stockpiling: Stockpile in area designated on site to depth not exceeding 8 feet; protect from erosion. Provide quantity great enough to provide minimum 8 inch layer of material at areas designated for planting; supplement with imported topsoil, if required. Remove excess topsoil not intended for reuse, from site.
4. Original Ground Surface Preparation:
  - a. General: At areas to receive pavement or structures, scarify and recompact existing ground as described below. Scarification and recompaction not required at areas to receive landscaping or shallow top soil fill.
  - b. Scarification: Subgrade soils exposed by excavation, or subgrade soils that have been allowed to desiccate prior to placement of fill, slabs or pavements, shall be disked or plowed to depth of [6][?] inches.
  - c. Moisture Conditioning: After scarification and prior to compaction, the soils on which fill will be placed, and soil subgrade areas achieved by excavation or left at existing grade, shall be moisture conditioned to a depth of at least six inches, or to the full depth of processing as described in Section 3.3 D5, whichever is deeper.
  - d. General Compaction: Once the soils have been moisture conditioned to the satisfaction of the Geotechnical Engineer's representative, the soil shall be compacted to at least 90 percent of the ASTM D1557 maximum dry density.
  - e. Compaction at Pavement: In pavement areas, the upper six inches of subgrade soils shall be compacted to at least 95 percent of the maximum dry density, regardless of whether the subgrade surface is achieved by excavation, filling or is near the original site grade.
5. Trenches:
  - a. General: Excavate to achieve required levels. Comply with requirements of jurisdictional agencies.
  - b. Utility Trenching: Excavate straight and true to line and grade and sufficiently wide to enable installation and allow for inspection. Excavate to depth required to for utility installation at grades shown allowing for minimum cover, installation of crossing utilities, and required depth of bedding below utilities. Refer to Section 33 00 00 – SITE UTILITIES, Section 33 40 00 – STORM

DRAINAGE UTILITIES, and Division 16 – ELECTRICAL GENERAL REQUIREMENTS for additional requirements affecting trenching.

- c. Footings: Excavate to adequate width to allow for installation of formwork. Where earth is sufficiently stable to retain its position during concreting and concrete will be poured directly into excavation, cut trench a minimum of 2 inches larger than shown.
- E. Bedding: Install as specified for buried material. Refer to Section 33 00 00 – SITE UTILITIES, Section 33 40 00 – STORM DRAINAGE UTILITIES, or Division 16 – ELECTRICAL GENERAL REQUIREMENTS for respective requirements.
- F. Filling and Backfilling:
  1. General: Perform fill and backfill operations in the presence of the Geotechnical Engineer who will make field density tests to check compaction of fill material. Remove shoring, sheeting, lagging and bracing prior to commencing operations. Fill to subgrades established by finish contours and elevations shown.
  2. Soil:
    - a. Moisture Condition: Moisture condition, uniformly mix, and evenly spread each layer.
    - b. Compaction: After each layer has been placed, mixed and spread, compact to the following percentages of maximum dry density:
      - i. 90 Percent: All fills unless specified otherwise.
      - ii. 95 Percent: Upper six inches of fill or existing soils below pavement.
      - iii. 85 Percent: Trench backfill in landscaped areas
      - iv. Fill in Trenches and Adjacent to Walls: Backfill with material excavated, unless otherwise shown. Moisture condition place in 6 inch layers and compact each layer to density specified for adjacent material. In trenching through native soil compact to 90 percent relative compaction. Backfill simultaneously on each side of un-braced foundation walls, or utility pipes, conduits or structures.
  3. Aggregate Fill:
    - a. General: Do not place fill on soft, muddy, or frozen surfaces.
    - b. Base: Spread aggregate over prepared substrate to a total compacted thickness as shown. Compact to 95 90 percent of maximum dry density.
    - c. Drain Rock: Place after underground work and foundations are in place; Compaction is required under buildings or paved areas where depth of free-draining aggregate exceeds one foot. Place fill in one foot lifts and make one pass with vibratory type compaction equipment at each lift.
    - d. Permeable: Place as shown.
- G. Grading:

1. General: Uniformly grade to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines and elevations shown. Cut out soft spots, fill low spots, and trim high spots.
2. Adjacent Grades: Provide smooth transition between adjacent existing grades and new grades.
3. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations established by finish grades and contours to within the following tolerances:
  - a. Landscaped or unpaved areas: Plus or minus .01 feet.
  - b. Walks: Plus or minus .01 feet.
  - c. Pavements: Plus or minus ½ inch.
  - d. Under buildings: Plus or minus ½ inch.

H. Topsoil Placement:

1. General: Except as shown, place minimum 6 inches thickness of native topsoil to tolerance of plus or minus ½ inch of finished elevations shown in all areas to receive landscaping. Allow for volume of soil amendments to be added. See Section. Hold topsoil one inch below top of paving, walks, and curbs and one half inch above top of drainage structures. Eliminate rough or low areas. Slope grade away from buildings. Place only during dry weather.
2. Compaction: Compact topsoil to a minimum of 82 percent and a maximum of 85 percent of maximum dry density.
3. Acceptance: Project Inspector will determine if material is uniformly spread to minimum depth specified.

### **3.4 FIELD QUALITY CONTROL**

- A. Field Testing: Refer to Section 01 45 29 - TESTING LABORATORY SERVICES.
- B. Retesting: Make necessary corrections to non-conforming work; retest at Contractor's expense.

### **3.5 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris. Do not bury or burn rubbish on the site.

**END SECTION 31 00 00**

**END DIVISION 31 – EARTHWORK**

## **DIVISION 32 – EXTERIOR IMPROVEMENTS**

### **32 12 00 FLEXIBLE (ASPHALT) PAVING**

#### **PART 1 - GENERAL**

##### **1.1 RELATED DOCUMENTS**

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

##### **1.2 SUMMARY**

- A. This Section includes asphalt concrete paving and related work as shown and specified.

##### **1.3 SUBMITTALS**

- A. Paving Materials: Submit certificates that materials comply with specified requirements.
- B. Wheel Stops: Per product data and manufacturing installation instructions.
- C. Closeout Submittals:
  - 1. Provide completed Guarantee form per Article 1.5.

#### **PART 2 - PRODUCTS**

##### **2.1 BASE COURSE AGGREGATE**

- A. General: CalTrans Standard Specifications, Section 26, Class 2 aggregate base; 3/4 inch maximum]; for 4 inches or less, 1-1/2 inch maximum for 5 inches or more.
- B. Asphalt Binder: Steam-refined paving asphalt per CalTrans Standard Specifications, Section 92, Grade PG 64-10.

##### **2.2 SURFACE COURSE AGGREGATE**

- A. Mineral aggregates for Type "B" asphalt concrete, per CalTrans Standard Specifications, Section 39-02, Type B, 1/2 inch maximum grading.

##### **2.3 SEAL COAT**

- A. Acceptable Products: OverKote Asphalt Pavement Coating, as manufactured by RaynGuard Protective Materials, Inc.
- B. Alternate Products: Comparable products manufactured by Reed and Graham, Inc. Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.

## **2.4 WOOD HEADERS AND STAKES**

- A. Foundation Grade Redwood.

## **2.5 LINE PAINT**

- A. FS TT-P-1952, Class A traffic paint; colors as listed below.

## **2.6 WHEEL STOPS**

- A. Acceptable Products: Precast Concrete Bumper Block, product number M20WBB, manufactured by Christy, a division of Oldcastle Precast, Inc., or product number PPC 130, manufactured by Teichert Precast or equal
- B. Alternate Products: Must be equal in appearance, function, and installation. The attributes of products that will be accepted as equal include but are not limited to the following:
  - 1. Minimum Dimensions: 5 ¼ inches high, 7 ½ inches wide, 48 inches long.
  - 2. Construction: Minimum 4000 psi concrete with steel reinforcement.

## **2.7 MIXES**

- A. General: Plant mixed per CalTrans Standard Specifications, Section 39, Type B, ½ inch maximum grading.
- B. Temperature of Asphalt: 275 degrees F minimum; 325 degrees F maximum, when added to aggregate.
- C. Temperature of Aggregate: 250 degrees F minimum; 325 degrees F maximum, when asphalt is added.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Take field measurements; report variance between plan and field dimensions.
- B. Environmental Requirements:
  - 1. Base Course: Do not lay during wet weather, on muddy sub-grade, or when atmospheric temperature is below 35 degrees F.
  - 2. Asphalt Surfacing: Do not apply during wet weather, on wet base course, or when atmospheric temperature is below 40 degrees F.

