CASITAS MUNICIPAL WATER DISTRICT

RINCON PUMP STATION ELECTRICAL UPGRADE
(Specification No. 17-397)

March 14, 2019

Bids will be received at the office of the
Casitas Municipal Water District,
1055 Ventura Avenue, Oak View, California 93022
*until Thursday, April 11**, 2019** @ **3:00 p.m***

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CASITAS MUNICIPAL WATER DISTRICT

NOTICE INVITING BIDS

RINCON PUMP PLANT ELECTRICAL UPGRADE
SPECIFICATION NO. 17-397

Sealed bids for the above referenced project and specification will be received by the Casitas Municipal Water District (Casitas or District) up to **3:00 p.m. on Thursday, April 11, 2019,** at the office of the District, 1055 Ventura Avenue, Oak View, California, 93022, at which time they will be opened and publicly read aloud. Each bid shall be made out on a form to be obtained from the Casitas Municipal Water District. Each bid must be accompanied by a certified check, a cashier's check, or by a bid bond executed by a corporate surety satisfactory to the Casitas Municipal Water District, in the sum of not less than ten (10) percent of the total amount of the bid, as a guarantee that the bidder will enter into the proposed contract, if it be awarded to them. The guarantee will be forfeited, should the bidder to whom the contract is awarded fail to enter into the contract.

The following contractors submitted their qualifications and were determined by the Board of Directors of the District as qualified to submit bids. Bids will not be accepted from any other contractors.

1. Venco Electric, Inc.
2. Eco Energy Solutions, Inc. dba High volt Electric
3. Oilfield Electric Company dba Oilfield Electric and Motor
4. Taft Electric Company

In accordance with the provisions of Section 1770 of the California Labor Code, the Casitas Municipal Water District has ascertained the general prevailing rate of wages applicable to the work to be done. It shall be mandatory upon the Contractor to whom the contract is awarded, and upon the subcontractor under him, to pay not less than the specified rates to all laborers and mechanics employed by him in the execution of the contract. The wage scale can be obtained on the internet at www.dir.ca.gov/dlsr/statistics_research.html.

All bidders and their subcontractors shall be registered with the California Department of Industrial Relations (DIR). Failure of the bidder or subcontractors to be registered with the DIR shall render their bid as non-responsive and will be rejected except where State code provides for exceptions to the registration requirements. All contractors and their subcontractors shall furnish electronic certified payroll records directly to the Labor Commissioner, also known as Division of Labor Standards Enforcement.

The District reserves the right to waive any formalities which, in the opinion of the Board of Directors, do not materially affect the relationship of the various proposals. The District reserves the right to retain all bids for a period of sixty (60) days and to reject any and all bids for any reason at the sole discretion of the District, with or without cause.

The contract documents shall consist of this Notice Inviting Bids, the Instructions to Bidders, Formal Proposal with Bidding Sheet and Bidder's Plan for Construction, Form of Agreement, Specifications and Drawings, and any changes made by issuance of a supplemental notice.

A non-mandatory pre-bid tour will be conducted at 9:00 a.m. on March 20, 2019. The meeting will begin at the District headquarters at 1055 Ventura Avenue, Oak View, CA 93022. Questions regarding the project may be directed to Lindsay Cao, P.E. at (805) 649-2251 ext. 144. Complete bid package (plans and specifications) may be examined and **downloaded free of charge** from our website at: http://www.casitaswater.org/lower.php?url=bidding-jobs.

INSTRUCTIONS TO BIDDERS

Proposal. The proposal shall be submitted on the separate bid forms accompanying these specifications, designated "Proposal" and made a part of these specifications. The proposal shall be enclosed in a sealed envelope marked “Bid” addressed to Casitas Municipal Water District, 1055 Ventura Avenue, Oak View, California, 93022, and shall be endorsed with the name of the project as set forth in the Notice Inviting Bids.

The sealed proposals will be publicly opened and read at the time and place stated in the Notice Inviting Bids. Bidders, or their authorized agents, are invited to be present.

The proposal shall give the price, both in words and in figures, for which the bidder proposes to do the work required by the Specifications and the accompanying Drawings. In the event of disagreement between words and figures, the words will govern and the figures will be disregarded. In the event that the unit price and the total amount named by any bidder for any item are not in agreement, the unit price shall govern and the totals shall be corrected to conform thereto. The bidder shall fill out all blanks of the proposal forms as therein required.

Unauthorized conditions, limitations, or provisions attached to a proposal will render it informal, and may cause its rejection. The completed proposal forms shall be without interlineations, alterations, or erasures. Alternate proposals will not be considered unless asked for. No oral or telephonic proposals or modifications will be considered.

The District reserves the right to waive any informalities which, in the opinion of the Board of Directors, do not materially affect the relationship of the various proposals. The District reserves the right to reject any and all bids for any reason at the sole discretion of the District, with or without cause.

The proposal may be withdrawn upon request by the bidder without prejudice to themselves prior to, but not after, the time fixed for opening of bids, provided that the request is in writing, has been executed by the bidder or their duly authorized representative, and is filed with Casitas Municipal Water District.

Proposal Signature. If the proposal is made by an individual, it shall be signed and proposer’s full name and address shall be given; if it is made by a partnership, it shall be signed with the partnership name by a member of the firm, who shall sign their own name, and the name and address of each member shall be given; and if it is made by a corporation, the name of the corporation shall be signed by its duly authorized officer or officers, attested by the corporate seal, and the names and titles of all officers of the corporation shall be given.

Competency of Bidders. In selecting the bidder for award of the contract, consideration will be given not only to the total amount of the bid, but also to the general competency of the bidder for the performance of the work covered by the proposal. To this end, the District will require bidders to submit a statement of their technical ability, safety record and experience. The District reserves the right to require a statement of the lowest bidder’s current financial condition prior to acceptance of the proposal.

Bidders' Plan for Construction. As part of the proposal, bidders must furnish a detailed statement of the plan or layout for performing the work. As preparation for the foregoing, each Bidder shall examine carefully the site of the proposed work and the contract documents therefore. It will be assumed that the bidder has investigated, and is satisfied as to, the conditions to be encountered; the characters, quality, and quantities of work to be performed; the quality and quantities of the materials to be furnished, and the requirements of the contract, specifications, and drawings.

Subcontracts. Subcontracts will be permitted, subject to the following provisions. No subcontract will be permitted which has the effect of avoiding the residence or wage requirements, or any other provision of the main contract. Individual subcontractors, or members of the contracting or subcontracting organizations personally engaged upon the work, shall be subject to all the requirements of these specifications applicable to employees working for wages, including but not limited to wages, hours of work, character of workmen and certified payrolls.

Reference is hereby made to the provisions of Chapter 2 of Division 5 of Title 1 of the Government Code of the State of California, commencing with Section 4100, also known as the "Subletting and Subcontracting Fair Practices Act", which is incorporated herein and made a part hereof by reference, and the Contractor is bound thereby and shall be made subject to the consequences named in sections 4110 and 4111 of said Act, in the event of his violation thereof. Each bidder shall, in their bid or offer, set forth: (1) the name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement, in an amount in excess of one-half of one percent of the Contractor's total bid, or a subcontractor licensed by the State of California who, under subcontract to the prime Contractor, specifically fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the Prime Contractor's total bid; and (2) the portion of the work which will be done by each such subcontractor under said Act. The Contractor shall list only one subcontract for each such portion as defined by the Contractor in their bid. If the Contractor fails to specify a subcontractor, or if the Contractor specifies more than one subcontractor for the same portion of the work to be performed under this contract in excess of one-half of one percent of the Contractor's total bid, the Contractor agrees that they are fully qualified to perform that portion, and that they shall perform that portion themselves.

Subcontractors. Bidders must furnish as a part of the proposal, a complete listing of names, addresses and contractor license number of all subcontractors who will perform work in an amount in excess of one-half (1/2) of one percent (1%) of the total bid price, and a statement of the work which will be done by each subcontractor. The required statement shall be on the form of Bidder's Statement of Subcontractors, accompanying these specifications.

Prevailing Rate at Per Diem Wages. In accordance with the provisions of Section 1770-1784 of the California Labor Code, the District has ascertained the general prevailing rates of wages applicable to the work to be done. It shall be mandatory upon the Contractor to whom the contract is awarded, and upon any subcontractor under contractor, to pay not less than the specified rates to all laborers, surveyors and mechanics employed by Contractor in the execution of the contract. The wage scale is now on file at the office of the District and on the internet at www.dir.ca.gov/dlsr/statistics_research.html. **Final payment for services provided shall not be distributed until receipt of proof of prevailing wage payments.**

The contractor and all subcontractors shall be subject to Executive Order 12549, "Debarment and Suspension" and Department of Commerce regulations published at 15 CFR Part 26, Subparts A through E, "Governmentwide Debarment and Suspension (Nonprocurement)" for a drugfree work place.

Disqualification of Bidders. More than one proposal from an individual, partnership, corporation, or association under the same or different names will not be considered. Reasonable grounds for believing that any bidder is interested in more than one proposal for the work contemplated will cause the rejection of all proposals in which said Bidder is interested. If there is reason for believing that collusion exists among Bidders, all bids will be rejected, and none of the participants in such collusion will be considered in future proposals.

Return of Proposal Guarantee. Proposal guarantees will be held until the contract has been executed. They will be returned to the respective Bidders whose proposals they accompany upon request.

Insurance and Bonds. The Bidder to whom award is made shall promptly secure Workmen's Compensation Insurance, in accordance with the provisions of the California Labor Code and all amendments thereto, and also shall furnish to the District certificate of insurance showing that they have taken out the insurance of the kinds and in the amounts required under the specifications. The successful Bidder shall also promptly secure, with a reasonable corporate surety or corporate sureties, satisfactory bonds conditioned upon faithful performance by the said Bidder of all requirements under the Contract and upon the payment of claims of materialmen and laborers there under. Refer to Summary of Insurance, Bond and Payment Requirements for Various Construction Contracts attached.

Permits. The Contractor, at their sole expense, shall be required to obtain all other permits and/or licenses as required.

Licensing of Contractors. All Contractors submitting bids shall be licensed in accordance with the provisions of Chapter 9, Division 3, of the Business and Professions Code of the State of California. Effective January 1, 1990, Contractors submitting bids must state, under penalty of perjury, the Contractor's license number and expiration date. Any bid not containing this information shall be considered non-responsive and shall be rejected by Casitas (Business & Professions Code 7028.15). The license required for this project is a C-10, Electrical Contractor.

Failure of the bidder to meet either of the criteria above shall deem the bid proposal non-responsive and the bid proposal will be rejected.

Supplemental Notices. Full consideration shall be given to all Supplemental Notices in the preparation of Bids, as Supplemental Notices form a part of the Contract Documents. Bidders shall verify the number of Supplemental Notices in the bid. Failure to so acknowledge may cause the Bid to be rejected.

Pre-bid Information Requests. All requests for information and questions regarding this bid proposal, the specifications, permits or the plans shall be submitted to the District. The request can be emailed to the District at lcao@casitaswater.com. The District will make a reasonable attempt to respond to the request prior to the bid opening. It is unlikely that any request for information received after **4:30 p.m. on Tuesday, March 26, 2019** will be responded to by the bid opening.

Award of Contract. The award of the contract by the Board of Directors of the Casitas Municipal Water District, if it is awarded, will be to the lowest responsible bidder or bidders whose proposal complies with all requirements presented herein. Casitas maintains the right to reject any and all bids for any reason and to waive minor irregularities.

Execution of Contract. The Bidder to whom award is made shall execute a written contract with the Casitas Municipal Water District in the form of agreement provided, and shall furnish certificate of Workmen's Compensation Insurance and good and approved bonds as required in the preceding paragraphs, within seven (7) days from the date of the mailing of a notice from the Casitas Municipal Water District to the Bidder, to the address given by them, of the acceptance of their proposal. At this time Contractor shall also provide District with a completed IRS W-9 form (Request of Taxpayer Identification Number and Certification.)

Failure or refusal to enter into a contract as herein provided, or to conform to any of the stipulated requirements in connection therewith, shall be just cause for the annulment of the award and the forfeiture of the proposal guarantee. If the successful Bidder refuses or fails to execute the contract, the Casitas Municipal Water District may award the contract to the second lowest responsible Bidder.

Notice to Proceed shall be issued by the District within fifteen (15) days of the receipt of the bonds, insurance and agreements documents satisfactory to the District and the execution of the Agreement by the District. Should there be reasons why the Notice to Proceed cannot be issued within such period, the time may be extended by mutual agreement between the District and the Bidder. If the Notice to Proceed has not been issued within the period stated herein, the Bidder may terminate the Agreement without further liability on the part of either party.

PROPOSAL

RINCON PUMP PLANT ELECTRICAL UPGRADE

SPECIFICATION NO. 17-397

TO: Casitas Municipal Water District
1055 Ventura Avenue, Oak View, California 93022

The undersigned proposes to furnish all materials and labor, and provide all necessary tools and machinery for the completion of the above referenced project and specification, and to perform and complete all the work in the manner set forth, described, and shown in the specifications or on the drawings for the work and in the form of agreement.

The bidder agrees that, upon receipt of written notice of the acceptance of this proposal within seven (7) days after the opening of the bids, bidder will execute the contract in accordance with the proposal as accepted and furnish the required bonds and will secure the required insurance, all within seven (7) days from the date of mailing of said notice of acceptance to them at their address as given below; and that, upon failure to do so within said time, then the proposal guarantee accompanying this proposal shall become the property of the Casitas Municipal Water District as liquidated damages for such failure, and shall be deposited as monies belonging to the Casitas Municipal Water District. If said bidder shall execute the contract, furnish the required bonds, and secure the required insurance, the proposal guarantee check or bond shall be returned to them within five (5) days thereafter.

The bidder declares that they have read the Notice Inviting Bids and the Instructions to Bidders, and agrees to all the stipulations contained therein; that they have examined the site of the work, the form of agreement, the specifications and the drawings therein referred to; that they propose and agree, in the event their bid as submitted in the attached Bidding Sheet be accepted, to enter into a contract to perform all the work mentioned in the agreement and the specifications, and to complete the same within the time stipulated therein; and that they will accept in full payment therefore the amount named in said Bidding Sheet.

The bidder further declares that the surety or sureties named in the space provided below have agreed to furnish bonds in the form and amounts set forth in the Instructions to Bidders, in the event the contact is awarded on the basis of this proposal.

Dated: _____ _____

Bidder

(Corporate Seal)

By:_____

Title: _____

Telephone No. _____

Corporation organized under the laws of the State of

_____

Bidder's post office address:

_____

_____

Contractor's License Number:

_____

Date of Expiration: _____

Surety or Sureties agreeing to furnish bond:

Names and addresses of all members of the partnership, or names and titles of all officers of the corporation:

_____ _____

_____ _____

_____ _____

_____ _____

BIDDING SHEET
RINCON PUMP PLANT ELECTRICAL UPGRADE
SPECIFICATION NO. 17-397

Schedule of prices for all work, materials and site cleanup for the above-mentioned project and specification in accordance with these specifications. Any item not specifically mentioned shall be considered incidental to the item to which it pertains. The bidder shall list prices for all bid items. Bids received which do not list prices in succession shall be rejected.
In the Bidding Sheet of the Proposal form, each Bidder shall quote unit prices for the appropriate items of work in the units stated in the Bidding Sheet form. Failure to quote on each unit price item may cause rejection of the Bidder's entire bid at the discretion of the District.

The unit prices as described herein for those bid items which are bid on a lump sum basis shall be equivalent to the "amount" price. Only the "amount" price need be completed on the items which are specifically stated on the Proposal form in lump sum units.

Unbalanced Prices. Proposed bid item prices which are so unbalanced as to be detrimental to the District's interests may be rejected or cause rejection of the Bidder's entire bid, at the discretion of the District.

Costs Included. Each proposed bid item shall cover all costs and charges, including, without limitation, the cost of material, fabrication, delivery, installation or application, damage to structure before acceptance by District, supervision, bond and insurance charges, overhead, profit and taxes. Quoted unit prices shall be the exact amount per unit to be applied to the units of work actually provided for the purpose of establishing the payment due the Contractor.

Quoted Bid Item. Prices accepted by the District shall be held good and in effect until the work is completed and accepted by the District, unless modified by change order.

Compensation for all plants, equipment, tools, material, labor, service, permits and all other items required to complete the work in conformity with the contract documents will be included in the payment provided in this section, unless specifically excluded. No other compensation will be made except for the items listed in the bid sheet. Work for which no separate payment has been provided will be considered as a subsidiary obligation of the Contractor, and the cost therefore shall be included in the applicable contract price for the item to which the work applies. All measurements of work will be made by the Engineer.

Bid Schedule

Bid Item #	Quantity & Unit	Description & Price in Words	Amount $
1	LS	Bonds and Insurance for the lump sum price of _____Dollars	$
2	LS	Mobilization for the lump sum price of _____Dollars	$
3	LS	Removal of asphalt in preparation for site work as it pertains to scope of work as specified for the lump sum price of _____Dollars	$
4	LS	Installation of foundation drain pipe around new and existing foundation as specified for the lump sum price of _____Dollars	$
5	LS	Connection of foundation drain pipe to point of release (to be coordinated with Owner) for the lump sum price of _____ Dollars	$
6	LS	Backfill and provide new asphalt for the lump sum price of _____Dollars	$
7	LS	Temporary protection of existing equipment during demolition and construction _____Dollars	$
8	LS	Initiate demolition of wall(s) and removal of existing roll up door and windows as specified for the lump sum price of _____Dollars	$
9	LS	Installation of new roll up door and windows for the lump sum price of _____Dollars	$
10	LS	Installation of new roofing for the lump sum price of _____Dollars	$
11	LS	Installation of rain gutters and downspouts for the lump sum price of _____Dollars	$
12	LS	Prepare existing and new exterior walls for acceptance of water-resistant paint for the lump sum price of _____Dollars	$
13	LS	Paint all walls, interior and exterior side, and roofing elements, including gutters and downspouts for the lump sum price of _____Dollars	$
14	LS	Removal of temporary protection of existing equipment for the lump sum price of _____Dollars	$
15	LS	Testing of all systems for operability for the lump sum price of _____Dollars	$

Bid Item #	Quantity & Unit	Description & Price in Words	Amount $
16	LS	Prepare soil for formwork and acceptance of concrete foundations and slab for the lump sum price of _____Dollars	$
17	LS	Provide wall construction for the lump sum price of _____Dollars	$
18	LS	Provide roof construction for the lump sum price of _____Dollars	$
19	LS	Provide a new 2.4kV switchgear and make connections from new switchgear to existing MCC as specified for the lump sum price of _____Dollars	$
20	LS	Provide new 10ft.x12ft. slab box and underground conduits from pad mount transformer to new switchgear per Southern California Edison requirements, which includes excavation and backfill as specified for the lump sum price of _____Dollars	$
21	LS	Provide protection and maintain operation of the existing switchgear and motor control center as shown on Drawings in order to accomplish the new work without disrupting water service to end users for the lump sum price of _____Dollars	$
22	LS	Provide low voltage panels including conduit and wire extensions as shown on drawings for the lump sum price of _____Dollars	$
23	LS	Provide conduit stub-outs for future generator and pump plant controls, per Drawings for the lump sum price of _____Dollars	$
24	LS	Complete start-up and testing for the lump sum price of _____Dollars	$
25	LS	Provide new indoor fan coil unit and outdoor condensing unit, including miscellaneous work, per Drawings for the lump sum price of _____Dollars	$
26	LS	Clean up and demobilization for the lump sum price of _____Dollars	$
27	LS	Provide O & M and as-built drawing for the lump sum price of _____Dollars	$
		TOTAL BID AMOUNT (Items 1-27)	**$**

The above quantities are based on a lump sum price. Bidder will not be released on account of errors. When a discrepancy occurs between the written price and the number listed, the written price shall govern. The Bidder understands that the District reserves the

right to reject any or all bids, and to waive any formalities in the bidding.

Date:_____

BIDDER: _____

By: _____
Title: _____
License No. _____ Expiration Date: _____
License Classifications: _____
Telephone. No: _____ Cell No: _____
Fax No: _____ Email: _____
Address: _____

_____

(**CORPORATE SEAL**)

BIDDER'S PLAN FOR CONSTRUCTION

1. The location for the proposed work was examined on _____
(date)
by _____ on behalf of the bidder.
(name and title)

2. Explain briefly your plan and tentative schedule for performing the proposed work.

BIDDER'S STATEMENT OF SUBCONTRACTORS

The bidder is required to state the name and address of each subcontractor who will perform work in an amount in excess of one-half (2) of one percent (1%) of the total bid price and the portion of the work which each subcontractor will do.

The undersigned submits herewith a list of subcontractors who Contractor proposes to employ on the work, with the proper firm name and business address of each and a statement of the work or bid item which will be done by each subcontractor.

Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )
Subcontractor		Portion of Work
Location and Place of Business		DIR No.
License No.	Expiration Date: / /	Phone ( )

Signed:

BIDDER'S BOND

KNOW ALL MEN BY THESE PRESENTS,

That we _____

_____

_____, as PRINCIPAL,

and

_____

_____, as SURETY,

are held and firmly bound unto the Casitas Municipal Water District, hereinafter called the District, in the penal sum of TEN PERCENT (10%) OF THE TOTAL AMOUNT OF THE BID of the Principal above named, submitted by said Principal to the Casitas Municipal Water District, for the work described below, for the payment of which sum in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

In no case shall the liability of the surety hereunder exceed the sum of $ _____

_____

THE CONDITIONS OF THIS OBLIGATION ARE SUCH,

That whereas the Principal has submitted the above-mentioned bid to the Casitas Municipal Water District, for certain construction specifically described as **Rincon Pump Plant Electrical Upgrade – Specification No. 17-397** which bids are to be opened at the office of Casitas Municipal Water District on **Thursday, April 11, 2019 at 3:00 p.m**.