- C. Preparation of Subgrade: Clean, shape and compact to hard surface free from elevations or depressions exceeding 3/8 inch in 10'-0" from true plane. Compact to not less than 95% of maximum dry density per ASTM D1557, as specified under Section 31 00 00 – EARTHWORK AND TRENCHING.
- D. No pavement marking to be performed until Architect has approved the marking placement.

### 3.3 INSTALLATION

- A. Required Thickness After Compaction:
  - 1. Aggregate Base Course: As shown.
  - 2. Asphalt Concrete Surface Course: As shown.
- B. Headers:
  - 1. General: Install at edge of asphalt paving, except where adjacent to existing pavement, concrete curbs, walks or building. Use ½ inch thick boards where required for bending.
  - 2. Existing Headers: Remove where new paving will join existing.
  - 3. Lines and Levels: Install true to line and grade. Nail stakes at spacing shown, with 2 - 16d galvanized common nails. Cut off tops of stakes at an angle to reduce their visibility on completion.
- C. Asphalt Paving:
  - 1. Aggregate Base Course: Install per CalTrans Standard Specifications, Section 26; compact to relative compaction of not less than 95%, ASTM D1557.
  - 2. Soil Treatment: Apply toxicant chemicals per manufacturer's instructions over entire base course area just prior to application of asphalt.
  - 3. Asphalt Binder: Apply as "tack coat" to all vertical surfaces of existing paving, curbs, walks, and construction joints in surfacing against which paving is to be placed. Apply at rate of 0.02 to 0.10 gallons per square yard of surface.
  - 4. Asphalt Concrete Surface Course:
    - a. General: Per CalTRANS Standard Specifications, Section 39-6 except as modified below.
    - b. Final Gradation: Smooth, uniform and free of ruts, humps, depressions or irregularities, with a minimum density of 95% of maximum theoretical unit weight as determined by California Test Method No. 304. Maximum variation 1/8 inch in 10'-0" when measured with steel straightedge in any one direction. Test paved areas for proper drainage by applying water to cover area. Correct portions that do not drain properly by patching with plant mix.
  - 5. Seal Coat: Thoroughly clean all surfaces of dust, oil spots and other foreign material. Apply a minimum of 30 days after placement of paving. Mix and apply per manufacturer's instructions. Apply 2 coats, minimum, at a rate of 30 gallons of material per 1,000 square feet, minimum. Additional applications may be required to provide uniform surface.

6. Oiled Gravel Areas: Install base course and apply sterilant; refer to Section 02360 – SOIL TREATMENT. Apply primer at rate of 0.30 gallon per square yard. Do not allow traffic on oiled gravel areas until primer has thoroughly dried.
- D. Patching: Cut existing paving square and plumb at all edges to be joined by new paving. Prime vertical surfaces before installing new work. Warp carefully to flush surface, with seal over joints, and feather edge. Patch existing paving where cut for installation of piping or conduits under DIVISION 16 - ELECTRICAL.
- E. Line Painting:
1. General: Apply 2 coats of paint to clean, dry surfaces; do not thin paint. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  2. Apply paint to produce pavement markings with uniform, straight edges and even thickness. Overspray and overspill will not be accepted.
  3. Striping and Symbols: As shown at asphalt and portland cement concrete pavement, walks, stairs, and ramps.
  4. Colors:
    - a. Striping and Lettering: White.
- F. Wheel Stops: Install where shown, secure with epoxy adhesive and 2 reinforcing steel bars ½-inch diameter by 24 inches long, galvanized, driven flush with top of concrete bumper; do not damage bumpers or asphalt concrete paving.

**END SECTION 32 12 00**

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes chain link fences, gates and related work as shown and specified.

**1.3 SUBMITTALS**

- A. Product Data: Include graphic and written description and evidence of compliance with this specification for all products and materials including fittings and hardware.
- B. Shop Drawings: Indicate size and finishes of materials. Include dimensioned drawings, gate elevations, details of component connections including post anchorage and bracing, and details of hardware installation.
- C. Closeout Submittals: Provide completed Guarantee form per Article 1.5.

**1.4 QUALITY ASSURANCE**

- A. Installer Qualifications: Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.

**1.5 GUARANTEE**

- A. Provide in required form for a period of 1 year from date of acceptance by Owner.

**PART 2 - PRODUCTS****2.1 FRAMEWORK**

- A. General: Per ASTM F1083. Use ASTM A53 schedule 40 galvanized steel pipe. Pipe sizes indicated are outside diameter, unless otherwise noted.
- B. Posts with chain link fabric only:
  - 1. Line Posts: 2.38 inch diameter pipe up to 8 feet high.
  - 2. Terminal Posts (End, Corner, and Pull): 2.88 inch diameter pipe.
  - 3. Line, Terminal Posts over 8 feet: 3.5 inch diameter pipe.
- C. Rails and Braces: 1.66 inch diameter pipe, plain end, sleeve coupled; provided with malleable iron fittings.

- D. Sleeves: Pipe diameter at least 3/4" larger than post outside diameter.

## 2.2 FABRIC

- A. General: Zinc Coated Steel per ASTM A392, 9 gage steel wire, 2 inch mesh, class 1 zinc coating, knuckled selvage top and bottom.

## 2.3 TENSION WIRE

- A. Wire: 0.177 inch diameter per ASTM 824

## 2.4 GATES

- A. General: Per ASTM F900.
- B. Gate Posts
  - 1. Leaf width 4 feet or less: 2.88- [2.5-] inch diameter pipe.
- C. Gate Frame: 1.66 inch diameter pipe at leaf widths of 4 feet or less, 1.90 inch diameter pipe at leaf widths over 4 feet..
- D. Gate Hardware:
  - 1. Hinges: 180 degree swing outward Double Gate Latch Assembly: 1.32 inch diameter pipe full height drop rod with fork latch operable from either side. Fork latch to rotate upward to allow single leaf operation. Provide butterfly latch where shown for accessibility. Configure latch and drop rod to lock with the same pad lock.
  - 2. Butterfly Latch:
    - a. General: For 2 1/2-inch gate post. [Padlock provided by Owner.]
    - b. Model No. CL-BL-253, as manufactured by Hoover Fence Company, Model No. 83063, as manufactured by Builders Fence Company, Inc. or equal.
  - 3. Keeper: Provide means to secure gate in open position.
  - 4. Pad Lock and Gate Chain:
  - 5. Accessible Lock and Lever Kit: "Locinox Gate Lock", manufactured by Hoover Fence Co., with post adapter, chain link fence holder, keeper, tension bands and[ 1 handle][ 2 handles].

## 2.5 FITTINGS

- A. General: Provide post caps, rail and brace ends, top rail sleeves, tie wires and clips, tension bands tension bars, truss rod assembly per ASTM F626 except where more stringent requirements are specified herein.
- B. Truss Rod Assembly: 3/8 inch diameter galvanized threaded rods with tighteners.
- C. Tie Wire: 9 gauge

## **2.6 ACCESSORIES**

- A. Galvanizing Repair Materials:
  - 1. Per ASTM A780.
  - 2. Acceptable Products: Galvilite Repair Compound, as manufactured by ZRC Worldwide or equal
- B. Nonshrink Grout: Premixed, factory-packaged, non-metallic, non-staining, non-corrosive, nongaseous grout complying with ASTM C 1107.

## **2.7 CONCRETE**

- A. Site concrete per Section 03 30 00 – CONCRETE.][3000 pounds per square inch at 28 days; 1 inch maximum aggregate size; 0.50 maximum water to cement ratio.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork and trenching, pavement work, and other conditions affecting performance. Do not begin installation before final grading is completed. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Stake locations of fence lines, gates, and terminal posts. At property boundaries, locate centerline of posts 6 inches inside boundary.

### **3.3 FENCE INSTALLATION**

- A. General: Install per ASTM 567 except where more stringent requirements are specified herein. Install straight, taut, and true. Posts shall be plumb, fabric shall be free of sags and waviness. Fence height designations refer to the height of the fabric.
- B. Excavation: Excavate holes for posts at indicated spacing into firm, undisturbed or compacted soil.
- C. Footings: 12-inch diameter concrete footings at posts up to 4-inch diameter; 16-inch diameter footings at posts over 4-inch diameter; minimum depth as listed below.
  - 1. 2'-0" Deep Footings: At line and corner posts 4'-0" high or less.
  - 2. 3'-0" Deep Footings: At line and corner posts over 4'-0" high, up to eight feet high.
  - 3. 4'-0" Deep Footings: At all gate posts and posts over 8'-0" high up to 12'-0" high.
- D. Post Set in Concrete: Vibrate or tamp concrete for consolidation. Immediately clean any concrete residue or splatter from posts. Crown exposed concrete 2 inches above grade, shape and trowel smooth to shed water.

- E. Posts Set in Sleeves or Cored Concrete: Half-fill the void with non-shrink grout and force post to the bottom of the hole and plumb. Thoroughly work additional grout into the hole so as to leave no voids. Crown the grout to shed water.
- F. Terminal Posts: Install at ends, corners, and at any abrupt change in vertical or horizontal directions per ASTM F 567. Place additional terminal posts in long runs at spacing necessary to allow proper tensioning of fabric.
- G. Line Posts: Space line posts uniformly at 10 feet on center, unless shown otherwise.
- H. Rails and Tension Wire:
  - 1. Top: Install top rail throughout per ASTM F 567.
  - 2. Bottom: Install tension wire per ASTM F 567 except where bottom rail is shown.
- I. Post Bracing:
  - 1. Install per ASTM F 567 at all terminal, pull, and gate posts 6 feet high or higher.
  - 2. Provide horizontal brace at post midheight.
  - 3. Attach truss rod assembly at base of terminal post and at connection of horizontal brace and line post.
- J. Chain-Link Fabric Installation:
  - 1. General: Apply fabric to outside of enclosing framework per ASTM F 567 and F 626. Leave 2 inches between finish grade and bottom selvage except at tennis courts. Leave 1 inch between pavement and bottom of selvage at tennis courts. Fabric shall be full height of fence in the longest lengths practical.
  - 2. Tension Bars: Thread through fabric and secure to terminal posts with tension bands spaced not more than 15 inches o.c. Fasten tension bands with carriage bolts with head on fabric side of fence. Peen ends of bolts or score threads to prevent removal of nuts.
  - 3. Tie Wires: Tie fabric to line posts at 15 inches o.c. and to rails and braces at 24 inches o.c. Use wire of proper length to firmly secure fabric to line posts and rails. Bend ends of wire to minimize hazard to individuals and clothing.

### **3.4 GATE INSTALLATION**

- A. Install gates level, plumb, and secure for full opening without interference according to ASTM F567 and F900 instructions. Attach fabric as for fencing. Install ground-set items in concrete for anchorage.
- B. Adjust gate to operate smoothly, easily, and quietly, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding. Lubricate hardware and other moving parts.

### **3.5 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.

B. At completion clean exposed surfaces in a manner that will not damage finish.

**END SECTION 32 31 13**

**PART 1 - GENERAL****1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

- A. This Section includes concrete unit masonry retaining walls and related work as shown and specified.

**1.3 SUBMITTALS**

- A. Product Data: Manufacturer's data and installation instructions.
- B. Shop Drawings: Submit manufacture and installation details, including fastenings, for review.
- C. Samples: Provide full range of available colors for each material submitted.
- D. Calculations: Submit civil engineers design calculations.
- E. Certificates: Submit manufacturer's certificate stating that components meet specified requirements.
- F. Installer Qualifications: If requested, provide evidence that installers meet the requirements of Article 1.4.
- G. Closeout Submittals: Provide completed Guarantee form per Article 1.5.

**1.4 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. American Association of State Highway and Transportation Officials (AASHTO): Standard Specifications for Highway Bridges, Section 5.8.
  - 2. International Masonry Industry Association All-Weather Council (IMIAC): Recommended Practices and Guide Specifications for Hot and Cold Weather Masonry Construction.
  - 3. National Concrete Masonry Association (NCMA):
    - a. General: Design Guidelines for Segmented Retaining Walls.
    - b. SRWU-1: Connection strength evaluation.
- B. Installer Qualifications:
  - 1. Minimum of 3 years of experience on similar work; knowledge and understanding of standards referenced herein; skill necessary to perform in compliance with this specification. Installers failing to demonstrate the required experience, knowledge, or skill shall be removed from the project.

2. Engineer: Design retaining wall system under direct supervision of a Civil Engineer experienced in design of this Work and licensed in the State of California.

## **1.5 GUARANTEE**

- A. Provide in required form for a period of 1 year from date of acceptance by Owner.

## **PART 2 - PRODUCTS**

### **2.1 CONCRETE UNIT RETAINING WALL SYSTEM**

- A. Acceptable Products:
  1. Keystone Retaining Wall System, as manufactured by Keystone Retaining Wall Systems, Inc. or equal
  2. As manufactured by Anchor Wall Systems, Inc. or equal
- B. Alternate Products: Proposed equals are subject to substitution process per Section 01 33 00 – PRODUCT SUBMITTALS AND SUBSTITUTIONS.
- C. Modular Units:
  1. General: Standard Units.
  2. Modular Cap Units:
    - a. General: Manufacturers standard for units, as shown.
  3. Pins: Manufacturers standard for specified unit.

### **2.2 STRUCTURAL GEOGRID**

- A. As recommended by the manufacturer, for the installation shown.

### **2.3 AGGREGATE FILL**

- A. Per Section 31 00 00 - EARTHWORK AND TRENCHING and as recommended by the manufacturer.
- B. Concrete: Per Section 03 30 00 – CONCRETE.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine conditions of work in place before beginning work; report defects.

### **3.2 PREPARATION**

- A. Take field measurements; report variance between plan and field dimensions.

- B. Environmental Requirements: Per IMIAC recommended practices for hot and cold weather construction.
- C. Protect installed units from damage during subsequent construction.

### **3.3 INSTALLATION**

- A. Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.
- B. Earthwork:
  - 1. General: Per Section 31 00 00 - EARTHWORK AND TRENCHING.
  - 2. Base Leveling Pad: As shown; compact to 95% of dry density.
  - 3. Reinforced Backfill Placement: Per manufacturer's instructions for installation shown.
- C. Structural Geogrid: As recommended by manufacturer.
- D. Modular Units:
  - 1. General: Install as shown.

### **3.4 CLEANING**

- A. Keep premises free from accumulation of waste and debris. At completion of installation remove surplus materials and debris.
- B. At completion clean exposed surfaces in a manner that will not damage finish.

**END SECTION 32 32 19**

**END DIVISION 32 – UNIT MASONRY RETAINING WALLS**

**END TECHNICAL SPECIFICATIONS**



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 EL DORADO COUNTY GOVERNMENT CENTER  
 3000 FAIR LANE COURT, PLACERVILLE CA 95667**