NOW, THEREFORE, if the aforesaid Principal is awarded the contract and, within the time and manner required under the heading Instructions to Bidders, after the prescribed forms are presented for signature, enters into a written contract, in the form set forth in said specifications, in accordance with the bid, and files the two bonds with the District, one to guarantee faithful performance and the other to guarantee payment for labor and materials, as required by Instructions to Bidders and Certificate of Insurance for Workmen's Compensation and Contractor's liability insurance, then this obligation shall be null and void; otherwise, it shall be and remain in full force and virtue.

In the event suit is brought upon this bond by the Obligee and judgement 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 hereunto set our hands and seals this _____ day of _____, 20_____.

_____
Principal

By _____

(SEAL)

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

AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____ in the year _____ by and between the Casitas Municipal Water District, hereinafter designated as the District, and _____ hereinafter designated as the Contractor.

WITNESSETH: That the parties hereto do mutually agree as follows with respect to the project known as **Rincon Pump Plant Electrical Upgrade – Specification No. 17-397.**

ARTICLE I. For and in consideration of the payment of _____ _____ Dollars ($_____) in conformance with the specifications hereinafter mentioned, the Contractor agrees with the District to construct the aforementioned project and to perform and complete in a good and workmanlike manner all the work pertaining thereto shown on the Drawings and described in the Specifications therefor, to furnish at its own cost and expense all tools, equipment, labor, and materials necessary therefor, except such materials as in the said specifications are stipulated to be furnished by the District, and to do everything required by this Agreement and the said Specifications and Drawings.

ARTICLE II. For the same consideration set forth in Article I above, Contractor agrees to furnish all said materials and labor, furnishing and removing all plants, temporary work or structures, tools and equipment, and doing all the work contemplated and embraced in this Agreement, also to be responsible at its own expense for all loss and damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen difficulties which may arise or be encountered in the prosecution of the work until its acceptance by the District, and for all risks of every description connected with the works, and also for all expenses incurred by or in consequence of the suspension or discontinuance of works, except such as in the said Specifications are expressly stipulated to be borne by the District, and for well and faithfully completing the work and the whole thereof, in the manner shown and described in the said Drawings and Specifications and in accordance with the requirements of the Engineer under them, the District will pay and the Contractor shall receive in full compensation thereof the prices for the several items named in the Bidding Sheet of the Proposal.

ARTICLE III. The District hereby promises and agrees with the said Contractor to employ, and does hereby employ the said Contractor to provide the materials and to do the work according to the terms and conditions herein contained and referred to for the price aforesaid, and hereby contracts to pay the same at the time, in the manner and upon the conditions set forth in the Specifications; and the said parties for themselves, their heirs, executors, administrators, successors and assignees do hereby agree to the full performance of the covenants herein contained.

ARTICLE IV. The Notice Inviting Bids, the Instructions to Bidders, the Proposal, the Specifications and the Drawings mentioned therein, and all addenda issued by the District with respect to the foregoing prior to the opening of bids, are hereby incorporated in and made part of this Agreement.

IN WITNESS WHEREOF: the parties hereto have caused this contract to be executed the day and year first above written.

CASITAS MUNICIPAL WATER DISTRICT

By: _____
President

ATTEST:

_____
Secretary

Approved as to form:

_____
Attorney

Dated: , 20__

_____
Contractor

By_____

_____
Title

BOND FOR FAITHFUL PERFORMANCE

KNOW ALL MEN BY THESE PRESENTS,

That we _____

_____

hereinafter referred to as Contractor, as principal, and _____

_____, as surety,

are held and firmly bound unto the Casitas Municipal Water District, OAK VIEW, California, in

the sum of _____

_____Dollars ($ _____)

lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that:

whereas, said Contractor has been awarded and is about to enter into a contract with the Casitas Municipal Water District, for construction of the project known as **Rincon Pump Plant Electrical Upgrade - Specification No. 17-397**, and is required by said District to give this bond in connection with the execution of the contract.

NOW, THEREFORE, if the said Contractor shall well and truly do and perform all the covenants and obligations of said contract on his part to be done and performed at the times and in the manner specified herein, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect;

PROVIDED, that any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said contract shall not in any way release the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

WITNESS our hands this _____ day of _____, 20____.

_____
Contractor

By:_____

_____
Surety

By:_____

Approved as to form and execution:

_____
Attorney

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS,

That we _____

_____

as principal, and _____

_____, as surety, are held and firmly bound unto the Casitas Municipal Water District, Oak View, California, in the sum of

_____

_____Dollars ($ _____)
lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the above obligation is such that:

Whereas, said principal has been awarded and is about to enter into a contract with the Casitas Municipal Water District, for construction of the project known as **Rincon Pump Plant Electrical Upgrade Specification No. 17-397** and is required by said District to give this bond in connection with the execution of the contract.

NOW, THEREFORE, if said principal as Contractor in said contract, or subcontractors, fails to pay for any materials, provisions, provender or other supplies, or teams, used in, upon, for or about the performance of the work contracted to be done, or for any work or labor thereon of any kind, or for amounts due under the Unemployment Insurance Act with respect to such work or labor, said surety will pay for the same, in an amount not exceeding the sum specified above, and also, in case suit is brought upon this bond, a reasonable attorney's fee, to be fixed by the court. This bond shall insure to the benefit of any and all persons entitled to file claims under Section 11929 of the Code of Civil Procedure of the State of California.

PROVIDED, that any alterations in the work to be done, or the material to be furnished, which may be made pursuant to the terms of said contract shall not in any way release either the Contractor or the surety thereunder, nor shall any extensions of time granted under the provisions of said contract release either the Contractor or the surety, and notice of such alterations or extensions of the contract is hereby waived by the surety.

WITNESS our hands this day of _____, 20_____.

_____
Contractor

By _____

_____
Surety

By _____

Approved as to form and execution:

_____
Attorney

CASITAS MUNICIPAL WATER DISTRICT

SUMMARY OF INSURANCE, BOND & PAYMENT REQUIREMENTS
FOR VARIOUS CONSTRUCTION CONTRACTS

	Informal Under $35,000	**Formal $35,000 &Over**
Certificates of Insurance (CG 2010 Endorsement required)		
1. Workmen's Compensation	Yes	Yes
2. Commercial, General & Auto Liability	Yes	Yes
a. For one person per accident	$1,000,000	$1,000,000
b. More than one person per accident	$1,000,000	$1,000,000
3. Property damage per accident	$1,000,000	$1,000,000
4. Thirty days written notice prior to cancellation	Yes	Yes
Bonds		
Bidder's Bonds	None	10%
Payment Bonds (Material and Labor)* (Projects bid by CMWD only)	None	100%
Performance Bonds* (Projects bid by CMWD only)	None	100%
Maintenance and Guarantee Provisions	Yes	Yes
Contracts		
Period for Final payment upon acceptance	15 Days	35 Days
Amount of Retention	-0-	15%
Progress Payment (if required, retain 5%)**	None	If Required
Final Cost Statement	None	Yes
Notice of Completion	None	Yes
Labor and Material Releases	Yes	Yes

* At the option of the District and depending upon the type of construction activity, payment bonds and/or performance bonds may be placed as a requirement on the job.

** If progress payments are required for a Purchase Order Contract, provisions therefor must be added.

NOTE: The above listed are the minimum requirements for all construction contracts. Provisions are included within the Terms and Conditions for Purchase Order Contracts which will be issued for all jobs under $35.000. Provisions should be included within the Specifications for all contracts $35,000 and over. **The United States (Bureau of Reclamation), Casitas Municipal Water District, their directors, officers, employees or authorized volunteers,** shall be named as additional insured as respects to all coverages listed above when the named insured is Lessee or Licensee of the Casitas Municipal Water District or when work is performed by the named insured for the Casitas Municipal Water District, and in both instances this coverage shall be primary. Casitas, in addition to Certificates of Insurance, shall be provided with the ISO CG 2510 Endorsement or insurer's equivalent.

In accordance with the provisions of Section 1770 of the California Labor Code, the District has ascertained the general prevailing rates of wages applicable to the work to be done. If shall be mandatory upon the Contractor to whom the contract is awarded, and upon any subcontractor under him, to pay not less than the specified rates to all laborers and mechanics employed by him in the execution of the contract. The wage scale is on the internet at www.dir.ca.gov/dlsr/statistics_research.html.

NOTICE TO CONTRACTORS, AGENTS AND INSURANCE COMPANIES.
PLEASE COMPLETE AND RETURN THIS FORM TO

CASITAS Municipal Water District

CERTIFICATE OF INSURANCE

(This certificate is to be used to list such coverages as the policies listed thereon provide, and does not reflect our insurance requirements.)

TO:
Casitas Municipal Water District
P. O. Box 37
Oak View, California 93022

Name and Address of Insured:

TYPE OF POLICY	COMPANY AND POLICY NO.	POLICY PERIOD	LIMITS OF LIABILITY	
			Bodily Injury	Property Damage
1.—Workmen's Compensation Employers Liability		Eff. Exp.	Statutory	Nil
2.		Eff. Exp.		
3.—Comprehensive Liability (A) Automobile		Eff. Exp.	Each Person $ Each Occurrence $	Each Occurrence $
(B) General*		Eff. Exp.	Each person $ Each Occurrence $ Aggregate $	Each Occurrence $ Aggregate $
4.—Comprehensive Liability Auto and General*		Eff. Exp.	Combine Single Limit: Each Occurrence $ Aggregate $	
5.		Eff. Exp.		
6.		Eff. Exp.		
7.—Umbrella Liability		Eff. Exp.	Each Occurrence and Aggregate $ (A) Excess of Items: (B) Total Limit Including Items:	

*COVERAGE includes Contractual Liability, Completed Operations, Protective Liability, Product's - Liability, and Explosion, Collapse and Underground Hazards.

REMARKS: **The U.S. Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees or authorized volunteers shall be named as additional insured as respects to all coverages listed above when the named insured is Lessee or Licensee of the Casitas Municipal Water District or when work is performed by the named insured for the Casitas Municipal Water District, and in both instances this coverage shall be primary.**

These policies shall not be canceled nor reduced in coverage until after 30 days written notice of such cancelation or reduction in coverage shall have been mailed to this certificate holder.

Name and Address of Agent:

Dated_____

By_____

CASITAS MUNICIPAL WATER DISTRICT	Payment Document No. Progress ( ) Final ( )	OFFICE USE ONLY - Contractor/Vault/Engineer
PROJECT:		Reviewed By:
CONTRACTOR:		Approved for Payment:
Date:		

Spec. No. Project No. , General Manager Date

Bid Item No.	Description	Unit	Quantity	Per Bid Schedule		This Estimate		Actual to Date	
				Unit Price	Amount	Quantity	Amount	Quantity	Amount
1							$0.00		$0.00
2							$0.00		$0.00
3							$0.00		$0.00
				TOTAL	$0.00		$0.00		$0.00

Actual to Date:	$0.00
Less 5% Retained:	$0.00
Total Allowed to Date:	$0.00
Less Previous Payment	$0.00
*Less Deductions:	$0.00
Net Amount Due this Payment	$0.00

PREV. PAYMENT RECORD		
PP No.	Date	Amount

I certify the above bill is correct & just; that payment therefor has not been received; that all statutory requirements as to American Production and Labor Standards and that all conditions of purchase applicable to the transactions have been complied with.

CONTRACTOR:

By:

Date:

g:\engr.wks\specs\boilerforms\progpayblank.xls

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to federally assisted construction contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity Clause).

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction Contractor certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction Contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, color, religion or national origin, because of habit, local custom or otherwise. The federally assisted construction Contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such certifications in his files.

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

_____
Contractor

_____
Signature

_____
Title

Date: _____

NONCOLLUSION DECLARATION
(MUST BE SUBMITTED WITH BID)

The undersigned declares:

I am the _____ of _____,
(Title) (Company)
the party making the foregoing bid. The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid. The bidder has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or to refrain from bidding. 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. All statements contained in the bid are true. 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, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____,
(Date)

at _____, _____.
(City) (State)

_____

NOTICE TO PROCEED

To: _____ Date: _____
_____
_____

Project: **Rincon Pump Plant Electrical Upgrade – Specification No. 17-397**

In accordance with Section 4 of the Special Conditions of the Contract Specifications, you are hereby notified to commence work on or before _____ and to complete all work by March 31, 2020 (including materials procurement).

CASITAS MUNICIPAL WATER DISTRICT

By : _____
Title: Lindsay Cao P.E., Civil Engineer

ACCEPTANCE OF NOTICE

Receipt of above Notice to Proceed is hereby acknowledged by _____

on _____, 2019.

CONTRACTOR

By: _____

Title: _____

SPECIFICATIONS
Part B - General Conditions

1. Definitions.

(a) Whenever the words defined in this article occur in these Specifications, or in any other contract document, they shall have the meaning here defined:

(b) The word "specifications" shall include these General Conditions, the Special Conditions and the applicable portions of the Standard Specifications. The form of these Specifications is intended to provide for all of the work performed for Casitas Municipal Water District.

(c) The word "District" shall mean the Casitas Municipal Water District.

(d) The word "Board" shall mean the Board of Directors of the Casitas Municipal Water District.

(e) The words "General Manager" shall mean the person holding the position or acting in the capacity of General Manager of the Casitas Municipal Water District.

(f) The word "Engineer" shall mean the General Manager, or his duly authorized representative.

(g) The word "Contractor" shall mean the Contractor in the agreement for the construction of the work and/or the furnishing of materials and/or equipment herein specified, the legal representative, or the agent of said party.

(h) The word "Subcontractor" shall mean one who, as a subcontractor, performs at the site of the work some part of the Contractor's obligation, the legal representative, or the agent therefor.

(i) The words "Standard Specifications" shall mean the provisions of the latest edition of the Standard Specifications for Public Works Construction (SSPWC) with all supplements, prepared and promulgated by the Southern California Chapters of the American Public Works Associated and Associated General Contractors of America. Part one of the SSPWC is hereby deleted.

2. Contract Documents.

(a) The Notice Inviting Bids, Instructions to Bidders, Proposal Bonds, Specifications and Drawings, with the Agreement, supplemental notices, Notice to Proceed, permits and change orders shall be considered as incorporated in the contract. The contract documents are complementary, and what is called for in one shall be as binding as if called for by all. The intent of the contract documents is to provide for the execution and completion of a finished piece of work. The Contractor shall provide all labor and services and furnish all materials and equipment as necessary, except those items definitely stipulated in the Specifications or Drawings to be furnished by the District. Anything shown in the Drawings and not the Specifications, or in the Specifications and not the Drawings, shall be performed by the Contractor as though shown in both the Drawings and the Specifications.

(b) The Drawings and the Specifications show conditions as they exist, to the best knowledge and belief of the District. The Contractor shall not be relieved of any liability or responsibility under this contract, and the district or any of its officers shall not be liable for any loss sustained by the Contractor because of any variation between conditions as shown on the Drawings and the actual conditions revealed during the progress of the work, except as provided in Section 4215 of the Government Code.

3. Precedence of Contract Documents.

(a) Should conflicts occur between Contract Documents, the document highest in precedence shall control. The precedence shall be:

(1) Permits from other agencies as may be required by law.
(2) Proposal.
(3) Special Conditions and Measurement and Payment.
(4) Technical Conditions.
(5) General Conditions
(6) Contract Drawings.
(7) Standard Plans.
(8) Standard Specifications.
(9) Reference Specifications.

(b) Change orders, supplemental agreements and approved revisions to plans and specifications will take precedence over documents listed above. Detailed plans shall have precedence over general plans.

4. Indemnification of District. Contractor shall indemnify and hold harmless and defend the United States Bureau of Reclamation, the District, their directors, employees, agents or volunteers, and each of them from and against:

(a) Any and all claims, demands, causes of action, damages, costs, expenses, losses or liabilities, in law or in equity, of every kind and nature whatsoever for, but not limited to, injury to or death of any person including District and/or Contractor, or any directors, officers, employees, agents or volunteers of District or Contractor, and damages to or destruction of property of any person, including but not limited to, District and/or Contractor and their directors, officers, employees, agents or volunteers, arising out of or in any manner directly or indirectly connected with the work to be performed under this agreement, however caused, regardless of any negligence of District or its directors, officers, employees, agents or volunteers, except the sole negligence or willful misconduct or active negligence of District or its directors, officers, employees, agents or volunteers.

(b) Any and all actions, proceedings, damages, costs expenses, penalties or liabilities, in law or equity, of every kind or nature whatsoever, arising out of resulting from, or on account of the violation of any governmental law or regulation, compliance with which is the responsibility of Contractor.

Contractor shall defend, at Contractor's own cost, expense and risk, any and all such aforesaid suits, actions or other legal proceedings of every kind that may be brought or instituted against District or District's directors, officers, employees, agents or volunteers.

Contractor shall pay and satisfy any judgment, award or decree that may be rendered against District or its directors, officers, employees, agents or volunteers, in any such suit, action or other legal proceeding.

Contractor shall reimburse District and its directors, officers, employees, agents and/or volunteers, for any and all legal expenses and costs incurred by each of them in connection therewith or in enforcing the indemnity herein provided.

Contractor agrees to carry insurance for this purpose as set out in the specifications.

5. Insurance.

(A) Contractor shall provide and maintain the following commercial general liability and automobile liability insurance:

(1) Coverage for commercial general liability and automobile liability insurance shall be at least as broad as the following:

a. Insurance Services Office Commercial General Liability coverage (Occurrence Form CG 0001).

b. Insurance Services Office Form Number CA 0001 (ed. 1/87) covering Automobile Liability, Code 1 (any auto).

(2) The Contractor shall maintain limits no less than the following:

a. General Liability. One million dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to the project/location (with the ISO CG 2501 or insurers equivalent endorsement provided to the district) or the general aggregate limit shall be twice the required occurrence limit.

b. Automobile Liability. One million dollars ($1,000,000 per accident for bodily injury and property damage combine single limit.

(3) The general liability and automobile liability policies are to contain, or be endorsed to contain the following provisions:

a. The United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers are to be covered as insureds as respects: liability arising out of activities performed by or on behalf of the Contractors, products and completed operations of the Contractor; premises owned, occupied or used by the Contractor; or automobiles owned, leased, hired or borrowed by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to the United States Bureau of Reclamation, Casitas Municipal Water District, its directors, officers, employees, agents and volunteers.

b. For any claims related to this project, the Contractor's insurance shall be primary insurance as respects the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers. Any insurance or self-insurance maintained by the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

c. Any failure to comply with reporting or other provisions of the policies including breaches of warrantees shall not affect coverage provided to the Unites States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers.

d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

e. Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, canceled by either party, reduced in coverage or in limits except after thirty (30) days prior to written notice by certified mail, return receipt requested, has been given to Casitas Municipal Water District.

f. Such liability insurance shall indemnify the Contractor and his subcontractors against loss from liability imposed by law upon, or assumed under contract by, the Contractor or his subcontractors for damages on account of such bodily injury (including death), property damage, personal injury and completed operations and products liability. Such insurance shall be provided on a policy written by underwriters through an agency satisfactory to the District (see Section 4-08.05), which includes a cross-liability clause, and covers bodily injury and property damage liability, owned and non-owned vehicles and equipment, blanket contractual liability and completed operations liability. Such liability insurance shall include explosion, collapse, underground excavation and removal of lateral support. The United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees agents and volunteers shall be named as additional primary insured on any such policies. An additional insured endorsement (ISO CG 2010 or equivalent) (modified to include provisions 2-5 above) and a certificate of insurance (Accord Form 25-S or equivalent), shall be provided to the District.

(4) Any deductible or self-insured retention must be declared to and approved by the District. At the option of the District, either the insurer shall reduce or eliminate such deductibles or self-insured retentions as respects the United States Bureau of Reclamation, Casitas Municipal Water District, their directors, officers, employees, agents and volunteers; or the Contractor shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

(5) Insurance is to be placed with insurers having a current A.M. Best's rating of no less than A:VII or equivalent.

(6) The Contractor shall not commence work under this contract, nor allow any subcontractor to commence work on this subcontract, until he has secured all insurance required under the section and has filed with the District, certificates of insurance in the amounts specified. Such certificates shall contain a provision that they may not be called without at least thirty (30) days' written notice to the District.

(B) **Worker's Compensation Insurance**.

(1) By his signature hereunder, Contractor certifies that he is aware of the provisions of Section 3700 of the Labor Code which require every employer to be insured against liability for worker's compensation or to undertake self-insurance in accordance with the provisions of that code, and he will comply with such provisions before commencing the performance of the work of this contract.

(2) The Contractor shall maintain, and shall cause all subcontractors he may employ to maintain adequate workers compensation insurance under the laws of the State of California for all labor employed by them, directly or indirectly, in the execution of the work. The Contractor and all subcontractors shall file with the District certification of such workers compensation insurance prior to beginning construction.

(C) **Evidences and Cancellation of Insurance**.

(1) Prior to execution of the contract, the Contractor shall file with the District evidence of insurance from an insurer or insurers certifying to the coverage of all insurance required herein. Such evidence shall include the ISO CG 2010 (or insurer's equivalent) signed by the insurer's representative and certificate of insurance (Accord Form 25-S or equivalent). All evidence of insurance shall be certified by a properly authorized officer, agent or qualified representative of the insurer and shall certify the names of the insured, any additional primary insurers, where appropriate, the type and amount of the insurance, the location and operations to which the insurance applies, the expiration date, and that the insurer will give by certified mail, written notice to the District at least thirty (30) days prior to the effective date of any cancellation, lapse or material change in the policy.