**REVISIONS**

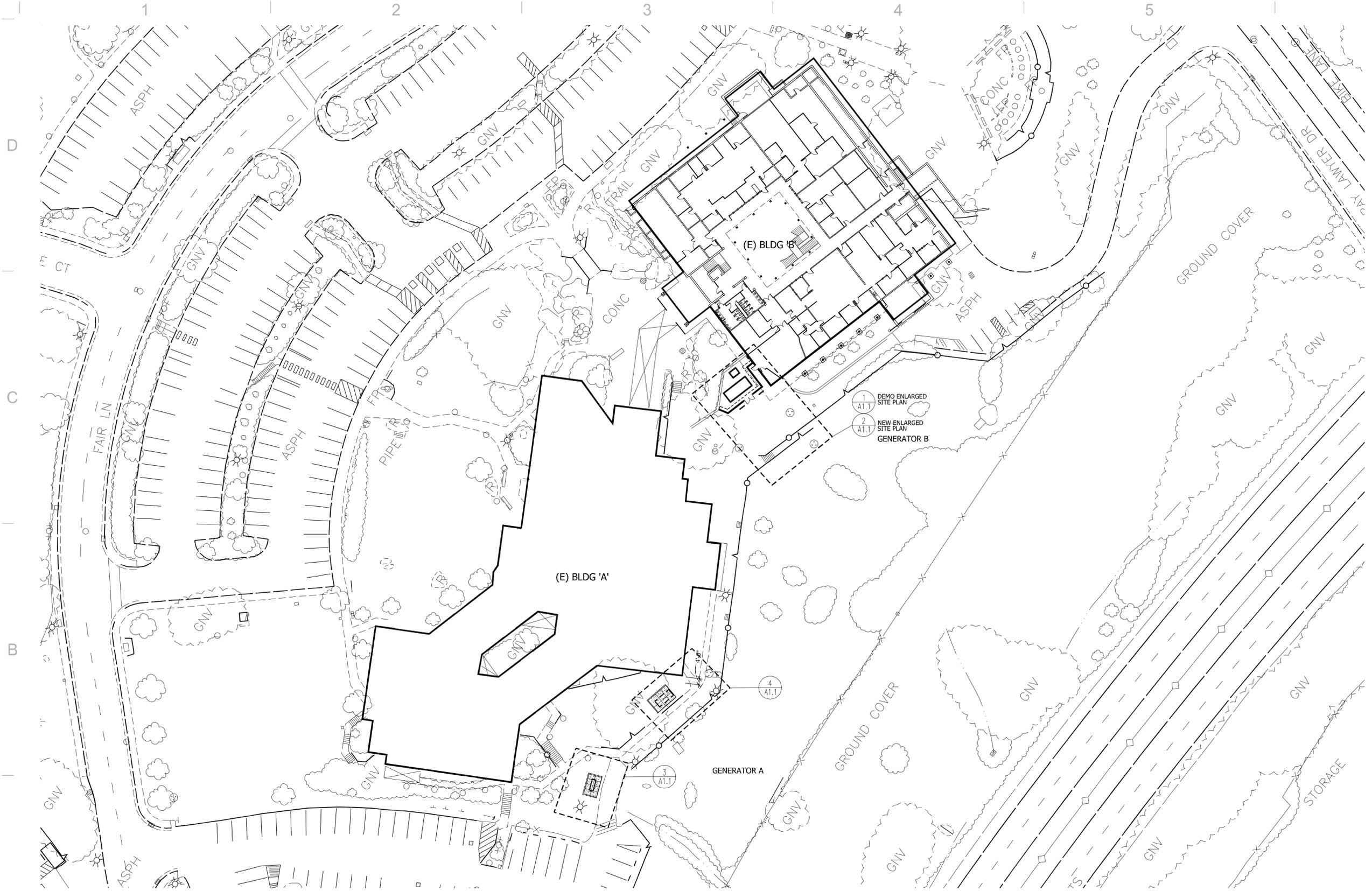
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 CHECKED BY: XXX  
 DRAWN BY: XXX  
 DATE: MM.DD.YYYY

**SHEET CONTENTS:**

**OVERALL SITE PLAN**

**A1.0**



**1 OVERALL SITE PLAN**  
 A1.0 1"=30'-0"

**SITE LEGEND:**

MANHOLE		WATER		MEDIAN BARRIER		SMALL SIGN	
DRAIN INLET		PAVED ROAD		MASONRY WALL		MEDIUM SIGN	
FIRE HYDRANT		CURB		RETAINING WALL		MARSH	
VALVE		CONCRETE		FENCE		PHOTO CENTER	
VAULT		DIRT ROAD		GUARDRAIL		HORIZ. VERT. CONTROL	
POWER POLE		LEVEE/ DIKE		ROCKS		HORIZONTAL CONTROL	
GUY WIRE		TREES				VERTICAL CONTROL	
ELECTROLIER		GROUND COVER				BENCHMARK	





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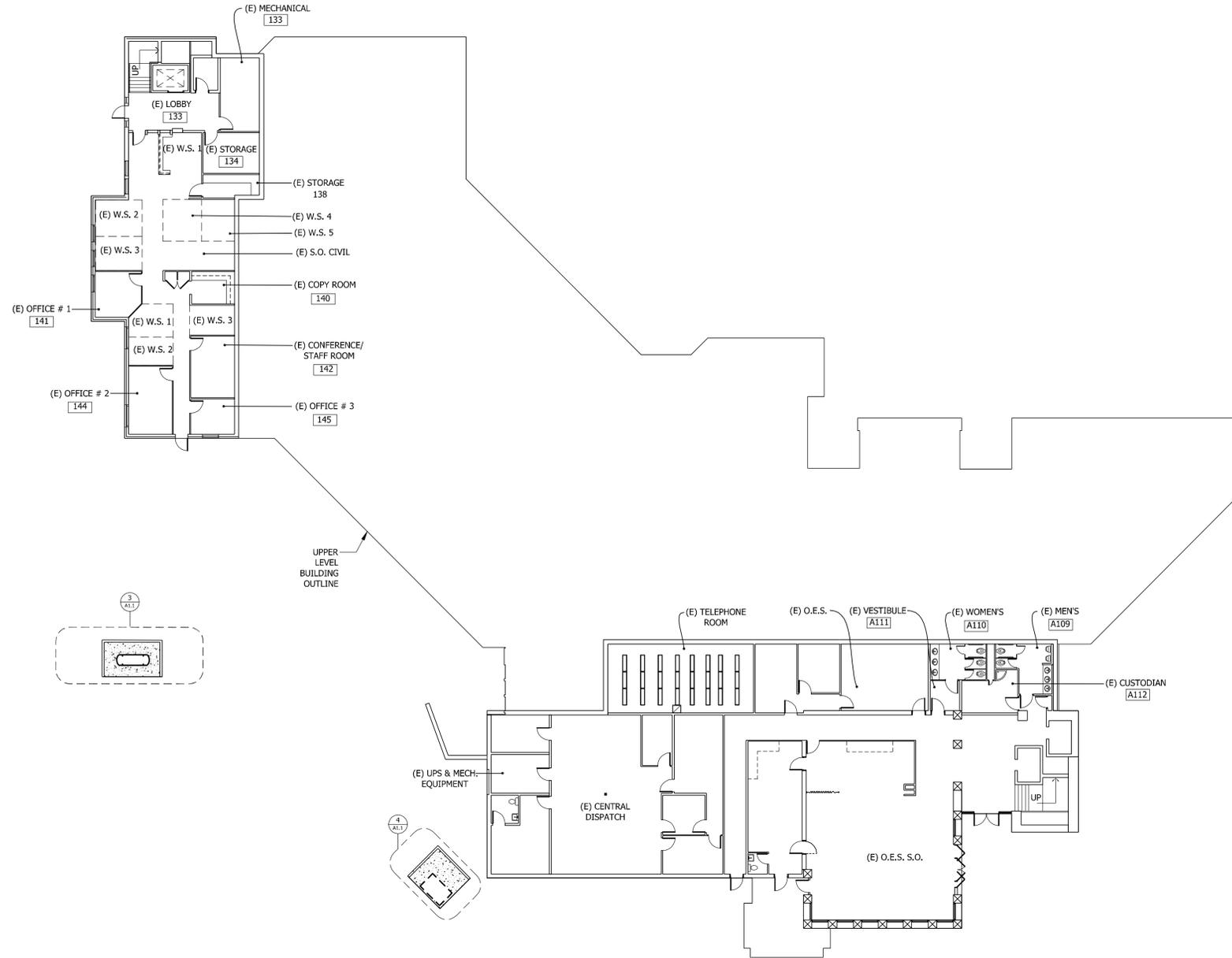
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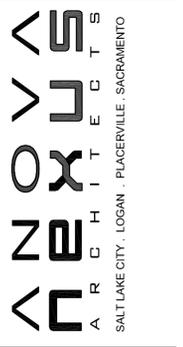
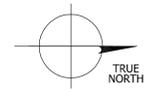
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A



**1 FLOOR PLAN - BLDG A - LOWER FLOOR**  
 A2.1 1/16"=1'-0"



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 DATE: MM.DD.YYYY

SHEET CONTENTS:  
**FLOOR PLAN**  
**BLDG A - LOWER**  
**FLOOR**

**A2.1**

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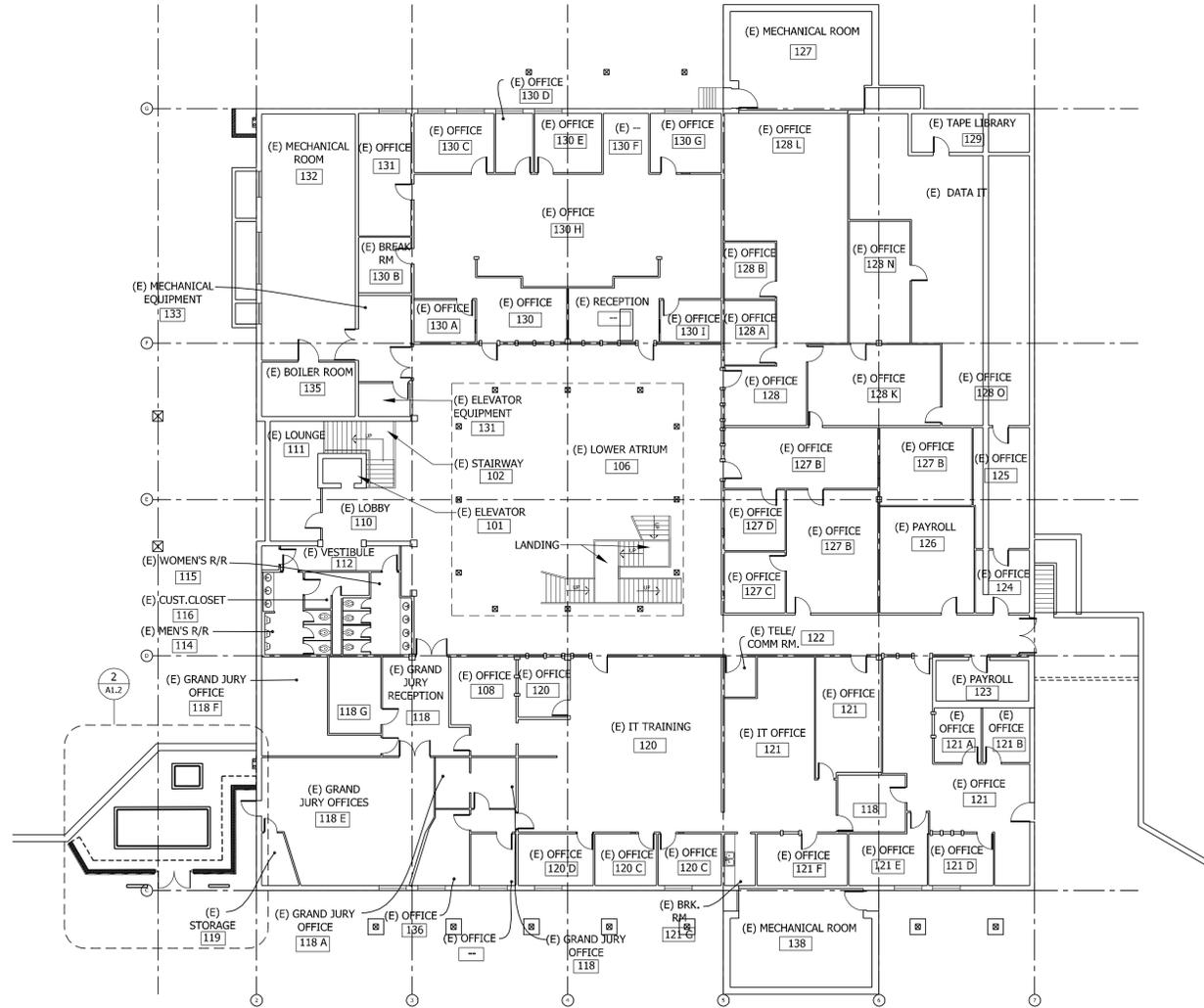
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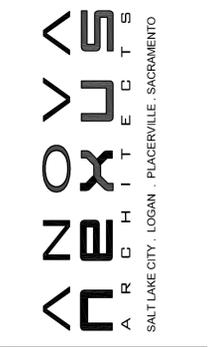
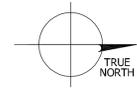
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**1 FLOOR PLAN - BLDG B - LOWER FLOOR**  
 A2.3 1/16"=1'-0"



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SHEET CONTENTS:  
**FLOOR PLANS  
 BLDG B**

**A2.3**



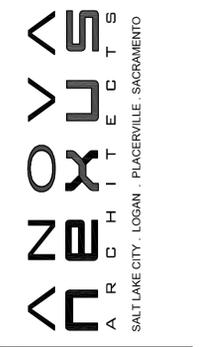
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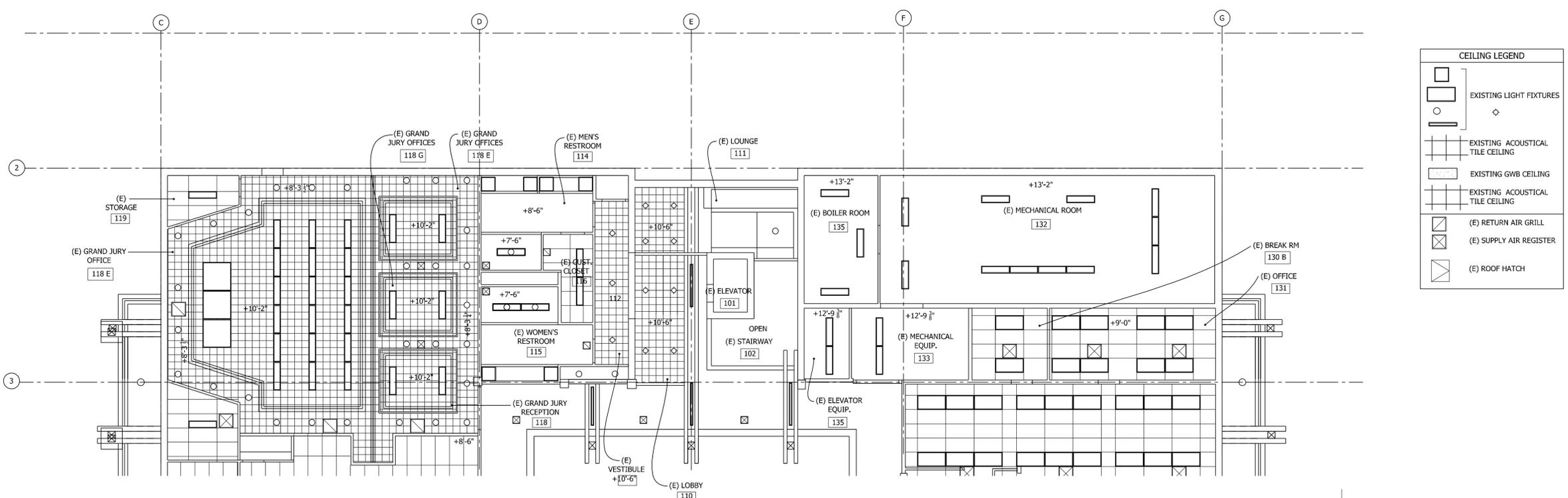
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SHEET CONTENTS:  
**PARTIAL REFLECTED CEILING PLANS  
 BLDG B**