(2) The Contractor shall, upon demand of the District, deliver to the District all such policy or policies of insurance and the receipts for payment or premiums thereon; and should the Contractor neglect to obtain and maintain in force any such insurance or deliver such policy or policies and receipts to the District, then is shall be lawful for the District to obtain and maintain such insurance, and the Contractor hereby appoints the District his true and lawful attorney-in-fact to do all things necessary for this purpose. All money paid by the District for insurance premiums under the provisions of this article shall be charged to the Contractor.

6. Bonds.

(a) Payment Bond. The successful bidder shall file with the District a surety bond to be approved by the District in a sum of not less than one hundred percent (100%) of the total amount payable by the terms of the contract, conditional as provided by Section 3247 of the Civil Code.

(b) Performance Bond.

(1) The successful bidder shall also file with the District a surety bond, to be approved by the District in a sum of not less than one hundred percent (100%) of the total amount payable by the terms and conditions of the Contract. Pursuant to Public Contract Code Section 22300, at the request and expense of the Contractor, securities equivalent to the amounts withheld by the District to ensure performance under this contract, shall be deposited with the District. The District shall pay such monies to the Contractor upon satisfactory completion of the contract. Securities eligible for investment under this section shall include those listed in Government Code Section 16430, or bank or savings and loan certificates of deposit. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. If the securities to be deposited by the Contractor pursuant to this provision are in registered form, the registration shall be transferred to the District.

(2) Maintenance and Guarantee. The Contractor hereby guarantees that the entire work constructed by him under the Contract will meet fully all requirements thereof as to quality of workmanship and of materials furnished by him. The Contractor hereby agrees to make, at his own expense, any repairs or replacement made necessary by defects in material or workmanship supplied by him that becomes evident within one year after the date of final payment, and to restore to full compliance with the requirements of these Specifications, any part of the work which, during said one year period, is found to be deficient with respect to any provision of the Specifications. The Contractor shall make all repairs and replacement promptly upon receipt of written

orders from the Engineer to do so. If the Contractor fails to make the repairs and replacements promptly, the District may do the work and the Contractor and his Surety shall be liable to the District for the cost thereof.

(c) Each of said bonds shall be executed by the Contractor and a corporate surety licensed in the State of California. If the amount payable under terms of the Contract exceeds the original bid because of additional quantities and/or the issuance or change orders, said surety shall be required to cover the additional amount.

7. Additional Surety. If, during the continuance of the Contract, any of the sureties upon the faithful performance bond, in the opinion of the Engineer, are or become insufficient, he may require additional sufficient sureties, which the Contractor shall furnish to the satisfaction of the Engineer within 15 days after notice, and in default thereof, the contract may be suspended and the work completed as provided in Section 21 hereof.

8. Assignment Forbidden. The Contractor shall not assign, transfer, convey or otherwise dispose of this Contract, nor of his right, title or interest in any part thereof, nor any of the monies to become due and payable under the Contract, in any manner without the previous consent in writing of the Engineer. If the Contractor shall, without such written consent, assign, transfer, convey or otherwise dispose of any part of this Contract, or of any of the monies to become due and payable under the Contract, the District may, at its option, terminate the Contract according to Section 21 of these General Conditions. The District shall thereupon be relieved from all liability to the Contractor, and to his assignee or transferee.

9. Time and Order of Work. The Contractor shall at all times employ such personnel, and provide such services, materials and equipment as will be sufficient, in the opinion of the Engineer, to complete the work or any separable portions thereof according to a progress schedule, and within the time limit fixed by the Contract. If the Contractor should fail to maintain adequate progress, he may be required to employ additional personnel, and provide additional services, materials and equipment, and to modify his plans and procedure in such manner as to ensure completion of the work within the time limit fixed by the Contract. This provision shall not be the exclusive remedy of the District.

10. Protests. If the Contractor considers any of the work demanded of him to be outside the requirements of the Contract, or if he considers any order or ruling of the Engineer or any duly authorized representative to be unfair, he shall immediately ask for written instructions or divisions, whereupon he shall proceed without delay to perform the work or conform to the order or ruling; but unless the Contractor finds such instructions or divisions satisfactory, he shall, within ten (10) days after receipt of same, file a written protest with the Engineer, stating clearly and in detail his objections and the reasons therefor. Except for such grounds for protest or objections as are made of record in the manner specified and within the time stated herein, the Contractor hereby waives all grounds for protests or objections to the order, rulings, instructions, or decisions of the Engineer, and hereby agrees that as to all matters not included in such protest, the order, instructions and decisions of the Engineer shall be final and conclusive.

11. Authority of the Engineer. The work shall be observed by the Engineer to determine that the work is being completed according to the plan, specifications and design and planning concepts. The Contractor shall be responsible for the supervision of construction processes, site condition, operation, equipment, personnel and the maintenance of a safe place to work or any safety in, on or about the work site until such time as the District files a Notice of Completion. The Engineer, however, reserves the right to determine the adequacy of the Contractor's method, plant, and appurtenance to determine in all cases the amount, quality, acceptability and fitness of the work and material to be provided under the Contract, to determine all questions in relation to said work and construction thereof, and to decide in all cases any question which may arise concerning the

fulfillment of this Contract by the Contractor. Should any discrepancy appear or any misunderstanding arising as the import of anything contained in the Specifications or Drawings, the matter shall be referred to other Engineer and his decision shall be binding on the Contractor. Any differences or conflicts which may arise between the Contractor and other contractors performing work for the District shall be adjusted to the satisfaction of the Engineer.

12. Right of Way and Encroachment.

(a) Except as otherwise stated in the Special Conditions, the right of way for the work to be constructed under these Specifications will be provided by the District. This shall not be interpreted as giving the Contractor exclusive occupancy of the right of way provided. When the work to be performed is located within State Highway, County or Southern Pacific Railroad rights of way, or within a water course which is under the jurisdiction of the Ventura County Flood Control District, the Contractor will be required to obtain construction permits from those agencies in his own name.

(b) Right of way to be furnished by the District for construction operations and other purposes will be specifically shown on the Drawings or provided for in the Detailed Specifications. Should the Contractor find it necessary to use any additional lands during the construction of the work, he shall provide for the use of such lands at his own expense.

13. Errors or Discrepancies Noted by Contractor.

(a) If the Contractor, either before commencing work or during the work, finds any discrepancy between these Specifications and Drawings, or between either of them an the physical conditions at the site of the work, or finds any error or omission in any of the Drawings or in any survey, he shall promptly notify the Engineer in writing of such discrepancy, error, or omission. If the Contractor observes that any drawings or specifications are at variance with any applicable law, ordinance, regulations, order or degree, he shall promptly notify the Engineer, in writing, of such conflict.

(b) The Engineer, upon receipt of any such notice, shall promptly investigate the circumstances and give appropriate instructions to the Contractor. Until such instructions are given, any work doe by the Contractor, either directly or indirectly after his discovery of such error, discrepancy or conflict, will be at his own risk and he shall bear all costs arising therefrom.

14. Extra Work.

(a) If, during the performance of the Contract, it shall, in the opinion of the Engineer, become necessary or desirable, for the proper completion of the contract, to order work done or materials or equipment furnished which, in the opinion of the Engineer, are not susceptible of classification under the bid items, the Contractor shall do and perform such work and furnish such materials and equipment as extra work, as hereinafter provided. All extra work shall be ordered in writing before it is started. No extra work shall be paid for unless ordered in writing.

(b) Extra work will ordinarily be paid for at a lump sum or unit price agreed upon in writing by the Engineer and the Contractor before the extra work shall be ordered.

(c) When the price of the extra work cannot be agreed upon, the District will pay for the extra work based on the accumulation of costs as provided in subsections (d) through (I). The failure of the Contractor to comply with the requirements of this section shall deem the Engineer to establish costs as he deems reasonable.

(d) At the close of each working day, the Contractor shall submit a daily report to the Engineer, on forms approved by the District, together with applicable delivery tickets, listing all labor, materials, and equipment involved for that day, and for other services and expenditures when authorized. An attempt shall be made to reconcile the report daily, and it shall be signed by the Engineer and the Contractor. In case of disagreement, pertinent notes shall be entered by each party to explain points which cannot be resolved immediately. Each party shall retain a signed copy of the report. Reports by subcontractors or others shall be submitted through the prime contractor. Said reports shall contain the following information:

(1) The names of workers, classification and hours worked;

(2) A description and the amount of materials used;

(3) The type of equipment, size, identification number and hours of operation, including loading and transportation if available;

(4) Other services and expenditures shall be described in such detail as the District may require.

(e) The costs of labor will be the actual cost for wages prevailing locally for each craft or type of worker at the time the extra work is done, plus employer payments of payroll taxes and insurance, health and welfare, pension, vacation, apprenticeship funds, and other direct costs resulting from Federal, State or local laws, as well as assessment or benefits required by lawful collective bargaining agreements. The use of a labor classification which would increase the extra work costs will not be permitted unless the Contractor establishes the necessity for such additional costs. Labor costs for equipment operators and helpers shall be reported only when such costs are not included in the invoice for equipment rental.

(f) The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available and delivered to the job site in the entities involved, plus sales tax, freight and delivery. The District reserves the right to approve material sources of supply, or to supply materials to the Contractor if necessary for the progress of the work. No markup shall be applied to any material provided by the District.

(g) No payment will be made for the use of tools which have a replacement value of $100 or less. Regardless of ownership, the rates to be used in determining equipment rental costs shall not exceed listed rates prevailing locally at equipment rental agencies or distributors, at the time the work is performed. If local rental costs are unavailable, the Contractor shall submit his costs to operate the equipment compiled and signed by a Certified Public Accountant. The rental rates paid shall include the cost of fuel, oil, lubrication, supplies, small tools, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance and all incidentals. Necessary loading and transportation costs for equipment used on the extra work shall be included. If equipment is used intermittently and, when not in use, could be returned to its rental source at less expense to the District than holding it at the work site, it shall be returned, unless the Contractor elects to keep it at the work site at no expense to the District. All equipment shall be acceptable to the Engineer, in good working condition, and suitable for the purpose for which it is to be used. Manufacturer's ratings and manufacturer's approved modifications shall be used to classify equipment, and it shall be powered by a unit of at least the minimum rating recommended by the manufacturer. The reported rental time of the equipment already at the job site shall be the duration of its use on the extra work, plus the time required to move it from its previous site and back or to a closer site.

(h) The District may authorize other items which may be required on the extra work. Such items include labor, services, material, and equipment which are different in their nature form those required for the

work specified in the Contract which are of a type not ordinarily available from the Contractor or any of the subcontractors. Invoices covering all such items in detail shall be submitted with the request for payment.

(i) Vendors' invoices for material, equipment rental, and other expenditures, shall be submitted with the request for payment. If the request for payment is not substantiated by invoices or other documentation, the District may establish the cost of the item involved at the lowest price which was current at the time of the report.

(j) The following percentage shall be added to the Contractor's costs and shall constitute the markup for all overhead and profits:

Labor	10%
Materials	10%
Equipment Rental	10%
Other Items and Expenditures	10%

To the sum of the costs and markups provided for in this subsection, one percent (1%) shall be added as compensation for bond and liability insurance.

(k) When all or any part of the extra work is performed by any of the Contractor's subcontractors, the markups established in Subsection (14)(j) shall be applied to the subcontractor's actual cost of such work, to which a markup of five percent (5%) on the subcontracted portion of the extra work may be added by the prime contractor.

(l) Any extra work performed hereunder shall be subject to all of the provisions of the Contract and the Contractor's sureties shall be bound with reference thereto as under the original Contract.

15. Changed Conditions.

(a) The Contractor shall notify the Engineer in writing of the following work site conditions, hereinafter called changed conditions, promptly upon their discovery and before they are disturbed:

(1) Subsurface or latent physical conditions differing materially from those represented in the Contract; and

(2) Unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the character of the work being performed.

(3) Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the Health and Safety Code, that is required to be removed to a Class I, Class II, or Class III disposal site in accordance with provisions of existing law.

(b) The Engineer will promptly investigate conditions when notified of any conditions which appear to be changed conditions. If the Engineer determines that the conditions are changed conditions and that they will materially increase or decrease the costs of any portion of the work, a change order will be issued adjusting the compensation for such portion of the work. If the Engineer determines that conditions of which he/she has been notified by the Contractor do not justify an adjustment in compensation, the Contractor will be so advised in writing. Should the Contractor disagree with such determination, he may submit a protest to the Engineer, as provided in Section 10 of these General Conditions.

(c) If the Engineer determines that the conditions are changed conditions and that they will materially affect the performance time, the Contractor, upon submitting a written request, may be granted an extension of time subject to the provisions of Section 22.

(d) The Contractor's failure to give notice of changed conditions promptly upon their discovery and before they are distributed shall constitute a waiver of all claims in connection therewith.

16. Disputed Work.

(a) If unable to reach agreement under any of the foregoing procedures, the District may direct the Contractor to proceed with the work. Payment shall be as later determined by arbitration, if District and Contractor agree thereto, or as fixed in a court of law.

(b) Although not to be construed as proceeding under extra work provisions, the Contractor shall keep and furnish records of disputed work according to Section 14.

17. Legal Action by Contractor.

(a) No legal action shall be commenced against the District concerning the Contract until any dispute or decision of the Engineer has been appealed and denied by the District's Board of Directors. The Board's refusal to consider or failure to consider a written appeal within thirty (30) calendar days after receipt shall be deemed denial of such appeal.

(b) Prior to submitting any appeal to the Board, the Contractor shall exhaust his administrative remedies by attempting to resolve the dispute with the District's staff in the following sequence:

Construction Inspector
District Engineering
General Manager
Board of Directors

(c) Should any of the listed persons fail to consider a request by the Contractor for reconsideration of a decision within three (3) working days after receiving written request to do so, the Contractor may proceed directly to the next person in the list. At the option of the District, the person to whom the request for reconsideration is directed may elect to take such request to a higher level and the Contractor's request shall be deemed to be properly submitted to such higher level.

(d) Nothing in this subsection shall be considered as relieving the Contractor from duties required by the Contract documents.

18. Changes.

(a) If either the Engineer or the Contractor, because of conditions which develop during the progress of the work, finds it impracticable to comply strictly with these Specifications, the Engineer may prescribe a modification of requirements or methods of work. For such purposes, the Engineer may, any time during the life of the Contract, by written order, make such changes, as Engineer shall find necessary, in the design, engineer, grade, form, location, dimensions, plan, or material of any part of the work or equipment to be furnished. If such changes increase or diminish the quantity of work to be done, they shall not constitute the basis for a claim for damages or anticipated profits in the work that may be dispensed with; provided that if

such changes or alterations render useless any work already done or materials already furnished or used in the work, the Engineer shall make reasonable allowance therefore, which action shall be binding upon both parties.

(b) In case of increasing or decreasing of work, the total amount of work actually done or materials or equipment furnished shall be paid for according to the unit price established for such work under the contract, wherever such unit price has been established. In the event no prices are named in the Contract but cover such changes or alterations, the cost of such changes shall be determined as provided in Section 14(c).

19. Discovery of an Unknown Utility.

(a) The Contractor's attention is directed to Section 4215 of the Government Code which provides that the district assumes the responsibility for the removal, relocation or protection of the existing utilities located on the site of any construction project if such utilities are not identified by the District in the plans and specifications made a part hereof.

(b) If the Contractor, while performing the Contract, discovers utility facilities not identified by the District in the Contract plans and specifications, the Contractor shall immediately notify the District. The Contractor shall not be assessed liquidated damages for delay in completion of the project, which such delay is caused by the failure of the District or the owner of the utility to provide for removal or relocation of the exiting utility facilities.

(c) In the event that the discovery of said utility facilities may cause extra work, the Contractor is required to obtain written authorization to change or modify the work according to Sections 14 and 18 of these General Conditions, entitled "Extra Work" and "Changes," respectively.

(d) The Contractor's failure to give said notice promptly upon discovery of an unknown utility or the Contractor's failure to obtain written approval for any work concerning the relocation, protection and/or removal of the said unknown utility or for any work relative to the modification of any portion of the work prior to the beginning of any of said work, shall constitute a waiver of any rights to any claim in connection therewith.

20. Termination of Contract.

(a) General. If, at any time before completion of work under the contract, it shall be found by the District that reasons beyond the control of the parties hereto render it impossible, or against the best interest of the District, to complete the work contracted to be done; or if the work shall have been prevented or suspended by injunction issued by a court of competent jurisdiction nor by any other order of constituted authority for a period in excess of 30 consecutive days; the District, by written thirty (30) day notice to the Contractor, may discontinue the work and terminate the contract; or, in the event the entire work shall have been suspended by the District, through no fault of the Contractor, in writing, the Contract shall be discontinued. Upon the service of notice of termination, the Contractor shall discontinue the work in such manner, sequence, and at such times as the Engineer may direct, continuing and doing, after said notice, only such work and only until such time or times as the Engineer may direct. Such work shall be paid for as extra work according to Section 14 of these General Conditions. The Contractor shall have no claim for damages for such discontinuance or termination of the Contract, nor shall the Contractor have any claim for anticipated profits on the work thus dispensed with, nor any other claim; except: (1) for the work actually performed between the date of the notice of termination and the time of complete discontinuance; and (2) for any liquidated damages accruing up to the date of said notice of termination according to the provisions of the Special Conditions.

(b) Consumable Supplies. In the event of discontinuance and termination of the contract, the District may, and at the request of the Contractor shall, purchase from the Contractor all consumable supplies of the Contractor on hand, or in transit, or on definite commitment which, in the opinion of the Engineer, are suitable and required, except for such discontinuance and termination, to complete the work, and the District shall pay the Contractor for such consumable supplies the prices paid therefor by the Contractor.

(c) Completion of Contract. In the event that the work shall be discontinued and the Contract terminated, the satisfactory completion of such work, as the Engineer may thereafter direct, and satisfactory compliance with the terms of said order shall be deemed the completion of the work specified in the Contract; and the final estimate shall be the amount of work completed to the time of such discontinuance and termination, with such other sums as may be due the Contractor according to the provisions of this section.

21. Suspension of Contract.

(a) If the work to be done under the Contract shall be abandoned by the Contractor, or if the Contractor shall make a general assignment for the benefit of his creditors or be adjudicated as bankrupt, or if a receiver of his property or business be appointed by a court of competent jurisdiction, or if this Contract shall be assigned by him otherwise than hereinbefore specified, or if at any time the Engineer shall be of the opinion that the performance of the contract is unnecessarily or unreasonably delayed, or that the Contractor is willfully violating any of the conditions of the Contract, or is executing the same in bad faith or not according to the terms thereof, or if the work be not fully completed within the time named in the Contract for its completion or within the time to which the completion of the Contract may have been extended as hereinafter provided, the Board may, by written notice, instruct the Contractor to discontinue all work, or any part thereof, under this Contract.

(b) When such written notice is served upon the Contractor, he shall immediately discontinue the work or such part thereof as covered by the notice, and shall not resume the same by written notice from the Board, in which case work shall be resumed in ten (10) days. In any such case, the District may take charge of the work and complete it by a new contract or by force account and charge the expense of completion by either method to the Contractor. In so doing, the District may take possession of and use any of the materials, plans, tools, equipment, supplies and property of every kind provided by the Contractor for the purpose of his work. Any such charges shall be deducted from such monies as may be due or may at any time hereafter become due the Contractor under this contract or at any part thereof. In case such expense shall exceed the amount which would have been due the contractor under the Contract if the same had been completed by him, he shall pay the amount of such excess to the District; and in case such expense shall be less than the amount which would have been payable under this contract if the same had been completed by the Contractor, he shall have no claim to the difference except to such extent as may be necessary, in the opinion of the Engineer, to reimburse the Contractor or the Contractor's sureties for any expense properly incurred for plans, equipment, materials, supplies and labor devoted to the prosecution of the work, of which the District shall have received the benefit which shall not have been otherwise paid for by the District. In computing such expense the salvage value of such plans and equipment, at completion of the work, shall be deducted from the depreciated value thereof at the time taken over by the District and the difference shall be considered the expense. All necessary estimate and appraisals shall be made by the Engineer.

(c) When any particular part of the work is being carried on by the District, by Contract or otherwise, under the provisions of this section, the Contractor shall continue the remainder of the work in conformity with the terms of the Contract, and in such a manner as to nowise hinder or interfere with the persons or workers employed, as provided above, by the District, to do any part of the work, or to complete the same under the provisions of this section.

22. Extension of Time of Completion.

(a) If the work shall be delayed in consequence of suspension by the District except as provided in Section 21 or of failure by the District to provide right of way, or of any other act or omission of the District, or by strikes, acts of God, delay of delivery or properly ordered materials for which a delivery time has not been stated in the Proposal, or other unforeseeable causes beyond the control and without the fault or negligence of the Contractor or his subcontractors, the Contractor shall be entitled to so much additional time wherein to perform and complete the contract on his part as the Engineer shall certify in writing to be just.

(b) Application for extension of time must be made to the Engineer, in writing, stating cause, within the ten (10) days immediately following the end of such delay.

(c) Permitting the Contractor to continue and finish the work, or any part of it, after the date to which the time fixed for its completion may have been extended, shall in no way operate as a waiver on the part of the District of any of its rights under this Contract.

(d) The Contractor shall receive no compensation on account of any suspension of the work either in whole or in part or for any delay or hindrance herein mentioned except as provided in the Special Conditions.

(e) No extension of time shall be made for ordinary delays and accidents and the occurrence of such shall not relieve the Contractor from the necessity of maintaining the required progress. In the case of an extension of time by the Engineer for completion of the contract as provided for in these Specifications, a revised schedule of progress may be prescribed according to such extension of time.

23. Failure to Complete on Time.

(a) The Contractor shall pay for each and every calendar day that he shall be in default in completing the whole work to be done under this contract, the sum named in these conditions, which sum is by the execution of this agreement mutually agreed upon as liquidated damages which the District shall suffer by reason of such default. The District shall have the right to deduct the amount of such damages from any monies due or to become due the Contractor under this Contract.

(b) The Contractor shall not be assessed liquidated damages for failure to complete the work on time due to any of the causes stated in Section 22(a).

24. Liquidated Damages.

(a) Pursuant to Section 23 of these General Conditions, failure of the Contractor to complete the work within the time allowed will result in damages being sustained by the District. Such damages are, and will continue to be, impractical and extremely difficult to determine. For each consecutive calendar day in excess of the time specified for completion of the work (as adjusted by change order), the Contractor shall pay the District, or have withheld from monies due it, the sum of $1,500, except as otherwise specified in Part C or the Agreement.

(b) Execution of the Contract under these Specifications shall constitute agreement by the District and Contractor that $1,500 per day, except as otherwise specified in Part C or the Agreement, is the minimum value of the costs and actual damage caused by failure of the Contractor to complete the work within the allotted time, that such sum is liquidated damages and shall not be construed as a penalty, and that such sum may be deducted from payments due the Contractor if such delay occurs.

25. Contractor's Responsibility.

(a) The Contractor shall be responsible for safe and efficient execution of the work to secure the safety of the workers, the quality of the work and the stipulated rate of progress.

(b) The Contractor shall bear all losses resulting to him no account of the amount or character of the work, or from any unforeseen obstruction or difficulties which may be encountered, or because of weather, floods, or other causes, except as follows:

(1) The Contractor shall not be responsible for the cost of repairing or restoring damage to the work which damage was caused by an act of God, as defined in Public Contract Code Section 7105, and shall be the basis for determining the extent of the District's liability, if any.

(2) It shall be the responsibility of the Contractor to take all reasonable and adequate measures to protect the work from damage and/or to minimize any damage to the work.

(3) The District reserves the right to make changes in the plans and Specifications applicable to the portion of the work to be restored. The District reserves the right to terminate the Contract and relieve the Contractor of further obligations to perform the work. In the event that the work damaged is to be repaired or restored either, in kind or changed by the engineer, a contract change order will be provided according to Sections 14 and 18 of the General Conditions of this Specification. The change order may provide for the Contractor to perform any work deemed by the Engineer as necessary to put the project in satisfactory condition for the termination of all work.

(4) The District may require the Contractor to submit as a separate bid item the insurance premium covering the cost of work destroyed in whole or in part by an "Act of God," as defined in Public Contract Code 7105 and provide such insurance to indemnify the District for any damage to the work caused by an "Act of God," and to rebuild said work with the proceeds of said insurance. If the District elects to do so, said insurance shall be in lieu of the provision of the Public Contract Code 7105.

(c) The Contractor shall be responsible for all material, except defective material, furnished by the District, and for the care of all work until its completion and final acceptance, and he shall at his own expense replace damaged, lost or stolen material and repair damaged parts of the work, or the same may be done at his expense by the District.

(d) During the progress of the work, the Contractor shall keep the premises occupied by him in a neat and clean condition. When the work is completed he will be required to remove all debris caused by him in his operations, repair all damage to existing improvements done by him or his employees and leave the site of the work in a neat condition. In the event of his failure to do so, the same may be done at his expense by the District.

(e) The Contractor shall be responsible for all damage or injury which may be caused on any property by trespass of the Contractor's employees during their employment, whether the said trespass was committed with or without the consent or knowledge of the Contractor.

(f) The Contractor shall provide at his own expense, all necessary water, telephone, and power required for his operations under the Contract, except as provided for in the Special Conditions.

(g) The Contractor shall so conduct his operations as not to close or obstruct any portion of any highway, road, or street, or prevent in any way free access to fire hydrants until permission to do so has been obtained from the proper authorities.

(h) The Contractor shall be responsible for determining the nature and extent of any simultaneous, collateral, and essential work by others. The Contractor shall coordinate his operation and cooperate with others to minimize interferences, conflicts, and/or any other related conduct during the construction of the work.

26. Shop Drawings.

(a) Drawings and prints of articles, machinery, or fabricated materials entering into permanent construction which are required to be furnished by the Contractor and for which detailed drawings are not furnished by the District, the Contractor shall submit electronic copies in Adobe Acrobat (pdf) format to the District. The District shall approve such drawings or return them electronically to the Contractor with requirements for approval within ten (10) days after the date of submission.

(b) Approval by the District on items called for under these Specifications does not relieve the Contractor from the responsibility for errors, omissions or deviations from the Contract documents unless such deviations were specifically called to the attention of the Engineer in the letter of transmittal submitted with the material for approval.

(c) If the Contractor objects to any conditions imposed by the District in granting said approvals, he shall immediately give the District written notification.

27. Trench Shoring Plans.

(a) In compliance with Section 6705 of the Labor Code, the Contractor, at his sole expense, shall be required to submit detailed shoring plans for review by the District's Engineer for all construction projects and/or any related modifications, revision or changes thereto, which are in excess of $25,000, for the excavation of any trench, trenches, or other excavation five (5) feet or more in depth.

(b) Shoring plans shall show the details of the shoring, bracing, sloping and all other provisions to be made for the workers' protection from the hazard of caving ground during the excavation of any trench, trenches, or other excavation.

(c) Such shoring plans shall be prepared by a qualified civil or structural engineer registered in the State of California in the event that such plans vary or deviate, in any manner, from the shoring system standards as outlined in the State Construction Safety Orders issued by the Division of Industrial Safety, State of California.

(d) The Contractor shall submit the shoring plans to the Division of Industrial Safety, State of California, for its approval.

(e) The Contractor shall be required to submit the shoring plans within fifteen (15) days after notification of an award of a contract has been sent.

28. Safety Permit.

(a) In compliance with Section 6424 of the Labor Code, the Contractor, at his sole expense, shall be required to obtain a permit from the Division of Industrial Safety for the excavation of any trench, trenches, or other excavation five (5) feet or more in depth, prior to beginning any excavation work that is not covered by Section 6422 of the Labor Code.

(b) A copy of all permits issued and the related construction safety orders approved by the Division of Industrial Safety shall be filed with the District within fifteen (15) days after notification of the award of a contract, or within three (3) days after issuance of the permit, and prior to the beginning of the excavation of any trench, trenches, or other excavation five (5) feet or more in depth.

(c) Additional permits may be required for each modification, revision or change in the work.

(d) Safety permits required by Section 6424 of the Labor Code shall be in addition to all other permits required.

29. Personal Attention. The Contractor shall give his personal attention constantly to the faithful prosecution of the work, and shall be present, either in person or by a duly authorized and competent representative, on the site of the work continually during its progress, to receive directions or instructions from the Engineer. Whenever the Contractor is not present on any part of the work where it may be desired to give directions, orders my be given by the Engineer, and shall be received and obeyed by the superintendent or foreman who may have charge of the particular part of the work in reference to which orders are given.

30. Laws, Regulations and Permits.

(a) The contractor shall give all notices required by law and comply with all laws, ordinances, rules and regulations pertaining to the conduct of the work. The contractor shall be liable for all violations of the law in connection with the work furnished by the contractor. If the contractor observes that the drawings or specifications are at variance with any law or ordinance, rule or regulation, he shall promptly notify the engineer in writing and any necessary changes shall be made by written instruction or change order. If the contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations and without giving notice to the engineer, the contractor shall bear all costs arising therefrom.

(b) The Contractor shall submit a certification that they are in compliance with the Civil Rights Act of 1964 as amended by the Equal Employment Opportunity Act of 1972, the California Fair Employment Practice Act of 1959, as amended, California Labor Code Section 1777.5 and Section 1735 and any other applicable Federal and State laws and regulations hereinafter enacted. Certification of Compliance with Executive Order 11246, as amended, will be required when applicable. Such certification shall be on forms satisfactory to the District.

(c) The following are exempted from the above provisions in relation to affirmative action efforts:

(1) Contractors, subcontractors and suppliers who have a paid work force of less than fifteen (15) persons.

(2) Contracts and subcontracts which do not exceed $10,000.00.

(3) Contracts and subcontracts which are deemed by the Board to be an "Emergency" nature or an apparent "Sole Source" purchase.

(4) Exemptions may be denied by the Board pursuant to a finding by the District that the exemption is having an adverse effect on the purpose of these Specifications. Additional exemptions may be granted by the Board for reasons of a similar finding.

(d) The Contractor shall only use equipment that complies with the state air quality regulations and the Ventura Air Pollution Control District regulations.

31. Sales and/or Use Taxes. Except as may be otherwise specifically provided herein, all sales and/or use taxes assessed by Federal, State or local authorities on materials used or furnished by the Contractor in performing the work hereunder shall be paid by the Contractor.

32. Construction Schedule. Prior to commencing the work, the Contractor shall submit a detailed construction schedule. At the beginning of each month as may be required by the Engineer, the Contractor shall submit an updated construction schedule. Said construction schedule shall show the order in which the Contractor proposes to complete the work, the dates when the various parts of the work are to begin and the estimated dates of completion. The detailed schedule shall be a modified bar type and shall show each principal item of work or activity.

33. Inspection.

(a) All materials furnished and all work done under these Specifications shall be subject to rigid inspection. The Contractor shall furnish the Engineer every reasonable facility for ascertaining whether the work is in accordance with the requirements and intent of these Specifications.

(b) Work done in the absence of prescribed inspection may be required to be removed and replaced under the proper inspection. The entire cost of removal and replacement, including the cost of all materials which may be furnished by the District and used in the work removed, shall be borne by the Contractor, irrespective of whether the work removed is found to be defective.

(c) Work covered up without the authority of the Engineer shall, upon order of the Engineer, be uncovered to the extent required, and the Contractor shall bear the entire cost of performing all the work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement, as directed and approved by the Engineer.

(d) Nothing in these Specifications shall be construed to mean that the District will provide continuous inspection. The Contractor shall cooperate and coordinate his activities in order that he work can be inspected to the satisfaction of the Engineer.

(e) The Contractor shall keep the Engineer informed, a reasonable time in advance, of the times and places at which he intends to do work, so that the inspection and the necessary measurements may be made with a minimum of inconvenience to the Engineer, or delay to the Contractor.

34. Construction Staking.

(a) The Engineer will provide only minimal construction staking, the extent of which will be described in the Special Conditions hereof. The Contractor shall be required to provide all other additional staking and/or measurements necessary for the proper execution of the work.

(b) The Contractor shall notify the Engineer in writing at least five (5) working days before the time the Contractor will require the construction staking.

(c) The Contractor shall be required to preserve all bench marks, monuments, survey marks and construction stakes, and in case of their removal or destruction caused by the Contractor's activities, the Contractor shall be liable of the cost of their replacement.

35. Construction Interferences.

(a) Insofar as practicable during the progress of the work, the Contractor shall not disturb, but shall support and protect against injury, and maintain in good operating condition at his own expense, all subsurface, surface and overhead utilities, structures and other facilities as are encountered in the prosecution of the work.

(b) In the event that subsurface, surface, or overhead utilities, structures or other facilities are required to be disturbed or removed out permit the construction of the work, the Contractor shall not do any work that would affect such utilities, structures or facilities, or enter upon the right of way or other lands appurtenant thereto until notified by the Engineer that authority has been obtained to do so. The Engineer will make all necessary arrangements with the owner or other utilities for their relocation and reconnection, without cost to the Contractor, including the reconnection of services and the resurfacing of trenches required for said location; provided such arrangements shall not relieve the Contractor of his responsibilities as outlined in Section 2(b) of these General Conditions, nor the responsibility of proper care and protection of any utilities, structures or facilities encountered because of such varying conditions. The Contractor shall coordinate his operations with those of the owner or owners concerned with the disturbance or removal of facilities to minimize the inconvenience imposed on all affected parties.

(c) Except as provided in Section 4215 of the Government Code and in the event the Contractor disturbs, disconnects or damages any subsurface, surface, or overhead utility, structure or other facility prior to the making of necessary arrangements by the Engineer with the owner thereof, he shall immediately give to the owner notice of said disturbance, disconnection, or damage, and the Contractor shall assume all responsibility connected therewith, event in the even such damage occurs after backfilling or is not discovered until after completion of backfilling, and the provisions of this subsection shall continue in force until the termination of the guarantee period provided.

(d) All facilities removed shall be reconstructed as promptly as is possible in its original or other authorized location, and in a condition at least as good as when removed and subject to the inspection of the owner or of the governing body having jurisdiction.

(e) During the performance of the work under these Specifications, the owners or agencies in control of any of the facilities affected by the work shall have the right to enter, when necessary, upon the project right of way, or upon any street or other public way affected by the Contractor's operations, or any portion thereof, for the purpose of maintaining service and of making changes in or repairs to said facilities.

(f) The District reserves the right during the progress of the work and upon determination of the actual position of the existing utilities, structures, and other facilities, to make changes in the grade or alignment, or both, of the District's facilities wherever by so doing the necessity for relocation as provided herein of such utility, structures, or other facility will be avoided; provided that such changes shall not entitle the Contractor to additional compensation other than according to the prices named in the Bidding Sheet for the respective contract items.

(g) In the event the Contractor discovers a substructure as defined in Section 4215 of the Government Code and not identified by the District on the contract plans and Specifications, the Contractor shall be required to notify the District in writing. In the event that such discovery may cause extra work, the Contractor shall be required to obtain written authorization to change or modify the work according to Sections 14 and 18 of these General Conditions of the Specifications.

(h) Whether the Contractor is entitled to any additional compensation for any work hereinbefore described in Section 36 of these General Conditions shall be governed by the applicable portions of Section 4215 of the Government Code or amendments thereto.

(i) The Contractor shall make every effort to protect and preserve all trees encountered in the work. Any trees which unreasonably interfere with the work shall, with the approval of the Engineer, be removed by the Contractor. The cost of the removal shall be borne by the Contractor.

36. Materials, Workmanship, and Tests. The Contractor shall submit samples, specimens, or test pieces of such materials to be furnished or used in the work as the Engineer shall require. All materials must be new and must be of the specified quality and equal to approved samples. The Contractor shall furnish, without cost to the District, such quantities of construction materials as may be required for test purposes, and shall place at the Engineer's disposal all available facilities for and cooperate with him in the sampling and testing of all materials and workmanship. All work shall be done and completed in a thorough workmanlike manner, notwithstanding any omission from these Specifications or the Drawings.

37. Certification of Materials and Equipment

(a) All materials and equipment furnished by the Contractor shall be according to these Specifications. Any time when requested by the Engineer, the Contractor shall furnish written certification from the manufacturer of the various materials and equipment that such materials and equipment do meet all of the requirements of these Specifications. When requested by the Engineer, such certification shall be furnished to the District before payment to the Contractor, for the material and/or equipment in question, will be made.

(b) Where reference is made in these Specifications to a specification or test designation of the American Water Works Association, the American Society for Testing and Materials, the American Association of State Highway Officials, Federal Specifications, or any other recognized national organization, and the number or other identification accompanying the test designation representing the year of adoption of latest revision of the test is omitted, it shall mean the test method in effect on the date of the Notice Inviting Bids for the work.

38. Defective Work or Materials.

(a) The inspection of the work shall not relieve the Contractor of any of his obligations to fulfill his contract as herein prescribed, and defective work shall be made good, and unsuitable materials may be rejected, notwithstanding that such work and materials have been previously inspected by the Engineer and accepted or estimated for payment. If the work, or any part thereof, shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good such defect without compensation in a manner satisfactory to the Engineer and shall be charged for any excess material furnished by the District.

(b) If any materials furnished and brought upon the ground by the Contractor for use in the work, or selected for the same by him, shall be condemned by the Engineer as unsuitable or not in conformity with the

Specifications, the Contractor shall forthwith discard such materials and remove them to a satisfactory distance from the vicinity of the work.

(c) If the Contractor shall fail or neglect to make ordered repairs of defective work or to remove condemned materials from the work within ten (10) days after the service by the Engineer of an order to do so, the Engineer acting on behalf of the District may make the ordered repairs or remove the condemned materials and deduct the cost thereof from any monies due the Contractor.

39. Use of "Or Equal."

(a) Any material or article of equipment designated by manufacturer's name, trade name, catalog reference or brand and qualified by "or equal" shall be understood to be a standard of quality and performance. Articles of other make will be acceptable provided they are, in the opinion of the Engineer, of equal quality and/or capable of equal performance. Names, brands and characteristics of proposed substitute materials shall be submitted to the Engineer for approval and no such substitute materials shall be purchased or delivered to the project until the Engineer's approval, in writing, has been obtained.

(b) The Contractor may be required to obtain certification from a qualified testing laboratory approved by the Engineer that such proposed substitute materials meet the minimum requirements in the Specifications, and/or that such proposed substitute materials are of equal quality and performance of the material or article designated in the Specifications. Such certification shall be required prior to obtaining the Engineer's approval, and shall be at the sole expense of the Contractor.

40. Property Rights in Materials.

(a) Nothing in this contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or the soil, or after payment has been made for the value of unused material delivered to the site of the work as provided for in Sections 45, 58 through 65 inclusive hereof. All such materials attached or affixed or unused shall become the property of the District.

(b) The District reserves the right to use any or all of the completed facilities either after said facilities are connected to the existing facilities or otherwise completed by the Contractor as set forth in Section 45 hereof and prior to acceptance of the work by the Board.

41. Title to Materials Found on the Work. Except as may otherwise be provided in these Specifications, the right to the use of all soil, stone, gravel, sand and all other materials and equipment developed or obtained in the excavation or other operations by the Contractor or any subcontractor or any of their employees, and the right to use and/or dispose of the same, are hereby expressly reserved by the District and neither the Contractor nor any subcontractor, nor any of their employees shall have any right, title or interest in or to any part thereof nor shall they, nor any of them, assert or make any claim thereto. The Contractor shall be permitted to use in the work without charge any such materials which meet the requirements of these Specifications.

42. Patents and Copyrights. The Contractor shall hold and save the District, its officers, agents and employees, harmless from liability of any nature and kind, including costs and expense, for or because of any copyrighted or uncopyrighted composition, secret process, patented or unpatented invention, article, or appliances, manufactured, furnished, or used by him in the performance of this contract, including their use by the District, unless otherwise specifically stipulated in this contract.

43. Responsibility for Safe Storage. The Contractor shall be responsible for the safe storage of the material furnished by or to him and accepted by him and intended for the work until it has been incorporated in the completed project. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign matter at all times.

44. Completion. When in the opinion of the Contractor, the work under this contract has been fully completed according to the plans and Specifications, he shall notify the Engineer. Upon such notification, the Engineer shall, within a reasonable time, make a field inspection of the work and shall satisfy himself by examination and such tests as may be necessary that the work has been fully and properly completed according to the plans and Specifications. If any deficiencies are found, the Engineer shall notify the Contractor of the measures to be taken to correct them. When all deficiencies, if any, are corrected to the satisfaction of the Engineer, the work shall be deemed completed and the date of such completion shall be used in computing the Liquidated Damages, if any, as set forth in Section 24.

45. Final Cleanup. Upon completion of the work and before the final inspection and estimate is prepared, the Contractor shall, at his own expense, dispose of and remove from the vicinity of the work, all rubbish, unused materials and other items used under his direction during construction and perform cleanup to the satisfaction of the Engineer.

46. Responsibility for a Safe Place to Work.

(a) The Contractor's attention is directed to Section 4 of these General Conditions entitled, "Indemnification of District."

(b) The Contractor shall be responsible for the maintenance of a safe place to work and any safety in or about the work site. The Contractor shall be required to conform to all of the applicable Construction Safety Orders issued by the Division of Industrial Safety of the State of California.

(c) The contractor shall execute and maintain his work so as to avoid injury or damage to any person or property. The contractor shall comply with the requirement s of the specifications relating to safety measures applicable in particular operations or kinds of work.

(d) In carrying out his work, the contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including State of California, Division of Industrial Safety (Cal/OSHA) regulations. Safety precautions as applicable shall include, but not be limited to, adequate life protection, and life saving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees such as machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, and other safety devices, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; and adequate facilities for the proper inspection and maintenance of all safety measures.

(e) The names and telephone numbers of at least two medical doctors practicing in the vicinity and the telephone number of the local emergency response services shall be prominently displayed adjacent to telephones at the project site.

47. Public Convenience and Safety.

(a) The Contractor shall provide for the protection of the traveling public. The Contractor shall be required to furnish and maintain safety devices and other measures required for the public safety, which devices and measures shall conform to the requirements of Section 21406 of the Vehicle Code, any sign manual and current standard specifications of the Division of Highways. The Contractor shall conduct his operation to avoid unnecessary interference with the flow of traffic along highways, streets, roads, etc., used for vehicular traffic. Where any highway, street, road, etc., used for vehicular traffic is required to be kept open, the Contractor shall be required to furnish and maintain warning signs, lights, barricades, flagmen and other safety devices and measures necessary to provide adequate protection of the traveling public. Such protection shall be at the sole expense of the Contractor. Any highway, street maintenance or repair work required by local authorities concerning necessary operation under this contract shall be performed by the Contractor at his sole expense.

(b) Vehicular access to any driveway shall be maintained to the property line unless necessary construction precludes such access for reasonable periods of time.

(c) Vehicular and pedestrian access to any fire hydrant shall be maintained at all times during the construction of the work.

48. Safety, Sanitary and Medical Requirements.

(a) The Contractor, his employees and the subcontractors, if any, and their employees shall promptly and fully carry out the existing safety, sanitary and medical requirements as may from time to time be prescribed by the District to the end that proper work shall be conserved and safeguarded. In case such regulations and orders are not observed by the Contractor, they may be enforced by the Engineer at the Contractor's expense.