**A5.2**

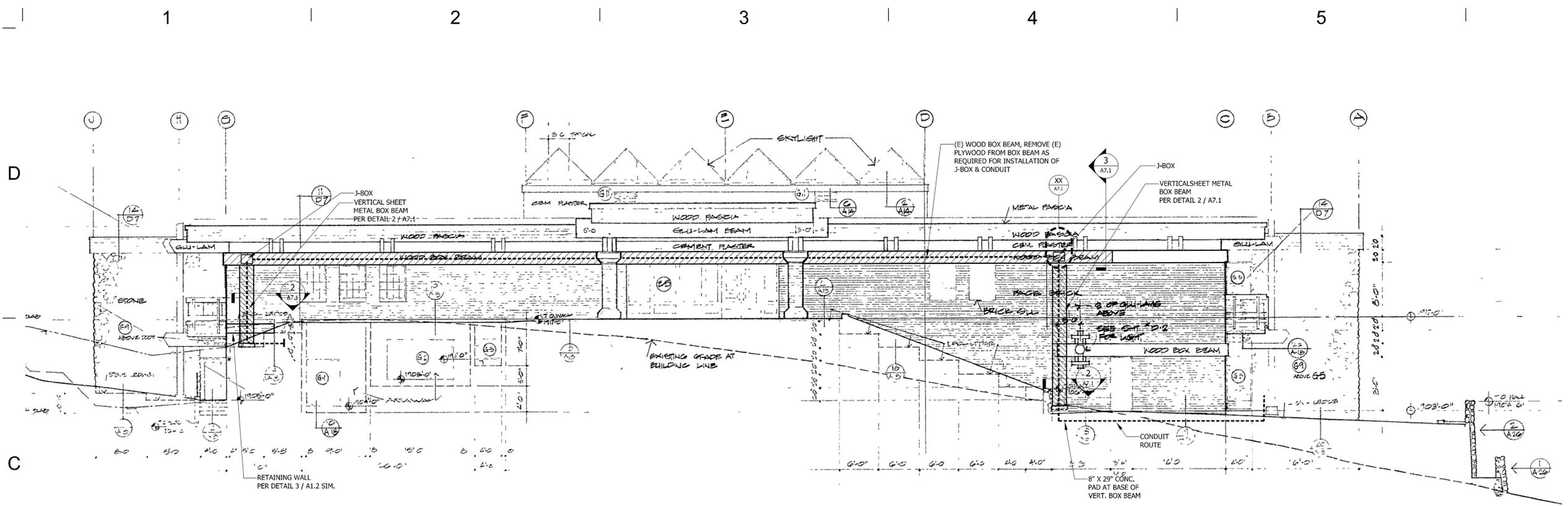
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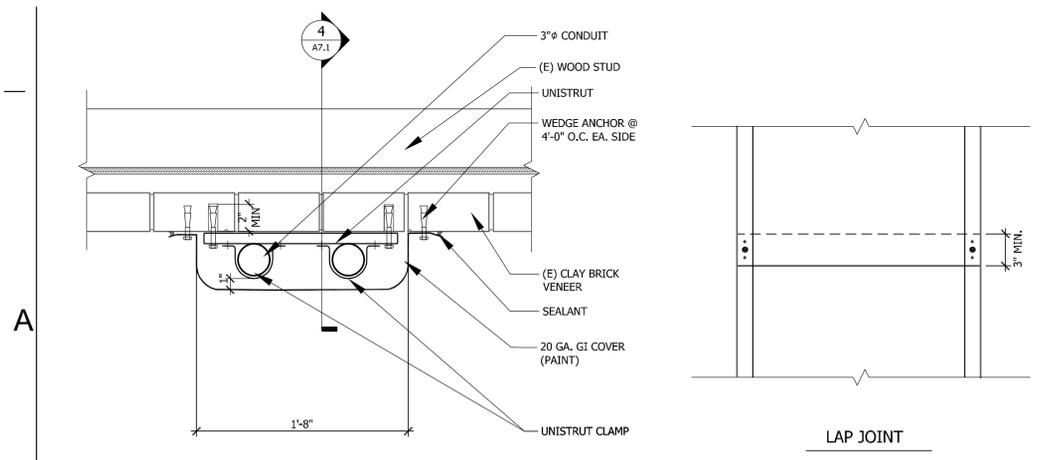
**2 PARTIAL REFLECTED CEILING PLAN - BLDG B - LOWER**  
 A5.1 1/8"=1'-0"



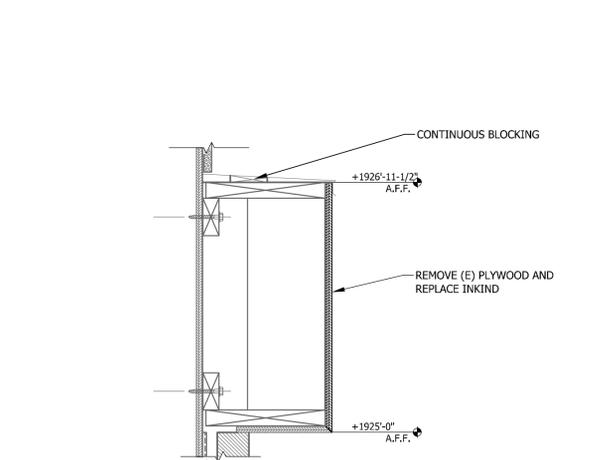
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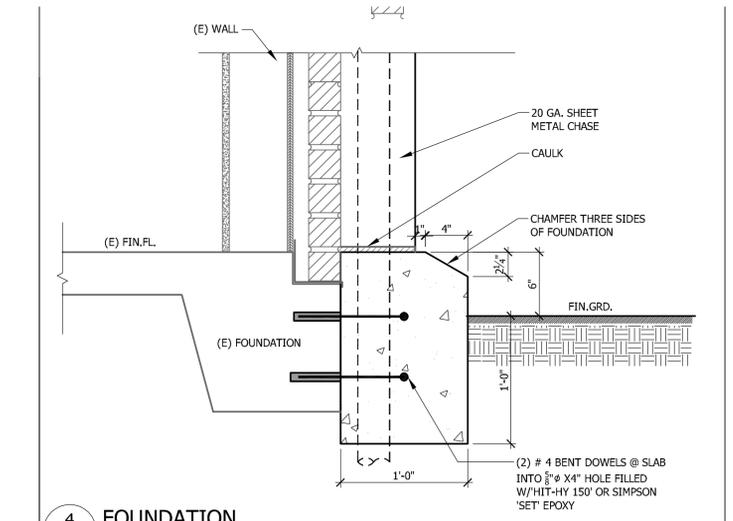
**1 SOUTH ELEVATION**  
 A7.1 1/8"=1'-0"



**2 VERTICAL METAL CHASE**  
 A7.1 SCALE: 1 1/2"=1'-0"



**3 EXISTING WOOD BOX BEAM**  
 A7.1 SCALE: 1 1/2"=1'-0"



**4 FOUNDATION**  
 A7.1 SCALE: 1 1/2"=1'-0"

REVISIONS	

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SHEET CONTENTS:  
**EXTERIOR ELEVATIONS AND DETAILS**



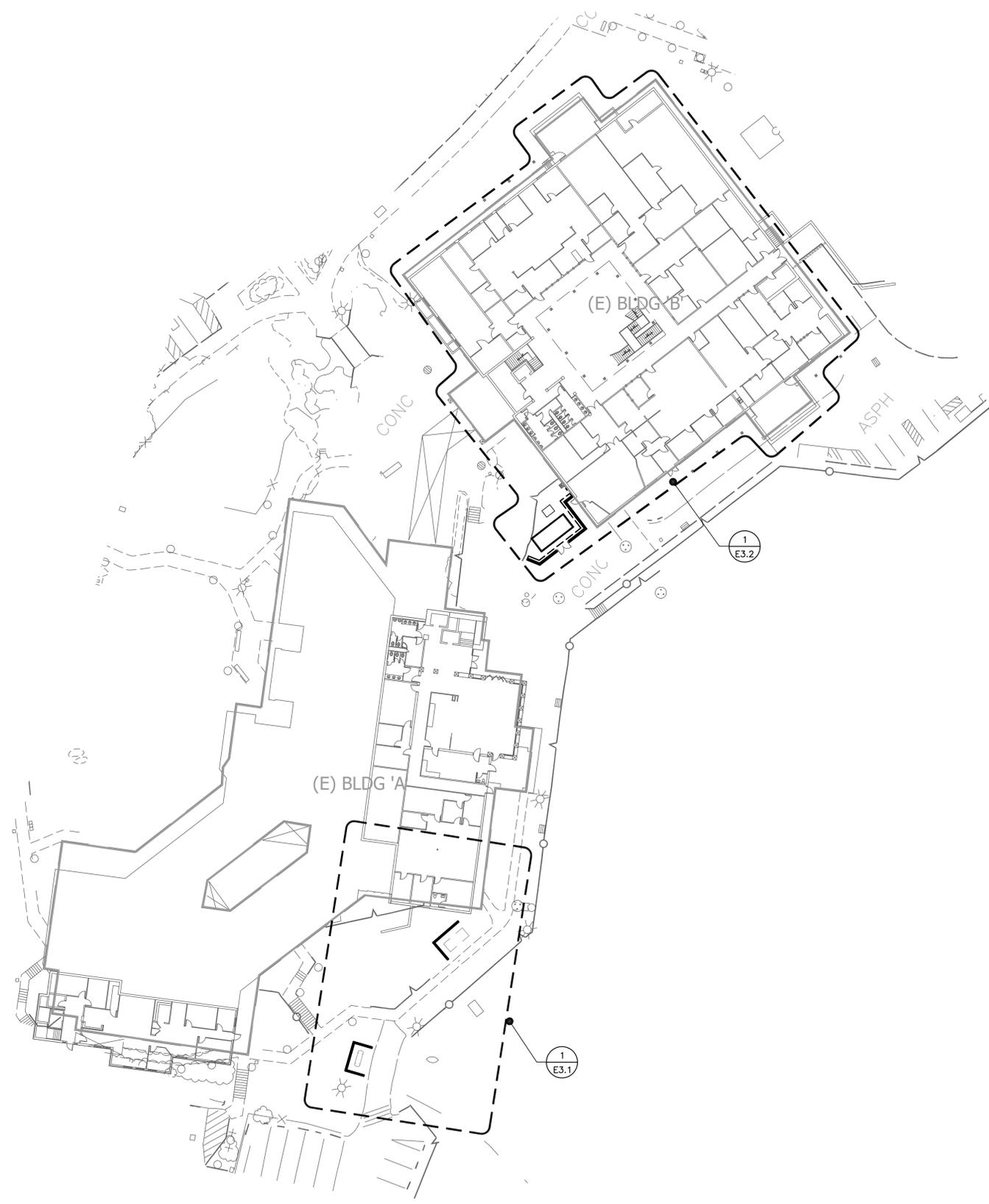
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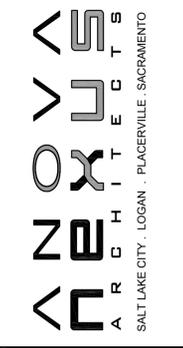
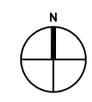
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**1 PARTIAL ELECTRICAL SITE PLAN**  
SCALE: 1"=30'-0"