(b) Contractor shall notify District in writing within twenty-four (24) hours should an employee, officer or agent of Contractor or subcontractor incur personal injury while present on District properties or employed by District. District shall be furnished copies of all medical reports or accident reports filed or required by any local state or federal agency or regulatory body.

49. Character of Workers.

(a) None but skilled workers shall be employed on work requiring special qualifications. All equipment operators, pipelayers and jointers shall be well qualified and experienced in their work. All welding, however minor, shall be done by competent, certified welders, who have been qualified under Section IX of the ASME Boiler and Pressure Vessel Code, API Publication 1104 or such other standard as may be satisfactory to the Engineer. The Engineer shall have the right any time to call for and witness the making of test specimens by any welding operator according to these standards, and the expense of such tests shall be borne by the Contractor. When required in writing by the Engineer, the Contractor, or any subcontractor shall discharge any person who is, in the opinion of the Engineer, incompetent, unfaithful, disorderly or otherwise unsatisfactory, and shall not again employ such discharged person on the work except with the consent of the Engineer. Such discharge shall not be the basis of any claim for compensation or damages against the District or any of its officers.

(b) Enforcement of Order. The Contractor shall be responsible for maintaining good order at the site where work is performed under this contract and to that end shall employ such watchmen or other persons as may be required. Unauthorized persons shall be excluded from the site of the work. The Contractor shall not sell, nor shall he permit or suffer the introduction or use of, intoxicating liquors or narcotics upon the work

embraced in these Specifications or upon any of the grounds occupied or controlled by him in connection with such works.

50. Subcontracts.

(a) Subcontracts will be permitted subject to the following provisions. No subcontract will be permitted which has the effect of avoiding the residence or wage requirements or any other provisions of the main contract. Individual subcontractors or members of contracting or subcontracting organizations personally engaged upon the work shall be subject to all the requirements of these specifications applicable to employees working for wages, including but not limited to, wages, hours of work, character of workers and certified payrolls.

(b) Reference is hereby made to the provisions of the Subletting and Subcontracting Fair Practices Act, Public Contract Code Section 4100, commencing with Section 4100, also known as the "Subletting and Subcontracting Fair Practices Act," which is incorporated herein and made a part hereof by reference, and the Contractor is bound thereby and shall be subject to the consequences named in Sections 4110 and 4111 of said Act in event of his violation thereof. Each bidder shall, in his bid or offer, set forth: (1) The name and the location of the place of business of each subcontractor who will perform work or labor or render service to the Contractor in or about the construction of the work or improvement in an amount in excess of one-half of one percent of the Contractor's total bid or a subcontractor licensed by the State of California who, under subcontract to the prime contractor, specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the plans and specifications, in an amount in excess of one-half of one percent of the prime contractor's total bid; and (2) The portion of the work which will be done by each such subcontractor under said Act. The Contractor shall list only one subcontractor for each such portion as defined by the Contractor in his bid. If the Contractor fails to specify a subcontractor or if the Contractor specifies more than one subcontractor for the same one-half of one percent of the Contractor's total bid, the Contractor agrees that he is fully qualified to perform that portion himself, and that he shall perform that portion himself.

51. Access to the Site and Haul Routes.

(a) The Contractor shall make his own investigation of the condition of available public or private roads or other access, and of clearances, restrictions, bridge load limits, bond requirements, and other limitations that affect or may affect transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of work. It shall be the Contractor's own responsibility to construct and maintain, at his own expense and at his own risk, any haul roads, access roads, bridges, or drainage structures required for construction operations.

(b) The use of existing roads (public or private) shall be at the Contractor's own expense and risk. It shall be the Contractor's responsibility to anticipate and meet all conditions properly imposed upon the use of existing roads by those having jurisdiction thereover, including (without limitation of the generality of the foregoing) seasonal or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage caused by contract-generated traffic.

(c) The hauling of sand, gravel, asphalt or other intra job hauling, over public highways, roads or bridges, shall be in compliance with the applicable regulations and shall be such as to minimize interference with or congestion of local traffic.

(d) The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

52. Irregular Hours.

(a) When any work is to be performed at a time other than regular working hours Monday through Friday, the Engineer shall be given advance notice. In the event of Saturday and/or Sunday work, the approval of the Engineer shall be required before such work will be allowed. All costs for inspection attributed to irregular working hours shall be borne by the Contractor and shall be deducted from the contract amount. Irregular working hours shall be defined as follows, except for certain specialized jobs and circumstances:

(1) Before 8:00 a.m. Monday through Friday.
(2) After 4:30 p.m. Monday through Friday.
(3) Anytime Saturday, Sunday, or District's Holidays.

(b) The Contractor will be exempt from this provision only for such work as required by the Specifications to be completed at other than working hours.

53. Eight-hour Law. In accordance with the provisions of Articles 1 and 3 of Chapter 1, Part 7, Division 2 of the Labor Code of the State of California eight (8) hours constitute a legal day's work. The Contractor shall forfeit, as a penalty to the District, $25.00 for each worker employed in the execution of the contract by the Contractor or any subcontractor under him: for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of the Labor Code, and in particular, Sections 1810 to 1815 thereof, inclusive, except that work performed by employees of Contractor in excess of eight (8) hours per day and forty (40) hours during any one week shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1-1/2) times the basic rate of pay as provided in said Section 1815. The Contractor and each subcontractor shall keep accurate records showing the name of and schedule of hours worked by each worker employed by him concerning the contract. The records shall be kept open at all reasonable hours to inspection by the District and the Division of Labor Law Enforcement.

54. Payment of Wages. The issuance as payment for wages of any evidence of indebtedness is prohibited unless the same is negotiable and payable on demand without discount. Wages must be paid at least semi-monthly on regular pay days established in advance, and shall include all amounts for labor or services performed by employees of every description as required under the provisions of the California Labor Code.

55. Prevailing Rate of Per Diem Wages. Pursuant to the provisions of Articles 1 and 2 of Chapter 1, Part 7, Division 2 of the Labor Code of the State of California, not less than the general prevailing rate of per diem wages and not less than the general prevailing rate of per diem wages for legal holiday and overtime work for each craft or type of worker needed to execute the work contemplated under this contract, as determined by the District and as set forth in the schedule of such wages currently on file in the District office, shall be paid to all workers employed on such work by the Contractor or by any subcontractor doing or contracting to do any part of said work. The Contractor shall comply with Labor Code Section 1775. According to said Section 1775, the Contractor shall forfeit, as a penalty to the District, $25 for each calendar day, or portion thereof, for each worker paid less than the stipulated prevailing rates for such work or craft in which such worker is employed for any work done under the contract by him or by any subcontractor under him in violation of the provisions of the Labor Code and in particular, Labor Code Sections 1770 to 1780, inclusive. In addition to said penalty and pursuant to said Section 1775, the difference between such stipulated prevailing wage rates and the amount paid to each worker for each calendar day or portion thereof for which each worker was paid less than the stipulated prevailing wage rate shall be paid to each worker by the Contractor. The Contractor and each

subcontractor shall keep accurate records showing the name of and schedule of hours worked by each worker employed by him in connection with the contract. The records shall be kept open at all reasonable hours to inspection of the District and the Division of Labor Law Enforcement.

56. Unpaid Claims. If, upon or before the completion of the work herein agreed to be performed or at any time prior to the expiration of the period within which claims may be filed as prescribed by Section 3184 of the Civil Code, any person or persons shall bring against the District or against any agent or agents thereof any action to enforce such claim, the District shall, until the discharge thereof, withhold from the moneys under its control so much of said moneys due or to become due the Contractor under this contract as shall be sufficient to satisfy and discharge the amount in such notice or under such action claimed to be due, together with the costs thereof; provided, that if the District shall in its discretion permit the Contractor to file such additional bond as is authorized by Section 3196 of the Civil Code, in a penal sum equal to one and one-fourth times the amount of said claim, said moneys shall not thereafter be withheld due to such claim.

57. Monthly Cost Estimates - Progress and Final Progress Payment.

(a) The Contractor shall submit, by the third calendar day of each month on a form acceptable to the District, his estimate of the amount and value of all acceptable work and any extra work or changes approved by the District, up to the last day of the preceding calendar month, for the District's approval; and the Contractor will request a progress payment for the work completed thereof.

(b) A deduction of five (5) percent shall be made from the total thus computed, and from the remainder there shall be further deducted any amounts due the District from the Contractor for supplies or materials furnished or services rendered and any other amounts that may be due the District under the terms of the contract. From the balance thus determined shall be deducted the amount of all previous payments and the remainder shall constitute the progress payment for that month. Such progress estimates shall not be required to be made by strict measurement, but they may be made by measurement or by estimation, or partly by one method and partly by the other, and it shall be sufficient if they are approximate only.

(c) Pursuant to Public Contract Code Section 22300, at the request and expense of the Contractor, securities equivalent to the amounts, if any, withheld by the District to ensure performance under this contract shall be deposited with the District. The District shall pay such moneys to the Contractor upon satisfactory completion of the contract. Securities eligible for investment under this section shall include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit. The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon.

If the securities to be deposited by the Contractor pursuant to this provision are in registered form, the registration shall be transferred to the District.

(d) The Engineer shall approve the amount and value of all acceptable work and any extra work or changes approved by the District. Upon mutual agreement thereto, the Engineer will forward the approved estimate to the Administrative Services Manager for payment of the progress or final progress payment within ten (10) days thereafter.

(e) In the event that the Contractor and the District cannot mutually agree as to the amount and value of any item of work in the progress payment, the District will authorize payment of that portion of the progress and final progress payment to which the Contractor and the District have mutually agreed.

(f) The Contractor shall file with the District, within five (5) calendar days after the Engineer has issued written notice of the disputed items to the Contractor, a written statement setting forth in complete

detail the basis for his disagreement, including, but not limited to, any amount or value in disagreement or dispute.

(g) Upon receipt of the Contractor's written statement, the General Manager shall investigate and consider the items of disagreement or dispute and render a decision thereon within a reasonable time, which decision shall be conclusive.

(h) In the event that the Contractor disagrees with the General Manager's decision, the Contractor's cost to the Contract for the delay in receiving the disputed balance of any progress or final progress payment, may be an item for arbitration according to Section 65 of the General Conditions.

(i) In the event the contract or any part thereof shall be suspended as provided in Section 21, the retained percentage as provided in Section 58(b) shall become the sole and absolute property of the District to the extent necessary to repay the District any excess in the cost of the work above the contract price. After issuance of notice to discontinue work, no payment upon progress estimates or otherwise shall thereafter be made to the Contractor for the work covered by said notice until completion of work and final settlement.

(j) The making of an estimate and payment in accordance therewith shall not preclude the District from demanding and recovering from the Contractor such damages as it may be entitled to under the contract because of his failure to comply with the Specifications.

58. Final Cost Statement.

(a) Final Cost Statement is a document which summarizes all of the Contractor's earnings under this contract and any amounts due the District from the Contractor, and from which the final payment is made.

(b) Upon completion of all of the work to be performed under this contract as set forth in Section 45, the Contractor shall submit for approval by the District in a form satisfactory to the District the amount and value of all acceptable work, and all extra work or changes approved by the District.

(c) The Engineer shall approve the amount and value of all acceptable work and any extra work or changes approved by the District. Upon mutual agreement thereof, this District will prepare the Final Cost Statement document which shall be submitted to the Contractor for his acceptance and signature.

(d) Upon endorsement by the Contractor of the Final Cost Statement, the District shall accept the work and authorize the final payment according to Sections 61 and 62 hereof.

59. Disputed Final Payment.

(a) In the event that the Contractor and the District cannot mutually agree as to the amount and value of the work, as set forth in this Final Cost Statement, the District will prepare the Final Cost Statement based upon the Engineer's determination of the amount and value of the work to which this Contractor may be entitled. Upon receipt of this Final Cost Statement, the Contractor shall file with the District within five (5) calendar days thereafter, a written statement setting forth in complete detail the basis for his disagreement, including, but not limited to, any amount or value in disagreement or dispute.

(b) The Board reserves the right to accept the work and file the necessary Notice of Completion.

(c) The Board shall investigate and consider the items of disagreement or dispute and render its decision thereon as to the amount due the Contractor within a reasonable time.

(d) The District will authorize payment of that portion of the Final Cost Statement to which the Contractor and the District have mutually agreed according to Section 58 hereof. Reference is made to Section 64 of these General Conditions.

60. Acceptance. Upon endorsement by the Contractor of the final cost statement, the Engineer shall prepare a memorandum of completion to advise the Board that the work has been satisfactorily completed and is ready for acceptance. At its next succeeding meeting, the Board shall consider acceptance of the work, and upon acceptance, shall authorize payment to the Contractor.

61. Final Payment.

(a) At the end of thirty-five (35) days after filing the notice of completion, as set forth above, the total balance due the Contractor, or in case of a dispute, any portion of the total balance which has been mutually agreed is not in dispute, if unencumbered, or any part thereof unencumbered, shall be paid provided that a guarantee bond shall have been filed with the District.

(b) For the purposes of this section, unencumbered balance means that portion over and above the face amount of all the stop notices on file with the District plus 25 percent of the face amount for potential interest and the cost of litigation as provided for in the Civil Code Section 3186-7.

62. Final Payment Terminates Liability.

(a) The acceptance by the Contractor of the final payment aforesaid shall be a release to the District and its agents from all claim liability to the Contractor for anything done related to the work or for any act or neglect of the District related to the work, except the claim against the District for the remainder, if any, of the amounts kept or retained as hereinbefore provided.

(b) No agent of the District shall be personally responsible for any liability arising under the contract. No claim shall be made or filed, and neither the District nor any of its agents shall be liable for, or held to pay any money, except as specifically provided in the contract.

63. Releases.

(a) Prior to payment of the final progress payment, the District may require the Contractor to obtain releases from each of the subs, material suppliers, equipment rental firms and employees, whether or not any have filed a preliminary notice with District, who have performed any work for the Contractor under this contract for which any payment may be warranted.

(b) Releases shall be submitted in a form approved by the District. Conditional releases may be unacceptable and acceptance thereof will be at the discretion of the District.

64. Disputes Settled by Arbitration. In the event there is a dispute between the parties as to any of the terms and conditions of this agreement, including but not limited to the accounting rendered by the District, and said dispute cannot be resolved according to Section 59 of these General Conditions, the dispute shall be submitted to arbitration before a single arbitrator agreed to by the parties or failing such agreement appointed by the American Arbitration Association and resolved according to Article 1.5 of the Public Contract Code. Regardless of the manner of appointment of said arbitrator, the arbitration shall be conducted according to the then prevailing rules of the American Arbitration Association for commercial arbitration, except that each party shall bear their own costs and attorney's fees which they incur.

(a) As required under Section 20104, et seq., of the California Public Contract Code (Stats. of 1990), any demand of $375,000 or less, by the Contractor for a time extension, payment of money, or damages arising from the work done by or on behalf of the Contractor pursuant to this Contract; or payment of an amount which is disputed by District shall be processed in accordance with the provisions of said Section 20104, et seq., related to informal conferences, non-binding judicially-supervised mediation, and judicial arbitration.

(b) A single written claim shall be filed under this Article prior to the date of final payment for all demands resulting out of the Contract.

(c) Within thirty (30) days of the receipt of the claim, District may request additional documentation supporting the claim or relating to defenses or claims District may have against the Contractor. If the amount of the claim is less than $50,000, the Contractor shall respond to the request for additional information within fifteen (15) days after receipt of the request. The Contractor shall respond to the request within thirty (30) days of receipt if the amount of the claim exceeds $50,000, but is less than $375,000.

(d) Unless further documentation is requested, District shall respond to the claim within forty-five (45) days if the amount of the claim is less than $50,000, or within sixty (60) days if the amount of the claim is more than $50,000 but less than $375,000. If further documentation is requested, District shall respond within the same amount of time taken by Contractor to respond, or fifteen (15) days, whichever is greater, after receipt of the information if the claim is less than $50,000. If the claim is more than $50,000 but less than $375,000 and further documentation is requested by District, District shall respond within the same amount of time taken by the Contractor to respond or thirty (30) days, whichever is greater.

(e) If the Contractor disputes District's response, or District fails to respond, the Contractor may demand an informal conference to meet and confer for settlement of the issues in dispute. The demand shall be served on District within fifteen (15) days after the deadline of District to respond or within fifteen (15) days of District's response, whichever occurs first. District shall schedule the meet and confer conference within thirty (30) days of the request.

(f) If following the meet and confer conference the claim or any portion remains in dispute, the claimant may pursue the remedies authorized by law. For purposes of these provisions, the running of the period of time within which a claim must be filed shall be tolled from the time the claimant submits his or her written claim until the time the claim is denied, including any period of time utilized by the meet and confer conference.

END OF PART B

PART C

SPECIAL CONDITIONS

1. Requirement. The work to be performed under this contract shall consist of furnishing all plans, tools, materials, supplies and manufactured articles and for furnishing all transportation, services, including fuel, power and water, trench shoring, and essential communications and the performance of all labor, work or other operations required for the fulfillment of the contract in strict accordance with the specifications, schedules and drawings, all of which are made a part hereof, and including such detail sketches as may be furnished by the Engineer from time to time during the construction in explanation of said drawings. The work shall be complete, and work, materials and services not expressly called for in the specifications or not shown on the drawings which may be necessary for complete and proper construction to carry out the contract in good faith shall be performed, furnished and installed by the Contractor at no increase in cost to the District.

2. General Description. The work generally consists of: (1) provide new 2.4 kV switchgear; (2) build a new electrical room extension in order to house the new switchgear and primary service; and (3) implement above without disrupting water service to end users.

The sequence of work is generally as follows:

(a) Prepare asphalt for removal per new structural foundation layout and new electrical work in the drawings.
(b) Prepare asphalt for removal to install foundation drain pipe around existing and new building footings, extent of discharge to be coordinated with the District. Coordinate prior to beginning work.
(c) Excavate site and prepare soil for construction of new construction, including electrical work. Structural engineer or third party inspection to be performed after completion of formwork and prior to pour.
(d) Coordinate and prepare for installation of new concrete work
(e) After slab and footing have cured per specifications, work on vertical construction may commence.
(f) Upon completion of vertical construction, protect existing electrical equipment before commencement of demolition. Equipment to be fully functional during demolition and construction, including proper ventilation.
(g) Demolition work to commence; properly secure and reinforce any areas determined to require such measures.
(h) Complete remainder of the construction work, including new roof structure and roofing.
(i) Upon completion of structural and architectural work, install new electrical equipment per electrical construction sequence.
(j) Protect existing switchgear and motor control center (MCC) during construction. Contractor shall build a temporary shed with plywood top over equipment.
(k) After completion of new electrical room, proceed with installation of new switchgear and complete all installation activities.
(l) Coordinate an 8-hour power down from Southern California Edison (SCE) and

disconnect the existing 5 kV power cable to MCC. Complete final connections from new switchgear to existing MCC. Check phase rotation.

(m) Startup testing and commissioning of new switchgear by manufacturer.

(n) Connect low voltage lighting panel "LP" to panel "NP".

(o) Complete all remaining site activity, including rodent control.

(p) Disconnect and remove "old" switchgear, overhead cable tray, 5kV cables, overhead 5 kV bus, and outdoor fencing as shown on Drawings.

(q) Furnish and install air conditioning system as shown on the mechanical drawings.

(r) Submit all required documentation (as-built drawings, manuals, etc.)

(s) Note: All power-down period require 48-hour advance notice to and approval from District and must be limited to 8 hours maximum per event.

3. General Sequence of Pre-Construction.

The General Sequence of the Contractor's pre-construction shall be as follows unless otherwise approved by the Engineer:

(a) Submit all necessary forms.

(b) Submit one (1) hardcopy and one (1) PDF version of the shop drawings per Part C Section 15. After the shop drawings are accepted, any special pieces may be ordered and delivered to the site.

(c) Submit a detailed schedule of construction. This schedule shall be updated during the process of the work when requested by the Engineer. A weekly progress report shall be coordinated with the Engineer.

(d) Pre-Construction. Prior to the start of construction, at a time agreed on between the Contractor and the District, a pre-construction and safety conference shall be held for the purpose of discussing and familiarizing all concerned with the contract documents, procedures, standards, correspondence and shop drawing requirements and safety issues relevant to this project.

Personnel to be present at this meeting are representatives of Casitas, the General Contractor and superintendent of General Contractor, the Subcontractors and foreman or superintendents of Subcontractors.

4. Beginning and Completion of the Work.

(a) The Contractor shall begin the work within fifteen (15) calendar days after the execution date on the Notice-to-Proceed and shall complete all work before March 31, 2020, **which includes the time required to procure all materials. Failure to have the pump plant completed before the deadline shall result in predetermined liquidated damages of $1,500 per day**. Contractor shall not be responsible for delays caused by Southern California Edison provided Contractor has diligently worked to install Southern California Edison required components and diligently attempted to schedule Southern California Edison for inspection and energizing the new power panel.

(b) The Contractor shall have the pump plant operational within eight (8) hours after the beginning of a scheduled pump plant shutdown. The beginning of the shutdown is defined as the time District personnel shut down and "tag out" the power to the pump plant. Failure of the Contractor to have the pump plant operational within eight hours of the beginning of the shut down shall result in predetermined liquidated damages **of $400 per hour. See Section 24 of Part B – General Conditions.**

5. Access to the Site and Haul Routes.

(a) The Contractor shall make his or her own investigation of the condition of the available public or private roads or other access, and of clearances, restrictions, bridge load limits, bond requirements and other limitation that affect or may affect transportation and ingress and egress at the job site. The unavailability of transportation facilities or limitation thereon shall not become a basis for claims for damages or extension of time for completion of work. It shall be the Contractor's responsibility to construct and maintain, at Contractor's own expense and at Contractor's own risk, any haul roads, access roads, bridges or drainage structures required by construction operations.

(b) Existing Public or Private Roads. The use of existing roads shall be at the Contractor's own expense and risk. It shall be the Contractor's responsibility to anticipate and meet all conditions properly imposed upon the use of existing roads by those having jurisdiction there over, including (without limitation of the generality of the foregoing) seasonal or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage caused by contract-generated traffic. It shall be the Contractor's responsibility to satisfy all lawful demands for repair of damage to existing roads caused by contract-generated traffic and barricade public access to project sites.

(c) Haul Routes. The hauling of sand, gravel, earth materials or other intra-job hauling over public highways, roads or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic.

(d) The Contractor shall provide worker training and follow-up reminders about traffic safety issues and restrictions to all employees and representatives from firms that will be traveling to the work site. Contractor shall promptly take corrective action, including forbidding the offending party from the work site, against parties found to be speeding on roads leading to the job site.

(e) Cost. The cost of all work described in this paragraph shall be included in the prices bid in the schedule for other items of work.

6. Contract Drawings. The Contractor's attention is directed to Section 2 of Part B - General Conditions to these Specifications. When deemed necessary by the Engineer, additional detailed drawings will be furnished to the Contractor during the progress of the work.

The Contract Drawings are further identified as follows:

Drawing A-0.0- SD2 Prepared by Mainstreet Architects & Planners Inc.

T-0 Project Title Sheet
A0.0 Cover Sheet
A1.0 Floor Plans and Schedules
A2.0 Elevation, sections, and details
AD1 Manufacturer Details
AD2 Manufacturer Details
AD3 Manufacturer Details
S1 General Notes and Details
S2 Foundation Plan
S3 Roof Framing Plan
SD1 Foundation and Concrete Block Details
SD2 Roof Framing Details

Drawing E-0 through M-1 Prepared by Consulting West Engineers

E- 0 - Electrical Title Sheet
E- 1 - Electrical Site Plan
E- 2 - New Electrical Service Plan
E- 3 - Single Line Diagram and Switchgear Elevation
E- 4 - Switchgear Manufacturer-Single Line Diagram
E- 5 - Switchgear Manufacturer - Specification
E- 6 - 120/208 V – Single Line, Load and Fixture Schedule
E- 7 - New Electrical Floor Plan
M-1 - Mechanical Floor Plan

7. Permits. The following permits are required:

(a) Safety Permit from California Division of Industrial Safety shall be required. Contractor's attention is directed to Sections 28 and 30 of Part B - General Conditions of these specifications.

(b) The Contractor's attention is directed to Section 3 of Part B - General Conditions in regard to precedence of documents.

8. Explosives and Blasting. The use of explosives on the work is not permitted.

9. Water & Power. The Contractor will be required to make arrangements for water and power the Contractor may require during construction of the project. If water is obtained from existing District facilities, the water will be furnished free of charge, but Contractor shall install and subsequently remove at Contractor’s expense, all temporary facilities required to obtain and use the water. The Contractor shall submit a $500 deposit for the temporary meter, which shall be refunded upon project completion and confirmation by the District no damages to District facilities have occurred as a result of the Contractor’s operations.

10. Construction Surveys. Reference is made to Section 34 of Part B – General Conditions. No construction survey or staking will be provided by the District.

11. Safety.

(a) The Contractor shall execute and maintain Contractor's work so as to avoid injury or damage to any person or property. The Contractor shall comply with the requirements of the specifications relating to safety measures applicable in particular operations or kinds of work.

(b) In carrying out the Contractor's work, the Contractor shall at all times, exercise all necessary precautions for the safety of employees appropriate to the nature of the work and the conditions under which the work is to be performed, and be in compliance with all federal, state and local statutory and regulatory requirements including State of California, Division of Industrial Safety (Cal/OSHA) regulations. Safety precautions as applicable shall include, but not be limited to, adequate life protection, and life saving equipment; adequate illumination for underground and night operations; instructions in accident prevention for all employees; such machinery guards, safe walkways, scaffolds, ladders, bridges, gang planks, confined space procedures, trenching and shoring, and other safety devises, equipment and wearing apparel as are necessary or lawfully required to prevent accidents or injuries; traffic control per County of Ventura requirements; and adequate facilities for the proper inspection and maintenance of all safety measures.

(c) The name and telephone number of at least one medical provider in the vicinity and the telephone number of the local ambulance service shall be prominently displayed adjacent to telephones.

12. Nonresidency at Job Site. The Contractor, their employees or any of their subcontractors shall not be permitted to remain at any of the job sites during non-working hours. The Contractor shall be responsible for the safe storage and security of equipment, materials, and waste by-products used or produced during the course of work.

13. Coordination of Work. The Contractor shall coordinate Contractor's work with the District, material suppliers, manufacturers and subcontractors during the course of the work. The time limit, date and time of the shutdown must be coordinated and approved by the Casitas Project Manager.

14. Utility Shutdowns. After Casitas has shutdown and locked out the pump plant, Contractor's work shall not exceed (8) eight standard working hours.

(a) The Contractor shall coordinate the shutdown(s) in writing ten (10) calendar days prior to shutdown time. No discharge of water to nearby creeks or streams shall be permitted unless complete removal of chloramines is provided by the Contractor. After the facility has been electrically shutdown and locked out, the Contractor shall complete the connection work within the above prescribed time period.

(b) Materials and equipment shall be at the project site twenty-four (24) hours prior to shutdown.

(c) For each hour or fraction thereof in excess of the allotted shut down time, the Contractor shall pay to the District a penalty of Four hundred dollars ($400) per hour.

(d) Rescheduling a shutdown may occur prior to the District isolation of the facility.

15. Shop Drawing Submittals.

(a) The Contractor shall review, mark with approval, and submit for review to the Engineer all shop drawings as listed below, as well as any additional submittals the Engineer may find necessary. Five (5) sets of shop drawings shall be submitted to the Engineer and be accompanied by a letter of transmittal listing the drawings submitted. As an alternative, the Contractor may submit the drawing electronically in an Adobe file. Drawings shall show the name of the project, the name of the Contractor, and if any, the names of the suppliers, manufacturers and subcontractors. Shop drawings shall be submitted with promptness and in an orderly sequence so as not to cause delay in prosecution of the work. By submitting shop drawings, the Contractor represents that the material, equipment and other work shown therein conforms to the plans and specifications, unless otherwise indicated in writing on the transmittal. Drawings required for conventional pumps, motors and other manufactured equipment may be brochures or catalogue sheets but must show the necessary dimensions required for proper installation, operation, and maintenance of the equipment.

(b) The Engineer will, within two (2) weeks of submittal receipt, return three (3) of the copies or one (1) electronic copy to the Contractor with any comments thereon. If so noted by the Engineer the Contractor shall correct the drawings and resubmit them in the same manner as specified for the original submittal. Shop drawings which are approved by the Engineer and will not require a resubmittal, shall be returned to the Contractor as, “Approved, No Exceptions Taken”.

(c) The review of the Engineer is only of general conformance with the design concept of the project, and general compliance with the plans and specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment, and work required by the Contract; the proper fitting and construction of the work; the accuracy and co-processes and techniques of construction; and performing the work in a safe manner.

(d) No portion of the work requiring a shop drawing submittal shall commence until the submittal has been reviewed by the Engineer and returned to the Contractor with a notation “Approved, No Exceptions Taken”.

(e) Prior to District approval and commencement of construction, the Contractor shall submit to the District:

(1) Work Schedule - Gant Chart for schedule of work and order of precedence.
(2) Service Panel drawings
(3) Conduit and cable materials and suppliers

16. Materials. All parts and materials provided for construction of the project shall be new unless otherwise indicated.

END OF PART C

SPECIFICATIONS

FOR

CASITAS MUNICIPAL WATER DISTRICT
RINCON PUMP PLANT ELECTRICAL UPGRADE

PROJECT NO. 17-397
1890 Casitas Vista Road
Ventura, CA 93001

OWNER: **CASITAS MUNICIPAL WATER DISTRICT**
1055 Ventura Avenue
Oakview, CA 93022
Contact: Julia Aranda
Email: jaranda@casitaswater.com
Phone: 805-649-2251

ARCHITECT: **MAINSTREET ARCHITECTS + PLANNERS, INC.**
422 E. Main Street
Ventura, CA 93001
Contact: Nick Deitch
Email: nick@mainstreetarchitects.com
Phone: 805-652-2115
Fax: 805-652-1532

FEBRUARY 2019

PROJECT TABLE OF CONTENTS

DIVISION 08 – OPENINGS

DIVISION 09 - FINISHES

DIVISION 31 - EARTHWORK

DIVISION 32 – EXTERIOR IMPROVEMENTS

DIVISION 33 - UTILITIES

END OF PROJECT TABLE OF CONTENTS

DOCUMENT 00 20 50
PRECEDENCE OF CONTRACT DOCUMENTS

A. In resolving inconsistencies or ambiguities among two or more components of the Contract Documents, the document highest or higher in the order of precedence shall govern or control.

B. The order of precedence shall be:

1. Permits from local, state, federal or other governmental agencies as may be required by law.

2. The form of agreement or contract.

3. Bid Proposal.

4. General Conditions.

5. General Requirements (Division 01).

6. Drawings. Finish Schedule take precedence over detailed drawings, and detailed drawings will take precedence over general drawings.

7. Technical Specifications (Divisions 02 thru 16).

8. Standard Plans of the governmental authority having jurisdiction.

9. Standard Specifications of the governmental authority having jurisdiction.

10. Reference Specifications.

11. Reference Drawings.

C. Supplemental Agreements, Change Orders, written interpretations and clarifications by the Owner and Addenda will take precedence over all other components of the Contract Documents.

D. Written dimensions take precedence over scaled dimensions.

E. The fact that a lower precedence document may invoke lower costs, or is less restrictive, or may be more convenient to perform does not change the order of precedence.

F. The fact that requirements stated in a lower precedence document are not required by law does not negate the requirement.

END OF DOCUMENT

SECTION 01 11 22
GENERAL REQUIREMENTS FOR RENOVATIONS

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. General requirements for project procedures pertaining to the alteration, renovation, remodeling, or modification of existing construction, as indicated on the drawings and specified

1.02 SUBMITTALS

A. Submit proposed Work schedules itemizing dates and hours that the various items of Work in existing facilities will be started and completed. The Owner reserves the right to modify the proposed schedules, to eliminate conflicts and to ensure the use of facilities during the Work.

B. Follow schedule exactly as finally approved by the Owner. No extra payment will be made to Contractor for portions of the Work required to be performed during night, Saturday, Sunday, or holiday hours. Revise and resubmit schedules when timing or sequence changes occur or are ordered by the Owner.

1.03 JOB CONDITIONS

A. General: Coordinate the Work of all trades and with the Owner to assure correct sequence, limits, methods, and times of performance. Arrange the Work to impose minimum hardship on operation and use of the facilities. Install protection for existing facilities, contents, and new work against dust, dirt, weather, damage, and vandalism, and maintain and relocate as the Work progresses.

B. Access: Confine entrance and exit operations to access routes designated by the Owner.

C. Existing Conditions: Intent of Drawings is to indicate existing site and facility conditions with information developed from original construction documents, field surveys, and the Owner's records, and to generally indicate quantity and type of demolition and removals required to prepare existing areas for new work.

D. Verification of Conditions: Perform a detailed survey of existing site and building conditions pertaining of the Work before starting Renovation Work. Report to the Owner discrepancies or conflicts between Drawings and actual conditions in writing for clarification and instructions and do not perform Work where such discrepancies or conflicts occur prior to receipt of the Owner's instructions.

E. Special Noise Restrictions: Use care to prevent generation of unnecessary noise and keep noise levels to minimum possible. When ordered by the Owner, immediately discontinue such methods that produce noise disruptive or harmful to facility functions and occupants, and employ unobjectionable methods. Equip air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with "residential" grade mufflers, and muffle the unloading cycle of compressors. Remove from site any equipment producing objectionable noise as determined by the Owner.

F. Shoring and Bracing: Provide supports, shoring, and bracing required to preserve structural integrity and prevent collapse of existing construction that is cut into or altered as a part of the Work.

G. Overloading: Do not overload any part of structures beyond safe carrying capacity by placing of materials, equipment, tools, machinery, or any other item thereon.

H. Building Security: Secure building entrances and exits with locking or other approved method in accordance with the Owner's instructions.

I. Safeguarding the Owner's Property: Contractor assumes custody, and responsibility for safeguarding Owner's property both fixed and portable, remaining in rooms vacated for use during Work. Owner's property shall remain contractor's responsibility until work is complete and reoccupied by Owner.

J. Covering and Cleaning: Cover and protect surfaces of rooms and spaces turned over for the Work, including the Owner's property remaining therein, as required to prevent soiling or damage by dust, dirt, water, fumes, or otherwise, and protect other areas where Work is performed in same manner, as deemed adequate by the Owner. Prior to Owner's reoccupancy of any such room or space, clean all surfaces including Owner's property in accordance with General Conditions and other cleaning instructions as may be specified by the Owner.

1.04 REMOVAL, ALTERATIONS AND REPAIRS

A. Basic Requirement: Renovate and refinish like new the existing construction and improvements that are cut into, damaged, relocated, reinstalled, or left unfinished by removals. Workmanship and materials shall conform to the best practices of the construction industry. Provide new fasteners, connectors, adhesives, and other accessory materials as required to fully complete the renovations and restorations. Where restorations and refinishing are defective or are otherwise not acceptable to the Owner, remove all the defective or rejected materials and provide new acceptable materials and finish at no extra cost to the Owner.

B. Extent: Perform renovations to extent required plus such additional removals as are necessary for completion even though not indicated or specified. More or less of the existing construction may be removed if such variation will expedite the Work and reduce the cost to the Owner, subject to prior approval in each case by the Owner.

C. Removals: Carefully remove Work so as to preserve that remaining in-place.

1. Walls, Partitions, and Ceilings: Remove by cutting down and not by tumbling, throwing, or dropping.

2. Concrete: Saw with powered concrete saw, or chip where sawing is not feasible, to prevent spalling of concrete to remain. Cut off reinforcing bars, except where bonded into new concrete or masonry, and paint ends with bituminous paint before enclosing.

3. Woodwork: Cut or remove to a joint or panel line. Undamaged removed material may be reused.

4. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and make watertight.

5. Glass: Remove broken or damaged glass and clean rebates and stops of setting materials.

6. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim existing lath and prepare for new lath.

7. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces, with at least two opposite cut edges centered on supports.

8. Acoustical Ceilings: Remove hanger wires where ceilings are not reinstalled.

9. Ceramic Tile: Cut back to sound tile and backing on joint lines if portions are to remain.

10. Finish Flooring: Completely remove finish flooring and clean backing of old cement or adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring to remain.

D. Patching, Repairing and Finishing:

1. Concrete: Keep the cut edges damp for 24 hours and scrub with a neat portland cement mortar just before new concrete is placed; epoxy adhesive may be used in lieu of cement mortar. Finish new concrete to match existing. Provide 3,000 psi concrete for repairs. At cut concrete edges to remain exposed, apply adhesive and restore with minimum 3/4" thick cement mortar finished to match adjoining surfaces.

2. Metal Items: Grind cut edges to remain exposed smooth and rounded.

3. Woodwork: Trim back to joint lines or splices, retrim cut surfaces, and patch new matching or undamaged remove materials.

4. Sheet Metal: Restore removed or damaged sheet metal items as required or directed.

5. Glass: Install new matching glass and calk all existing exterior windows.

6. Lath and Plaster:

a. Lath: Lath surfaces to be patched with matching lath as required, secured to supports at 6" centers. Lap new lath 6" over existing and wire-tie new and existing lath edges together at 6" intervals. Restore paper backings as required, shingled into existing.

b. Plaster: Apply a bonding agent on cut edges of existing plaster. Apply 3-coat plaster patching of type, thickness, finish, color, and texture to match existing plaster.

7. Gypsum Wallboard: Refasten cut edges of existing wallboard. Apply patches with at least two opposite edges centered on supports and secure at 6" centers. Tape and finish joints and fastener heads. Make patching nonapparent when painted.

8. Acoustical Ceilings: Conform to requirements specified herein as necessary to match the existing conditions.

9. Resilient Flooring: Completely remove damaged flooring and clean off all old cement as specified. Install new flooring of color, pattern, and type as specified.

10. Painted Surfaces: Prepare patched areas and refinish as specified in Section 09900: Painting.

1.05 PREPARATION OF EXISTING WORK

A. Holes: Core drill holes through existing concrete or masonry for new conduit or piping, and do not jack-hammer concrete or masonry.

B. Abrasiveblasting: Work includes sandblasting of existing surfaces to receive materials secured by cementitious, adhesive, or chemical bond (such as concrete, toppings, elastomeric coatings, plaster, mortar, etc.), and the abrasiveblasting of other surfaces as shown, specified, directed, or required for proper preparation of surfaces. Completely remove existing finishes, stains, oil, grease, bitumen, penetrated mastics and adhesives including primers, and substances deleterious to bond or connection of new materials, and expose clean sound surfaces.

C. Disposal: Conform to General Conditions. Dispose of removed material off the Owner's property except existing items to be salvaged or reinstalled. Promptly remove waste and debris and do not allow to accumulate within facilities or on site.

END OF SECTION

SECTION 01 42 60
MONITORING OF ROOFING AND WATERPROOFING WORKMANSHIP

PART 1 - GENERAL

1.01 SUMMARY

A. The Contractor shall monitor roofing and waterproofing workmanship to be assured of the quality of products and execution of the work.

B. The monitoring activity may be continuous, regularly recurring, intermittent or a combination of these modes of monitoring, at the Contractor's discretion and option.

1.02 QUALITY ASSURANCE

A. The roofing and waterproofing system shall be monitored and inspected for compliance with the contract documents and with the standards of the roofing and waterproofing industry. All deviations (if any) shall be recorded by the Contractor.

B. Where any form of deficiency is found, additional measures shall be taken as deemed necessary by the Contractor to determine the extent of the deficiency and corrective actions to be taken. Where free water, skips, excessive voids, dry laps, disbonding or any form of delamination are discovered between the plies, remove and rebuild affected area. Correction of inadequate number of thickness shall be as directed by the Contractor to ensure water-tightness throughout.

1.03 PROGRESS MONITORING

A. During progress of the roof work, the Contractor shall make visual inspections as necessary to ensure compliance with specified requirements, including the following:

1. Equipment is in working order.
2. Materials are not installed during adverse weather conditions.
3. Substrates are in acceptable condition, prior to application of subsequent materials.
4. The proper number, type, and spacing of fasteners are installed.
5. Materials comply with the specified requirements.
6. All materials are properly stored, and protected from moisture or other damage.
7. The proper number and types of plies are installed, with the specified overlaps.
8. Applied membrane surface is inspected, cleaned, dry, and repaired as necessary prior to cap sheet installation.
9. Membrane is without ridges, wrinkles, kinks, or delaminations.
10. Associated flashings and sheet metal are installed in a timely manner in accord with the specified requirements.

END OF SECTION

SECTION 01 42 88
FIRE WATCH FOR ROOFING TORCH SAFETY

PART 1 - GENERAL

1.01 FIRE WATCH

A. All personnel on the roof during torch application must be properly trained to use a fire extinguisher. Provide a fire watch for a minimum of two hours after completion of all torch work at the end of each work shift. Maintain the fire watch for additional time required to ensure no potential ignition conditions exist. For torch applications, provide and utilize a minimum of one certified heat detection gun per torch for use during the fire watch to verify cool, safe and non-combustible conditions exist.

B. Do not leave the rooftop unattended during breaks in work at any time during a work shift. Walk and scan all areas of application, checking for hot spots, fumes, or smoldering, especially at wall and curb areas, prior to departure at the end of each work shift. Ensure that any and all suspect conditions are cooled and eliminated prior to leaving the site each work shift.

1.02 OPEN FLAME APPLICATION (TORCH) EQUIPMENT AND PERSONNEL SAFETY

A. Only NRCA certified roofing applicators shall be allowed to operate any torching equipment. Verify that all such applicators maintain and are currently carrying a valid Certified Roofing Torch Applicator (CERTA) card.

B. All crew members must be trained in preventive measures for indirect and direct dangers and hazards associated with roofing work, which include, but are not limited to the following:

1. Heat Stress: Wear light colored clothing, a hat for ultra-violet protection, and other eye protective devices. Drink sufficient quantities of non-alcoholic, non-caffeine liquids. Stage shifts for crew members to allow for breaks from heat and sun exposure without interfering with work progress.

2. First Aid for Burns: Immediately call for an ambulance. Contact local Occupational Health Services (OHS).

C. All crew members must wear correct personal protective equipment (PPE), including. but not limited to the following items:

1. Long-sleeved shirts buttoned at the collar and cuffs,and must be made of non-flammable materials.

2. Work boots covering ankles with rubber or composite soles.

3. Long pants without cuffs to extend over the top of the work boots, and must be made of non-flammable materials..

4. Heavy leather gloves or flame retardant gauntlets which must be worn during all handling of a torch, whether operating or not.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

A. Definition: "Cutting and patching" includes cutting into existing construction to provide for the installation or performance of other work and subsequent fitting and patching required to restore surfaces to their original condition.

B. Refer to other sections of these specifications for specific cutting and patching requirements and limitations applicable to individual units of work.

1.02 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural work in a manner that would result in a reduction of load-carrying capacity or of load-deflection ratio. Prior to such work, obtain approval of project's structural engineer.

B. Safety: Do not cut-and-patch operational elements and safety-related components in a manner resulting in reduction of capacities to perform in manner intended or resulting in decreased operational life, increased maintenance, or decreased safety.