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CHECKED BY: RC  
DRAWN BY: LT  
DATE: 05.08.2013

SHEET CONTENTS:  
**PARTIAL ELECTRICAL SITE PLAN**



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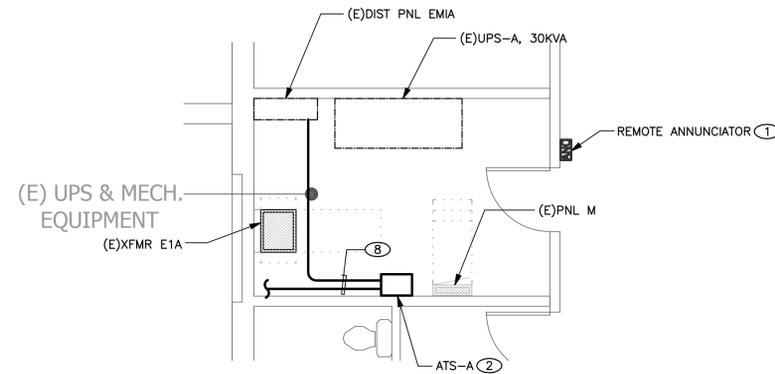
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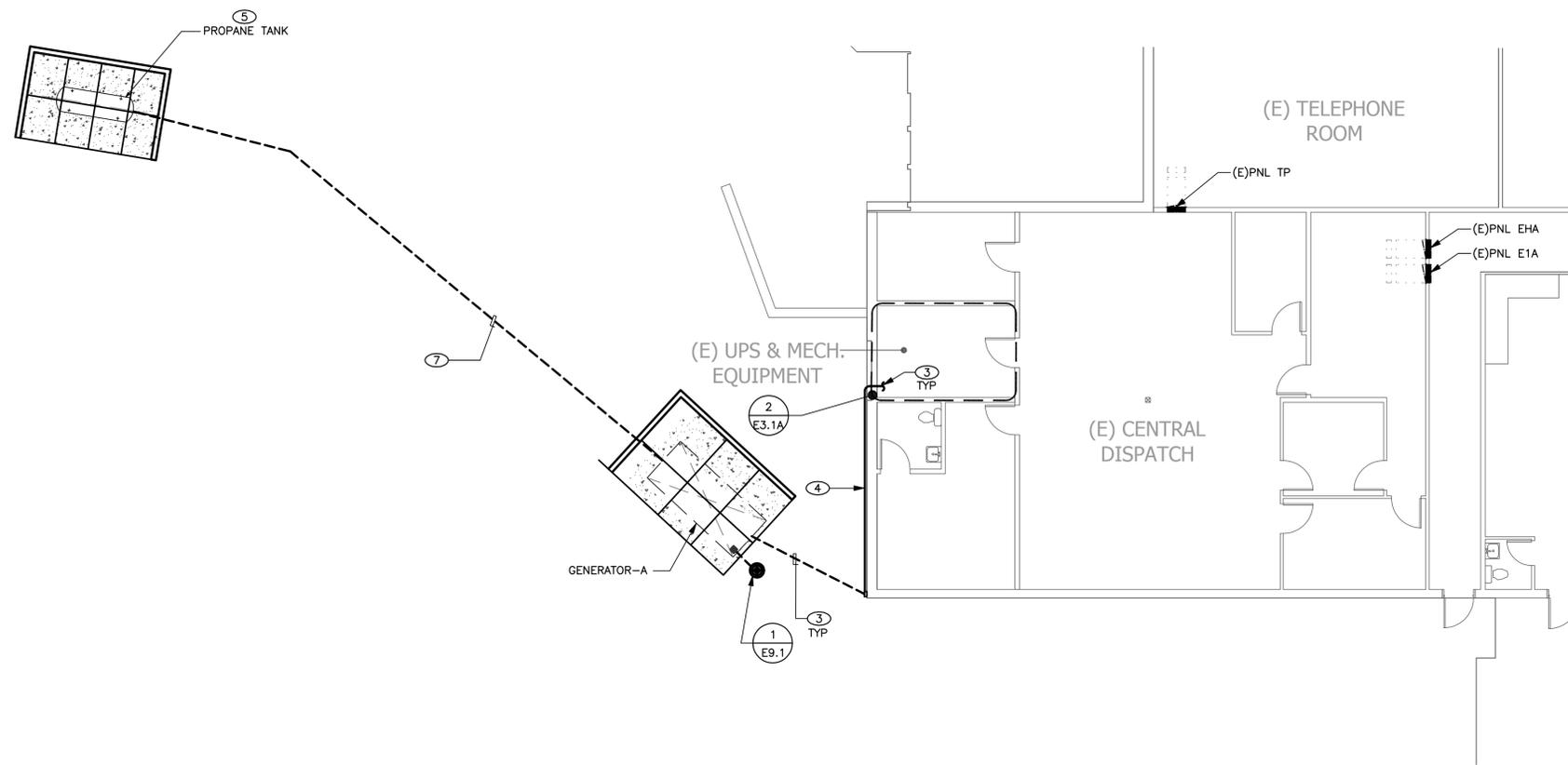
C

B

A



**2 ENLARGED ELECTRICAL FLOOR PLAN**  
SCALE: 1/4"=1'-0"



**1 PARTIAL FIRST FLOOR POWER PLAN - BLDG A**  
SCALE: 1/8"=1'-0"



**SHEET NOTES**

- COORDINATE LOCATION OF GENERATOR REMOTE ANNUNCIATOR WITH COUNTY.
- CONTRACTOR TO REMOVE EXISTING PNEUMATIC CONTROL BOX FOR INSTALLATION OF NEW ATS.
- REFER TO SINGLE LINE FOR GENERATOR A CONDUIT, CONDUCTOR AND CONNECTION REQUIREMENTS.
- ROUTE CONDUITS ON WALL IN EXTERIOR TRIM.
- 500 GALLON PROPANE TANK, SIZED FOR 24 HOUR GENERATOR RUNTIME AT FULL LOAD.
- CORE DRILL AND PROVIDE WATERTIGHT SEALANT FOR CONDUIT PENETRATIONS THROUGH BUILDING EXTERIOR.
- COORDINATE WITH FUEL TANK VENDOR INSTALLER FOR ALL FUEL PIPING CONNECTIONS, AS REQUIRED FOR A COMPLETE INSTALLATION PACKAGE.
- REFER TO SINGLE LINE DIAGRAM FOR FEEDER SIZING AND ADDITIONAL REQUIREMENTS.