C. Before cutting and patching structural elements obtain the Owner's approval to proceed.

D. Visual Requirements: Do not cut and patch work exposed on the building's exterior or in its occupied spaces, in a manner that would, in the Owner's opinion, result in lessening the building's aesthetic qualities. Do not cut and patch work in a manner that would result in substantial visual evidence of cut and patch work. Remove and replace work judged by the Owner to be cut and patched in a visually unsatisfactory manner.

1.03 SUBMITTALS

A. Procedural Proposal for Cutting and Patching: Where prior approval of cutting and patching is required, submit proposed procedures for this work well in advance of the time work will be performed and request approval to proceed. Include the following information, as applicable, in the submittal:

1. Describe nature of the work and how it is to be performed, indicating why cutting and patching cannot be avoided. Describe anticipated results of the work in terms of changes to existing work, including structural, operational and visual changes as well as other significant elements.

2. List utilities that will be disturbed or otherwise be affected by work, including those that will be relocated and those that will be out-of-service temporarily. Indicate how long utility service will be disrupted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General: Except as otherwise indicated, or as directed by the Owner, use materials for cutting and patching that are identical to existing materials. If identical materials are not available, or cannot

be used, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials for cutting and patching that will result in equal-or-better performance characteristics.

PART 3 - EXECUTION

3.01 PREPARATION

A. Temporary Support: To prevent structural failure or collapse, provide temporary support of work to be cut.

B. Protection: Protect other work during cutting and patching to prevent damage. Provide protection from adverse weather conditions of that part of the project that may be exposed during cutting and patching operations. Take precaution not to cut existing pipe, conduit or duct serving the building but scheduled to be relocated until provisions have been made to bypass them.

3.02 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching work. Except as otherwise indicated or as approved by the Owner, proceed with cutting and patching at the earliest feasible time and complete work without delay.

B. Cutting: Cut the work using methods that are least likely to damage work to be retained or adjoining work. Where possible review proposed procedures with the original installer; comply with original installer's recommendations.

C. Patching: Patch with seams which are durable and as inconspicuous as practicable. Comply with specified tolerances for the work.

D. Cleaning: Thoroughly clean areas and spaces where work is performed or used as access to work. Remove completely paint, mortar, oils, putty and items of similar nature. Do not allow debris to accumulate outside of work areas. Clean and mop floors.

END OF SECTION

SECTION 02 41 14
DECONSTRUCTION, REMOVALS AND DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Perform deconstruction, removal and demolition as specified, as indicated on the drawings, and as required to install the new work including:

1. Demount building components, separate, or remove vault materials from their mounted position or supports.

2. Cutting, drilling, chopping, and other similar operations.

3. Patching, rebuilding, reinforcing, repairing, refurbishing, restoring, replacing, or other similar operations.

B. It shall be the responsibility of the Contractor to ensure that noise, dust and vibration from construction operations do not at any time:

1. Interfere with building occupants during business hours;

2. Exceed the external noise limits prescribed by the City;

3. Cause employees to be exposed to excessive and unsafe noise and dust levels.

1.03 DECONSTRUCTION AND REMOVAL PLAN

A. The Contractor shall submit a plan describing procedures well in advance of the time deconstruction or removal will be performed before proceeding. Include the following information, in the proposal:

1. Describe the extent of deconstruction or removal required. Denote how it will be performed and indicate why it cannot be avoided.

2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance or other significant visual elements.

3. List scaffolding, hoists, lifts, other equipment and products to be used and firms or entities that will provide equipment.

4. Indicate dates when deconstruction or removal will be performed.

5. Utilities: List utilities that deconstruction or removal operations will disturb or affect. List utilities that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

6. Where deconstruction or removal involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.

7. Review by Architect prior to proceeding with cutting and patching does not waive Owner's right to later require complete removal and replacement of defective Work.

B. Include in the plan procedures for careful removal and disposition of materials required to be salvaged, coordination with other work in progress a disconnection schedule of utility service, and a detailed description of methods and equipment to be used for each operation and of the sequence of operations.

1.04 NOISE AND VIBRATION CONTROL

A. The Contractor shall schedule and coordinate potentially disruptive operations so the building occupants can operate at their normal efficiency during the period from 6:00 AM to 6:00 PM, Monday through Friday, hereafter referred to as "normal business hours." Due to the sensitive nature of the operations and functions in the existing building, demolition or construction noise will generally be considered disruptive (and therefore unacceptable) if it can be perceived by the occupants. The practical difficulties of limiting demolition and construction noise to levels below the threshold of perceptibility must be fully understood by the Contractor. Therefore, all potentially disruptive operations shall be conducted during other than normal business hours, unless measures are taken, with the specific prior approval of the Architect, to ensure that there will be no interference with or disruption of building occupants and functions. In the event of a complaint about noise from a building occupant, the Contractor shall be required, at the discretion of the Architect, to stop and desist the disruptive work.

B. Construction noise intrusion to occupied spaces above or below will tend to be structure borne rather than airborne. Vibration of the floor produced by a construction operation (such as floor finish removal, or drilling) or equipment (compressor, negative air machine, waste vacuum system, etc.) or impact (dropped tool or material) will be reradiated as noise in the space below. Similarly, the use of impact and/or power tools on the ceiling deck will transmit noise directly to the space above. Construction work which involves vibrating or impacting structural columns will cause structure borne noise transfer to both above and below.

C. Acoustical excitation of the building structure will also transmit noise to adjacent occupied spaces on the same floor. Airborne noise transfer to horizontal adjacencies is likely to be less significant, assuming that slab-to-slab constructions exist between the construction area and occupied space.

D. Excessive airborne noise levels within the construction area will at best disrupt speech communication, and at worst represent a hearing damage risk to the Contractor's employees. It is Contractor's responsibility to take all practicable steps to reduce construction noise levels at source and to comply with the requirements of Cal/OSHA General Industry Safety Orders, Title 8, Article 105 "Control of Noise Exposure".

F. On floors directly above or adjacent to occupied space, on ceiling slabs directly below adjacent to occupied space, and on structural columns are "prohibited" during normal business hours, and other operations that are considered "marginal" during normal business hours, and not allowed unless specific prior approval to conduct such operations is given by the Architect. The following Table 1 presents the prohibited and marginal operations:

TABLE 1
CONSTRUCTION NOISE AND VIBRATION CONTROL
RESTRICTED CONSTRUCTION OPERATIONS IN AREAS
ADJACENT TO OCCUPIED SPACE

OPERATION	TYPE
Powder Actuated Fastening	P
Percussive Hammer Drilling	P
Diamond Core Drilling	M
Grinding	P
Cutting/Sawing – Structural	P
Cutting/Sawing Existing Pipes or Ducts	M
Powered Equipment (Paint Sprayers, Negative Air Machines, Waste Vacuum Systems, Compressors, Generators)	M
Bead Blasting (if required to remove floor finish)	P
Hammering	P
P = Prohibited during normal business hours (6:00 am to 6:00 pm, Monday through Friday)	
M = Marginal Operation subject to approval of Architect	

G. Violation of these restrictions or any of the other noise limitations required elsewhere in this Section during business hours shall cause for penalizing the Contractor by requiring that all construction operations be immediately halted and/or conducted outside of business hours. The Architect will make the final decision regarding the scheduling and interruption of "restricted" noise generating operations adjacent to occupied space.

H. The Contractor's representative shall supervise and be responsible for enforcing all provisions of the Specifications concerning construction noise and vibration control.

I. The use of hammers or other impact tools on floors, structural members, ductwork, plumbing and sprinkler systems, ceiling systems, partitions, etc. is expressly prohibited during daytime hours in construction areas adjacent to occupied space.

J. On floors over occupied space, no noise or vibration generating work shall be carried out during business hours.

K. The Contractor shall be responsible for ensuring that all construction operations and activities, including the movement and loading of trucks around the building, comply with the City Noise Ordinance. The Ordinance requires that (i) the noise of mobile construction equipment be limited to 75dBA at a distance of 50-feet, and (ii) fixed equipment does not cause noise levels neighboring properties to exceed 65dBA between 7am and 10pm, and 60dBA between 10pm and 7am.

1.05 QUALITY ASSURANCE

A. Requirements for structural Work: Do not deconstruct or remove structural elements in a manner that would change their load-carrying capacity or load-deflection ratio. Obtain approval from Architect of the cutting and patching proposal before cutting and patching the structural elements.

B. Operational Limitations: Do not deconstruct or remove operating elements or moving components in a manner that would result in reducing their capacity to perform as intended. Do not deconstruct or remove operating elements or moving components in a manner that would result in increased maintenance or decreased operational life or safety of the system. Obtain review of the deconstruction and removal plan before deconstructing or removing the following operating elements or safety related systems:

1. Primary operational systems and equipment
2. Air or smoke barriers
3. Membranes and flashings
4. Fire protection systems
5. Noise and vibration control elements and systems
6. Control systems
7. Communication or data systems
8. Electrical wiring systems

C. Visual Requirements: Do not deconstruct or remove vault elements that are exposed to view on the exterior or in occupied spaces in a manner that would, in the opinion of Architect, reduce the building's aesthetic qualities. Do not deconstruct or remove surfaces in a manner that would result in conspicuous visual evidence of patching. Remove and replace surfaces that are patched in a visually unsatisfactory manner.

1.06 EXISTING CONDITIONS DOCUMENTATION

A. Before beginning any deconstruction or removal work, survey the site and examine the drawings and specifications to determine the extent of the work. Record existing conditions in the presence of the Architect showing the conditions of structures and other facilities adjacent to areas of alteration or removal. Photographs will be acceptable as a record of existing conditions. Include in the record the elevation of the top of foundation walls, finish floor elevations, possible conflicting electrical conduits, plumbing lines, alarms systems, the location and extent of existing cracks and other damage and description of surface conditions that exist prior to before starting work.

B. Contractor's responsibility to verify and document all required outages which will be required during the course of work, and to note these outages on the record document.

1.07 ITEMS TO BE UNDISTURBED AND REMAIN IN-PLACE

A. Take necessary precautions to avoid damage to existing items to remain in-place, to be reused, or to remain undisturbed. Repair or replace damaged items as approved by the Architect. Coordinate and harmonize the work of this section with the in-place undisturbed items.

B. Construct and maintain shoring, bracing, and supports as required. Ensure that structural elements are not overloaded. Increase structural supports or add new supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract. Do not overload structural elements. Provide new supports and reinforcement for existing construction weakened by deconstruction, or removal work. Repairs, reinforcement, or structural replacement require approval by the Architect prior to performing such work.

C. Do not disturb existing construction beyond the extent indicated or necessary for installation of new construction. Provide temporary shoring and bracing for support of building components to prevent settlement or other movement.

1. Provide protective measures to control accumulation and migration of dust and dirt in all work areas.

2. Remove dust, dirt, and debris from work areas daily.

D. For portions of the building to remain, protect building interior and materials and equipment from the weather at all times. Where removal of existing roofing is necessary to accomplish work, have materials and workers ready to provide adequate and temporary covering of exposed areas.

1.08 UTILITY SERVICES

A. Maintain existing utilities required to stay in service and protect against damage during deconstruction or removal operations. Prior to start of work, utilities serving each area of alteration or removal will be shut off by the Owner and disconnected and sealed by the Contractor.

B. Protect electrical and mechanical services and utilities. Where removal of existing utilities is required or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.

1. Floors, roofs, walls, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable conditions, must remain standing without additional bracing, shoring, or lateral support until demolished or deconstructed, unless directed otherwise by the Architect.

2. Ensure that no elements determined to be unstable are left unsupported, and place and secure bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, deconstruction, or demolition work performed under this contract.

1.09 PROTECTION OF PERSONNEL

A. Before, during and after the deconstruction or removal work the Contractor shall continuously evaluate the condition of the structure being deconstructed and take immediate action to protect all personnel working in and around the project site.

B. No area, section, or component of floors, roofs, walls, or other structural element shall be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workers remove debris or perform other work in the immediate area.

C. Avoid interference with the Owner’s use of adjoining areas or interruption of free passage of personnel to adjoining areas.

1.10 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Carefully remove existing Work to be salvaged and reinstalled. Protect and store for reuse into the Work. Verify compatibility and suitability of existing substrates before starting the Work.

B. Where the Work requires blast cleaning of existing surfaces in order to receive new materials secured by cementitious, adhesive or chemical bond, completely remove existing finishes, stains, oil, grease, bitumen, mastic and adhesives or other substances deleterious to the new bonding or fastening of new Work. Utilize wet sand blasting for interior surfaces and for exterior surfaces where necessary to prevent objectionable production of dust.

C. Cutting: Cut existing construction using methods least likely to damage elements retained or adjoining Work. Where practicable, review proposed procedures with the original manufacturer; comply with the original manufacturer’s recommendations.

1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.

2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

3. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and seal watertight.

4. Glass: Remove cracked, broken, or damaged glass and clean rebates and stops of setting materials.

D. Patching: Patch with durable seams that are as invisible as possible or as inconspicuous as practicable, subject to approval by the Architect.

1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation. Verify conditions of existing substrates prior to executing Work.

2. Restore exposed finishes of patched areas and extend finish restoration into retaining adjoining construction in a manner that will eliminate all conspicuous evidence of patching and refinishing.

3. Metal Fabrications: Items to remain exposed shall have their edges cut and ground smooth and rounded.

4. Sheet Metal: Replace removed or damaged sheet metal items as required for new Work.

5. Glass: Install matching glass and re-seal exterior glass assemblies.

6. Painting: Prepare areas to be patched, patch and paint colors as selected by the Architect.

END OF SECTION

SECTION 02 42 10
SALVAGEABLE PROPERTY

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor shall perform salvage of property as indicated on the drawings and as specified herein. Do not begin salvage of materials and equipment until authorization is received from the Owner.

B. Remove salvageable materials carefully to avoid damages. Materials indicated to be retained for reuse on this project and be incorporated into new work shall be located as indicated on the drawings. Except for items indicated to be retained as the Owner property, other removed and salvaged materials not indicated for reuse shall become Contractor's property when approved by the Owner and removed from site with further disposition at Contractor's option.

1.2 SUBMITTALS

A. Submit proposed salvage plans, and removal procedures to the Owner for approval before work is started. List the materials and equipment to be salvaged. If any unsafe conditions could develop due to the salvage work, notify the Owner.

PART 2 PRODUCTS

2.1 SALVAGEABLE PROPERTY

A. Protect salvageable property and existing work which is to remain in place, be reused, or remain the property of the Owner. Repair items that are to be salvaged and that are damaged during performance of the work to their original condition, or replace items with new articles. Repairs and replacement shall be subject to approval by the Owner.

PART 3 EXECUTION

3.1 REUSE OF MATERIALS AND EQUIPMENT

A. Demount, remove and store materials and equipment indicated to be remain the property of the Owner, salvaged, reused or relocated carefully to prevent damage, and reinstall them in the proper sequence, or as the work progresses. All materials handling and transportation equipment, including pallets, for salvaging property shall be provided and paid for by the Contractor. Deliver materials or equipment to a storage place on the premises as directed by the Owner.

B. Retained items that are to remain property of the Owner will be identified by the Owner or noted on drawings, or described in the specifications as items to be salvaged. Items that remain property of the Owner shall be removed or dislodged from present locations in such a manner as to prevent damage that would be detrimental to re-installation and reuse. Store such items where directed by the Owner.

END OF SECTION

SECTION 03 11 00
CONCRETE FORMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Design and construction of formwork for concrete.

2. Setting in forms, all anchor bolts, metal inserts, sleeves, etc., embedded in concrete.

3. Miscellaneous concrete work, including but not limited to areaways, cast-in-place valve boxes, pits, splash blocks, equipment bases, and other items as shown or required to complete all work.

B. Related Sections:

1. All Pertinent Provisions of Division 01, “General Requirements.”
2. Section 03 20 00: Concrete Reinforcement.
3. Section 03 30 00: Cast-In-Place Concrete
4. Section 03 31 16: Lightweight Structural Concrete.
5. Section 03 33 00: Architectural Cast-in-Place Concrete
6. Section 03 35 20: Stained Concrete
7. Section 03 54 16: Cement Based Underlayment
8. Section 05 31 00: Metal Floor and Roof Decking.
9. Section 31 10 00: Site Clearing
10. Section 31 20 00: Earth Moving

C. Related Work Specified Elsewhere:

1. Finishing and final curing of cast-in-place concrete.
2. Placing of embedded anchor bolts and inserts.
3. Gravel fill under interior floor slabs.
4. Subslab drainage fill.
5. Cement fill in metal stair pans.
6. Trench grates
7. Screeds for slabs.
8. Screeds for insulating concrete.
9. Screeds for composite insulating concrete.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Division 01 Section "Submittal Procedures".

B. Shop Drawings: Submit shop drawings showing form pattern layouts of all exposed exterior and interior concrete dimensioned to precisely locate grooves, form panel jointing, bulkhead formwork detail at construction joints and similar features. Review and approval will not include form strength and adequacy.

C. Record Document: Keep an accurate record of the dates of removal of forms, form shores and reshores, and furnish copies to the SEOR and Owner.

D. Submit product data for all proprietary items to be used on project.

1.03 QUALITY ASSURANCE

A. Comply with pertinent provisions of Division 01, Section 01 43 00, "Quality Assurance Requirements."

B. Construct forms according to ACI 347, "Guide to Formwork for Concrete," and conforming to tolerances specified in ACI 301, "Specifications for Structural Concrete," as applicable, unless exceeded by requirements of the County of Los Angeles or otherwise indicated or specified.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Comply with pertinent provisions of Division 01, Section 01 61 00, "Common Product Requirements."

B. Deliver materials for forms in timely manner to ensure uninterrupted progress.

C. Store materials by methods that prevent damage and permit ready access for inspection and identification.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Form lumber: Lumber with adequate strength, stiffness, dimensional accuracy and stability, workability, and durability in conformance with ACI 347 "Guide to Formwork of Concrete."

B. Form plywood: PS 1-95, Group I, Exterior Grade B-B Plyform or better, minimum 5-ply and 3/4" thick for exposed locations and not less than 5/8" thick for unexposed locations, grade marked, not mill oiled. Plywood having medium or high density overlay is acceptable.

C. Coated form plywood: For exposed painted concrete, plastic overlaid plywood of grade specified above, factory coated with a form coating and release agent "NoxCrete", or equal.

D. Tube forms: Sonoco "Seamless Sonotubes", or approved equal, type leaving no marks in concrete, 1-piece lengths for full required heights.

E. Joist forms: Approved steel or molded plastic types as required.

F. Special forms: For exposed integrally-colored concrete, plywood as above with high density overlay, plywood with integral structural hardboard facing or fibrous glass reinforced plastic facing, or approved equal producing specified finish.

G. Form ties: Prefabricated rod, flat band, wire, internally threaded disconnecting type, or equal, not leaving metal within 1-1/2" of concrete surface.

H. Form coating: Non-staining clear coating free from oil, silicone, wax, not grain-raising, "Cast-Off" by BASF or equal approved equal by the SEOR. Where form liners are used, provide form coatings recommended by form liner manufacturer.

I. Form liner: Rigid or resilient type by Labrado Forms, Symons, or approved equal, types shown or directed, matching approved sample.

PART 3 - EXECUTION

3.01 WORKMANSHIP

A. Rigidly construct forms to prevent mortar leakage, sagging, displacement or bulging between studs. Use clean, sound, approved form material, coated with specified materials only, not oil. Provide backing on all plywood joints.

B. Sides of all footings and grade beams shall be formed or cast against clean vertical cuts in unweathered bedrock, unless the member detail provides at least 3" clear cover to reinforcement and indicates that the member is cast against earth, or permission is obtained to place concrete directly against earth. Where this permission is granted, the footing or grade beam dimension shall be increased 3". Remove formwork prior to backfilling operations.

3.02 FORM ERECTION AND REMOVAL

A. Conform to ACI 301, 2010 CBC Section 1906A and ACI 347 except as exceeded by the requirements of the County of Los Angeles or herein.

B. Construction: Coat forms with the specified resin coating, not form oil. Construct forms to exact shapes, sizes, lines, and dimensions required to obtain level, plumb, and straight surfaces. Provide openings, offsets, keys, reglets, anchorages, recesses, moldings, chamfers, blocking, screeds, drips, bulkheads, and all other required features. Make forms easily removable without hammering or prying against concrete. Space forms apart with metal spreaders. Construct forms to accurate alignment, location and grades, and provide against sagging, leakage of concrete mortar, or displacement occurring during and after placing of concrete. Coordinate installation of inserts and anchors in forms according to Shop Drawings and requirements for work of other sections.

C. Camber: Place suitable jacks, wedges, or similar means to induce camber and to correct settlement in forms before and during concrete placing. In general, formwork shall be capable of accommodating camber of 1/8" per 10' of span plus 1/4". Provide camber as noted on the Structural Drawings (if required).

D. Corners and Angles: Provide 3/4" by 3/4" beveled chamfer strips for all exposed concrete corners and angles unless otherwise indicated. Form concealed concrete corners and angles square unless otherwise indicated.

E. Reglets and Rebates: Form required reglets and rebates to receive frames, flashing, and other equipment. Obtain required dimensions, details, and precise positions for work to be installed under other sections and form concrete accordingly.

F. Form Joints: Fill joints to produce smooth surfaces, intersections, and arises. Use polymer foam or equivalent fillers at joints and where forms abut or overlap existing concrete to prevent leakage of mortar.

G. Recesses, Drips, and Profiles: Provide smooth milled wood or pre-formed rubber or plastic shapes of types shown and required.