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EDC GENERATOR REPLACEMENT  
EL DORADO COUNTY GOVERNMENT CENTER  
3000 FAIR LANE COURT, PLACERVILLE CA 95667

**REVISIONS**

#	REVISIONS
05.08.2013	100%CD

NEXUS PROJECT #: 12201  
CHECKED BY: RC  
DRAWN BY: LT  
DATE: 05.08.2013

**SHEET CONTENTS:**

**PARTIAL FIRST FLOOR POWER PLAN BLDG A**

**E3.1**



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REVISIONS

#	REVISIONS	DATE	BY
1	05.08.2013 100%CD		

NEXUS PROJECT #: 12201

CHECKED BY: RC

DRAWN BY: LT

DATE: 05.08.2013

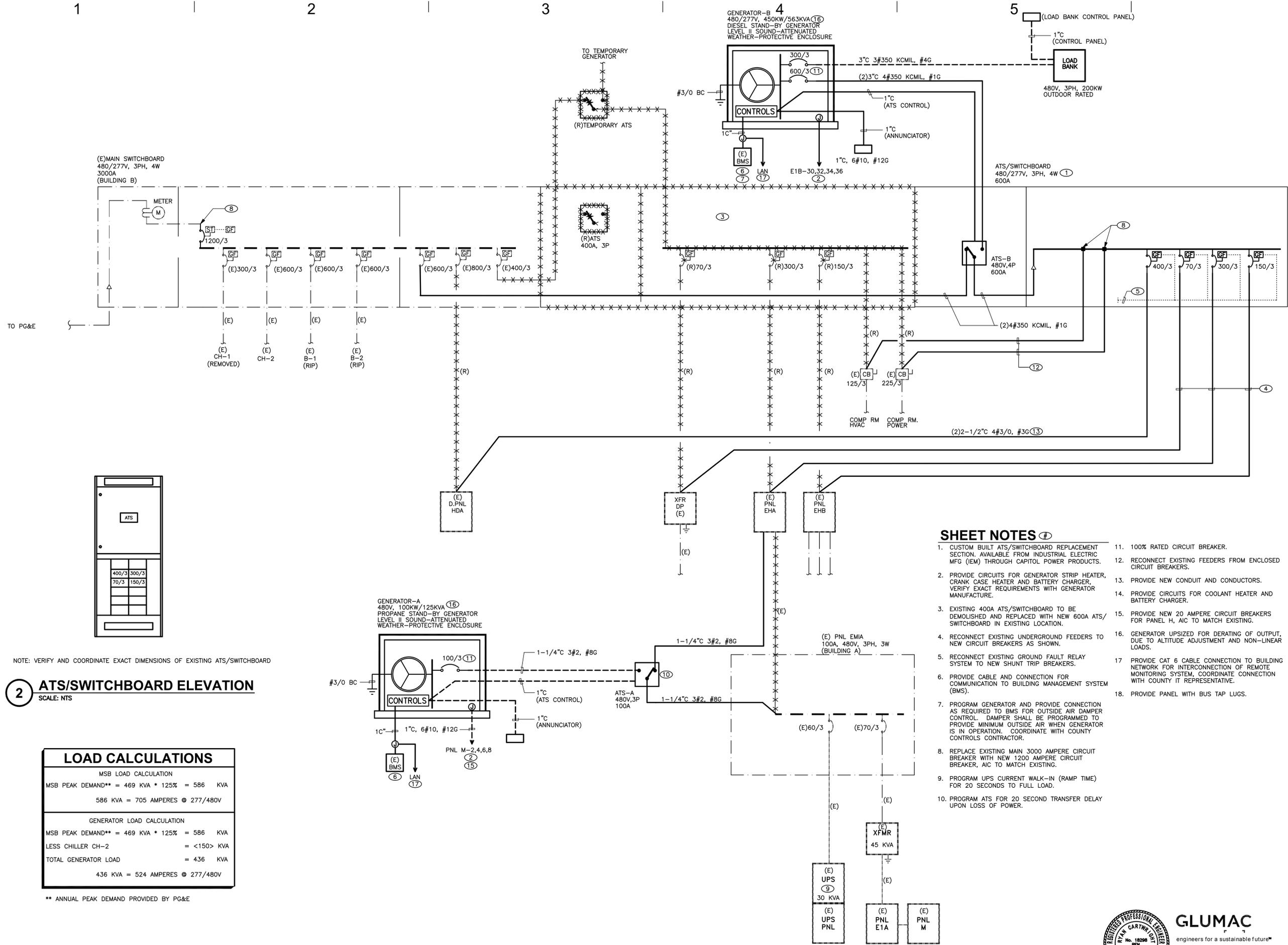
SHEET CONTENTS:

SINGLE LINE DIAGRAM

E5.1



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SHEET NOTES

- CUSTOM BUILT ATS/SWITCHBOARD REPLACEMENT SECTION. AVAILABLE FROM INDUSTRIAL ELECTRIC MFG (IEM) THROUGH CAPITOL POWER PRODUCTS.
- PROVIDE CIRCUITS FOR GENERATOR STRIP HEATER, CRANK CASE HEATER AND BATTERY CHARGER. VERIFY EXACT REQUIREMENTS WITH GENERATOR MANUFACTURE.
- EXISTING 400A ATS/SWITCHBOARD TO BE DEMOLISHED AND REPLACED WITH NEW 600A ATS/SWITCHBOARD IN EXISTING LOCATION.
- RECONNECT EXISTING UNDERGROUND FEEDERS TO NEW CIRCUIT BREAKERS AS SHOWN.
- RECONNECT EXISTING GROUND FAULT RELAY SYSTEM TO NEW SHUNT TRIP BREAKERS.
- PROVIDE CABLE AND CONNECTION FOR COMMUNICATION TO BUILDING MANAGEMENT SYSTEM (BMS).
- PROGRAM GENERATOR AND PROVIDE CONNECTION AS REQUIRED TO BMS FOR OUTSIDE AIR DAMPER CONTROL. DAMPER SHALL BE PROGRAMMED TO PROVIDE MINIMUM OUTSIDE AIR WHEN GENERATOR IS IN OPERATION. COORDINATE WITH COUNTY CONTROLS CONTRACTOR.
- REPLACE EXISTING MAIN 3000 AMPERE CIRCUIT BREAKER WITH NEW 1200 AMPERE CIRCUIT BREAKER, AIC TO MATCH EXISTING.
- PROGRAM UPS CURRENT WALK-IN (RAMP TIME) FOR 20 SECONDS TO FULL LOAD.
- PROGRAM ATS FOR 20 SECOND TRANSFER DELAY UPON LOSS OF POWER.
- 100% RATED CIRCUIT BREAKER.
- RECONNECT EXISTING FEEDERS FROM ENCLOSED CIRCUIT BREAKERS.
- PROVIDE NEW CONDUIT AND CONDUCTORS.
- PROVIDE CIRCUITS FOR COOLANT HEATER AND BATTERY CHARGER.
- PROVIDE NEW 20 AMPERE CIRCUIT BREAKERS FOR PANEL H, AIC TO MATCH EXISTING.
- GENERATOR UPSIZED FOR DERATING OF OUTPUT, DUE TO ALTITUDE ADJUSTMENT AND NON-LINEAR LOADS.
- PROVIDE CAT 6 CABLE CONNECTION TO BUILDING NETWORK FOR INTERCONNECTION OF REMOTE MONITORING SYSTEM. COORDINATE CONNECTION WITH COUNTY IT REPRESENTATIVE.
- PROVIDE PANEL WITH BUS TAP LUGS.

LOAD CALCULATIONS	
MSB LOAD CALCULATION	
MSB PEAK DEMAND**	= 469 KVA * 125% = 586 KVA
586 KVA	= 705 AMPERES @ 277/480V
GENERATOR LOAD CALCULATION	
MSB PEAK DEMAND**	= 469 KVA * 125% = 586 KVA
LESS CHILLER CH-2	= <150> KVA
TOTAL GENERATOR LOAD	= 436 KVA
436 KVA	= 524 AMPERES @ 277/480V

\*\* ANNUAL PEAK DEMAND PROVIDED BY PG&E

NOTE: VERIFY AND COORDINATE EXACT DIMENSIONS OF EXISTING ATS/SWITCHBOARD

2 AT S/WITCHBOARD ELEVATION  
SCALE: NTS

1 PARTIAL SINGLE LINE DIAGRAM  
SCALE: NTS