H. Cleanouts and Cleaning: Provide temporary openings in all wall forms and other vertical forms for cleaning and inspection. Clean forms and surfaces to receive concrete prior to placing.

I. Re-Use: Clean and recondition form material before re-use.

J. Form Removal: Do not remove concrete forms until concrete attains sufficient strength to support its own weight and all superimposed loads as determine by testing field cured concrete cylinders, but not sooner than specified in ACI 347, Section 3.6.2.3. Load supporting forms may be removed when concrete has attained 75 percent of required 28 day compressive strength, but no sooner than 3 days, provided construction is reshored. Vertical formwork for cast-in-place concrete walls may be removed no sooner than 1 day following concrete placement, provided that contractor can demonstrate that no sloughing or sagging of concrete will occur.

1. Reshore structural members as specified per ACI 347.

2. Remove formwork progressively so unbalanced loads are not imposed on the structure.

3. Avoid damage to concrete surfaces during form removal.

4. Store reusable forms for exposed architectural concrete to prevent damage to contact surfaces.

5. Remove formwork in same sequence as concrete placement to achieve similar concrete surface coloration.

K. Reshoring:

1. Minimum reshoring shall be as per the requirements of ACI 347.

2. Record: Maintain a form and shoring removal record.

3. Contractor shall submit shoring/reshoring plans and calculations for review and approval by the SEOR. Calculations and plans shall be stamped and signed by a licensed structural engineer registered in the State of California. Reshoring loads to the lower floors shall be consistent with the design loads specified on the construction documents and with the acquired strength of the lower floors based on the time they have been allowed to cure before being loaded.

L. Shoring for Tributary Loads: Set temporary shoring for structural steel beams supporting cast-in-place concrete beams, walls, or slabs.

3.03 FORMWORK TOLERANCES

A. Deflection: Limit deflection of forming surfaces from concrete pressure to L/240.

B. Finish Lines: Position formwork to maintain hardened concrete finish lines within following permissible deviations.

1. Variation from Plumb:

In 10'-0”	1/4 inch
In any story or 20'-0”	3/8 inch
In 40'-0” or more	3/4 inch

2. Variation from Level or Grades Indicated

In 10'-0”	1/4 inch
In any bay or 20'-0” maximum	3/8 inch
In 40'-0” or more	3/4 inch

3. Cross-Sectional Dimensions

Minus	1/4 inch
Plus	1/2 inch

C. Building Lines: Variation of linear building lines from established position in plan and related position of columns, walls and partitions:

1.	In any bay or 10'-0" maximum	1/2 inch
	In 40'-0" or more	1 inch

D. Slab Openings: Variations in size and location of sleeves and slab openings shall not exceed 1/4 inch.

3.04 SURVEY AND ADJUSTMENT

A. Check forms before and during placement of concrete, using an instrument, and make corrections as work proceeds.

3.05 EMBEDDED PIPING AND ROUGH HARDWARE

A. Where work of other sections require openings for passage of pipes, conduits, ducts, and other inserts in the concrete, obtain all dimensions and other information. All necessary pipe sleeves, anchors, or other required inserts shall be accurately installed as part of the work of other sections, according to following requirements. See specification Section 03 30 00, Section 1.3.B for submittal requirements related to this scope.

B. Conduits or Pipes: Locate so as not to reduce strength of concrete. Do not place pipes, other than conduits, in a slab 4-1/2" thick or less in any case. Conduit buried in a concrete slab shall not have an outside diameter greater than 1/3 the slab thickness nor be placed below the bottom reinforcing steel or over top reinforcing steel.

C. Sleeves: Pipe sleeves may pass through slabs or walls if not exposed to rusting or other deterioration and are of uncoated or galvanized iron or steel. Provide sleeves of diameter large enough to pass any hub or coupling on pipe, including any insulation. Refer to Architectural and MEP drawings and specifications for details of waterproofing seals at wall penetrations.

D. Conduits: Conduits may be embedded in walls only if the outside diameter does not exceed 1/3 the wall thickness, are spaced no closer than 3 diameters on centers, and do not impair the strength of the structure.

E. Clusters of Conduits:

1. Clusters of conduits embedded in a concrete slab shall not exceed 6 conduits per cluster and each conduit per cluster shall be individually spaced as per the above requirements. Conduit clusters exceeding this requirement shall be reviewed and approved by the Structural Engineer of Record and the County Building Inspector prior to the installation of the conduits.

2. If more than one conduit cluster is required in a specific area of the slab, routing and spacing of the clusters shall be reviewed and approved by the structural engineer of record and the County Building Inpector prior to the installation of the conduits.

3. At no time shall the quantity and routing of clusters of conduits impair the strength of the concrete construction.

3.06 FIELD QUALITY CONTROL

A. Inspection: Obtain inspection and approval of forms per 2013 CBC Table 1705.3 Item 12 before placing structural concrete. Comply with the general provisions of Division 01, Section 01 43 00, "Quality Assurance Requirements."

END OF SECTION

SECTION 03 20 00
CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Reinforcing bars for cast-in-place concrete.

2. Reinforcing mesh for cast-in-place concrete.

3. Accessories, including but not limited to, chairs and tie wires.

4. Furnish and deliver to site steel bar reinforcing for masonry.

5. Miscellaneous concrete work, including but not limited to areaways, cast-in-place valve boxes, pits, splash blocks, equipment bases, and other items as shown or required to complete all work.

1.02 SUBMITTALS

A. Comply with pertinent provisions of Division 01 Section 01 33 00 “Submittal Procedures.”

B. Shop Drawings: Submit shop drawings which should include complete layouts, sections, and details for congested conditions, typical bending diagrams and offsets, splice lengths and locations, proposed layout where vertical and horizontal bars intersect, and wherever welding is proposed, detailed to conform to AWS D1.4-05 and 2013 CBC requirements. After approval of initial submission, subsequent submittals may be waived.

C. Certification: Submit copies of welding operator's certificate.

D. Chemical Analysis: Provide for bars to be welded, in accordance with 2013 CBC Table 1705.3 and ACI 318-08 Section 3.5.2.

E. Weld Procedure Specifications: Provide for bars to be welded in accordance with AWS D1.4-05.

1. All WPS's shall be submitted to the Structural Engineer of Record (SEOR) for review and approval prior to use.

2. For WPS's that have been qualified by test, the supporting Procedure Qualification Record (PQR) shall be submitted to the Engineer for review and approval. All WPS's and PQR's shall be in accordance with the forms shown in Division 05 Section 05 12 10 “Welding.”

3. Included shall be WPS for repair welds.

1.03 QUALITY ASSURANCE

A. Comply with pertinent provisions of Division 01 Section 01 43 00 “Quality Assurance Requirements” for general requirements and to the following paragraphs for specific procedures.

B. Source Quality Control: Testing Laboratory shall perform following conformance testing, shall select test samples of bars, ties, and stirrups from the material at the site or from place of distribution, each sampling including at least two 18" long pieces, and perform the following tests in accordance with ASTM A706-05.

1. Identified Bars: If samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with Identification Certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when samples are selected.

2. Unidentified Bars: When positive identification of reinforcing bars cannot be made and when random samples are obtained, perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.

3. Certification of Welders: All welding both in shop and in field shall be performed by certified welding operators.

1.04 MARKING, SHIPPING AND DELIVERY

A. Comply with pertinent provisions of Division 01 Section 01 61 00 “Common Product Requirements,” delivering materials in a timely manner to ensure uninterrupted progress.

B. Bundle bars, tag with identification, and transport and store so as not to damage any material. Use metal tags indicating size, length and other marking shown on placement drawings. Maintain tags after bundles are broken.

1.05 EXTRA MATERIAL

A. Provide an allowance of an additional 10% of the total reinforcing steel tonnage in addition to quantities shown on drawings. This additional steel shall may be installed during construction, in sizes and locations as directed by the Structural Engineer. Provide unit price for purpose of adjusting contract price to reflect quantity of extra material actually used. All unused material shall be credited to the owner based upon the agreed unit prices.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Reinforcing bars: ASTM A615, Grade 60, unless otherwise indicated on drawings.

B. Reinforcing bars for welding: ASTM A706-05, Grade 60.

C. Reinforcing mesh: ASTM A185, mesh size and gauge as shown, 60 ksi minimum tensile strength. Provide mesh in flat sheets only.

D. Tie wire: ASTM A82, Annealed copper-bearing steel, 16 gauge minimum.

E. Chairs and similar support items:

1. Standard manufactured products conforming to Concrete Reinforcing Steel Institute (CRSI) “Manual of Standard Practice,” latest edition.

2. Use dense precast concrete supports with embedded wire ties for reinforcement placed on grade. Elsewhere, use wire bar supports.

F. Welding electrodes: AWS D1.4-05, Table 5.1 and 5.3, low hydrogen electrodes, E8018 for Grade 60 steel.

2.02 FABRICATION OF REINFORCING BARS

A. Comply with Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practice," latest edition for fabrication of reinforcing steel.

B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are subject to rejection. Use only tested and approved bar materials.

C. Welding: Use only ASTM A706 steel where welding is proposed. Perform welding, where shown or approved, by the direct electric arc process in accordance with AWS D1.4-05 using specified low-hydrogen electrodes. Preheat 6" each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is prohibited. Do not tack weld bars. Welding shall not be done on or within two bar diameters of any bent portion of a bar that has been bent cold. Welding of crossing bars shall not be permitted for assembly of reinforcement unless authorized by the SEOR and approved by The County of Los Angeles Building Inspector. Clean metal surfaces to be welded of all loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds found defective with chisel and replace with proper welding. Fillet welds may be considered prequalified per AWS D1.4-05, section 6.1.2. Other welds are to be qualified per AWS D1.4-05, section 6.1.2.

Where ASTM A615 steel is to be used or occurs in existing elements and is to be welded, complete chemical analyses shall be performed to determine chemical composition and, for new bar, provided in the mill certifications to determine weldability in accordance with ACI 318-08 Section 3.5.2 and with AWS D1.4-05. The carbon equivalency (CE) shall be clearly defined and bars with a CE above 0.75 shall not be welded. Welding Procedure Specifications and supporting Procedure Qualification Records with required testing per AWS D1.4-05, shall be provided for review and approval prior to welding. These WPS's and PQR's shall be specific to the CE as determined above, and shall, in addition to the other AWS requirements, include minimum and maximum preheat and interpass temperatures that are specific to the CE. This preheat and interpass temperature shall be strictly enforced in the field. If separate shipments of bars vary the weldability, the process listed in the requirements above shall be repeated for these new bars.

D. Galvanizing: Hot-dip galvanize fully completed reinforcing assemblies in accordance with ASTM A123 where indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF REINFORCING

A. Provide additional reinforcing bars at wall and slab openings as required. Before placing bars, and again before concrete is placed, clean bars of loose mill scale, oil, or any other coating that might destroy or reduce bond.

B. Securing in Place: Accurately place bars and wire tie in precise position where bars cross. Bend ends of wire ties away from the forms. Wire tie bars to corners of ties and stirrups. Support bars according to Concrete Reinforcing Steel Institute (CRSI) "Placing Reinforcing Bars," latest edition, using approved accessories and chairs. Place precast concrete cubes with embedded wire

ties to support reinforcing steel bars in concrete placed on grade and in footings. Use care not to damage vapor barriers where they occur.

C. Exposed Concrete Surfaces: Provide stainless steel or exterior quality vinyl plastic tipped chairs, bolsters, and accessories where exposed on exterior or interior concrete surfaces not to be painted or permanently covered.

D. Clearances: Maintain minimum clear distances between reinforcing bars and face of concrete as indicated on Contract Documents.

E. Splices: Do not splice reinforcing bars at the points of maximum stress except where indicated. Lap splices as shown or required to develop the full strength or stress of bars. Stagger splices in horizontal wall bars at least 48" longitudinally in alternate bars and opposite faces.

F. Field Welding of Bars: As specified for fabrication.

G. Maintaining Bars In Position:Take adequate precautions to assure that reinforcing position and spacing is maintained during placement of concrete.

H. Reinforcing Mesh: Lap one full mesh plus 2”, 9”, or 1.5 times diameter, whichever is greater, at splices, wire tie, and support the same as specified for bars.

I. Splice Devices:

1. Type and manufacture, noted on drawings and subject to review and approval by County of Los Angeles Building Inspector. If substitution is requested Contractor to supply manufacturer calculations and supporting data showing proposed substitution conforms to requirements indicated and supplied.

2. Install in accordance with manufacturer's written instructions.

3. Splice in a manner developing at least 125% of the yielding strength of the bar.

4. Samples must be representative of the mill sources to be used for reinforcement on the project. Tests may be determined to be acceptable if a bar stress of 125% fy is developed without any slip or distress at the connection between the reinforcing bar and mechanical splice.

5. Reinforcing resisting earthquake induced forces shall use splice connections meeting the requirements of ACI 318-08, Section 21.1.6.

3.02 FIELD QUALITY CONTROL

A. Comply with pertinent provisions of Division 01 Section 01 43 00 “Quality Assurance Requirements”

B. Supervision: Perform Work to this Section under supervision of a capable superintendent.

C. Inspection: Obtain inspection and approval of reinforcing per 2013 CBC Section 1704A.4 before concrete is placed.

D. Welding Inspection: Whether welding is done in the shop or at the site, perform welding of reinforcing bars under inspection of the Testing Laboratory Welding Inspector who is specially qualified and approved by The County of Los Angeles in accordance with 2013 CBC Section 1705.2.2 Item 2 b.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cast-in place concrete, including furnishing, concrete materials, mix design, placement procedures, curing, and finishes, except as otherwise specified.

2. Grout and drypack, except as otherwise specified.

3. Placing of embedded anchor bolts and inserts.

4. Waterstops including testing.

1.02 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 33 00 “Submittal Procedures.”

B. Shop Drawings: Submit shop drawings for all horizontal and vertical concrete. Coordinate with related trades for final dimensions of cladding, equipment and utilities. Indicate the following items tied to building gridlines or other floor level datums identified on the Drawings:

1. Edge of Slab at Building Perimeter
2. Edge of Slab at Openings
3. Curbs, pads and raised areas; indicate top of slab elevation.
4. Depressions; indicate top of slab elevation
5. Cast in place stairs and ramps
6. Sleeves, block-outs and penetrations
7. Locations and types of construction and expansion joints
8. Embedded pipes and rough hardware

C. Structural Concrete Mix Designs: Submit for all Structural concrete per Section 1.4. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances that may warrant adjustments.

D, Product Data: For each type of manufactured material and product including but not limited to the following:

1. Admixtures.
2. Curing compounds.
3. Floor and slab treatments.
4. Semirigid joint fillers.
5. Joint-filler strips.
6. Bonding agent.

7. Non-shrink grout.
8. Concrete Colors
9. Color Control Procedure

E. Delivery Tickets: With each transit truck, provide delivery ticket, signed by an authorized representative of the batch plant, containing all information required by ASTM C94, as well as time batched, type of brand of cement, cement content, maximum size of aggregate and total water content.

1.04 QUALITY ASSURANCE

A. Comply with pertinent provisions of Section 01 43 00 “Quality Assurance Requirements.”

B. Qualifications

1. Installer Qualifications: An experience installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

2. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

3. Concrete Testing and Inspection Services: The Owner will engage a qualified independent testing agency to perform evaluation tests and special inspections per Structural Notes on Drawings and as required by the Code. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

C. ACI Publications: Comply with the following, unless more stringent provisions are indicated:

1. ACI 301, "Specification for Structural Concrete."

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination."

E. Concrete Manufacturer: Furnish concrete Furnish concrete from a plant complying with the requirements of ASTM C94-07, with a current certificate from the National Ready Mixed Concrete Association, or other agency acceptable to the County of Los Angeles.

F. Allowable Tolerances: Construct concrete conforming to the tolerances specified in ACI 117 "Recommended Tolerances for Concrete Construction and Materials,” as applicable, unless exceeded by requirements of regulatory agencies or otherwise indicated or specified.

1. Floor Flatness & Levelness: Floor Profile Quality Classification – “Flat” per ASTM E1155 Standard Test Method for Determining Floor Flatness and Levelness using the F–Number System (SOFF and SOFL respectively). SOFF shall be applied to both slabs on grade and elevated slabs, and SOFL only to slabs on grade as is indicated by ACI 117.

G. Source Quality Control: Refer to the following paragraphs for specific procedures. Concrete materials which, by previous tests or actual service, have shown conformance may be used without testing when so approved by the SEOR and the County of Los Angeles. Testing Laboratory shall perform following conformance testing.

1. Portland Cement: Furnish Certificate of Compliance in accordance with ACI 318-08, and acceptable to Structural Engineer of Record, showing conformance with requirements specified. Cementitious materials without Certificate of Compliance shall not be used.

2. Aggregate for Normal Weight Concrete: Test the aggregate before and after concrete mix is designed and whenever character of aggregate varies or source of material is changed. Include a sieve analysis. Obtain samples of aggregates at the dry batching or ready-mix concrete plant in accordance with ASTM D75 and perform tests for the properties listed in the following table.

PHYSICAL PROPERTIES		
Physical Properties, units	Test Method	Minimum values
Sieve analysis	ASTM C136-06	Per ASTM C33-03 Section 6 for fine aggregate, and Table 2 for coarse aggregate
Organic impurities	ASTM C40-04	Fine aggregate not darker than reference standard color
Soundness	ASTM C88-05	Loss after 5 cycles not more than 8 percent of coarse aggregate, nor more than 10 percent of fine aggregate
Abrasion	ASTM C131-06	For coarse aggregate, weight loss not more than 50 percent after 500 revolutions
Deleterious materials	ASTM C33-03	Per ASTM C33-03 Table 1 for Fine Aggregate, and Table 3, Class 1N, for Coarse Aggregate.
Materials finer than No. 200 sieve	ASTM C117-04	Not over 1 percent for gravel, 1.5 percent for crushed aggregate
Reactivity potential	ASTM C289-07	Ratio of silica released to reduction in alkalinity not to exceed 1.0. See ACI 318-08
Sand equivalent	ASTM D2419-02	California sand equivalent values operating range not below 71 percent

3. Lightweight Aggregates: Test the lightweight aggregates before mix is designed and whenever the character of aggregate varies or source is changed in accordance ASTM C330 and C332. Include sieve analyses, report on unit weights, report on deleterious substances, unburned or underburned lumps, loss on ignition, soundness, staining materials, and crushed particles in coarse aggregate. Splitting tensile strength (FSP); 5.5 minimum. The use of pumice aggregate is prohibited.

4. Concrete Batch Plant Inspections: Continuous batch plant inspection is required for structural concrete, performed by a specially qualified inspector approved by the County of Los Angeles. Batch plant inspection may be waived provided batch plant is certified by the County of Los Angeles. Structural Engineer of Record and the County of Los Angeles approval will be required prior to the waiving batch plant inspection.

H. Compliance with Regulations: All materials shall comply with the current rules and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with FDA rules and regulations for dangerous substances in construction products.

1.05 CONCRETE MIX DESIGNS

A. General Requirements: A registered Professional Civil Engineer in the state of California with experience in concrete mix design shall prepare, design and stamp concrete mixes using field

experience and/or trial mixtures.Concrete mix designs shall state the intended usage and be submitted to the Structural Engineer of Record for approval.

B. Strength Requirements: Design mixes for structural concrete for minimum 28-day compressive strengths required by Drawings and Specifications. The trial batch strength for each mix shall exceed indicated or specified strength by 750 psi or a lesser amount based on the standard deviations of strength test records according to ACI 318-08 Section 5.3..

C. Normal Weight Concrete Mix Design: Design all mixes for workability and durability of concrete. Control the mixes in accordance with ACI 211.1, "Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete", and ACI 318-08, Chapter 4Make adjustments in cement content required for concrete strengths at Contractor's expense and do not exceed 0.50 absolute water-cement or cement plus flyash ratio by weight. Do not use calcium chloride or any admixture containing such material. Admixtures containing a material releasing nitrates in solution are limited to 0.06 percent by weight for the chloride ion.

D. Maximum Aggregate Sizes: Not exceeding 3/4 of minimum clear space between bars and between bars and forms, nor larger than 1/5 of least dimensions between the forms, nor larger than 1/3 the depth of slabs. Design the mixes with 1" maximum size, except maximum 1-1/2" size for foundations and maximum 3/8" size at congested reinforcing or thin sections, as submitted by the General Contractor and approved by the Architect and Structural Engineer of Record.

E. Pumped Concrete: Design concrete mixes specifically for pump placing with dry loose volume of fine aggregates not more than 47 percent of total aggregates.

1.06 DELIVERY, STORAGE AND HANDLING

A. Comply with pertinent provisions of Section 01 61 00, "Common Product Requirements."

B. Deliver, store, and handle all material to prevent damage.

C. Deliver all materials in timely manner to ensure uninterrupted progress of the Work.

D. Store materials by methods that prevent damage and provide ready access for inspection and identification.

E. Mix concrete only in such quantities as are required for immediate use, and use while fresh before initial set has taken place. Concrete which has developed initial set shall not be used. Concrete which has partially hardened shall not be retempered or remixed.

F. Use all means necessary to protect cast-in-place concrete materials before, during, and after installation and to protect the installed work and material of all other trades.

G. In the event of damage, immediately make all repairs and replacement necessary to the approval of the Engineer and at no cost to the Owner.

1.07 PROJECT SITE CONDITIONS

A. Do not place concrete during rain or adverse weather conditions without measures to prevent damage. Conform to to ACI 305, Recommended Practice for Hot Weather Concreting and ACI 306, Recommended Practice for Cold Weather Concreting as required except do not use calcium chloride or any type of accelerator.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Furnish materials meeting the test requirements of Paragraph "Source Quality Control" above, as applicable, and following requirements:

B. Portland cement: ASTM C-150-07, Type II, low alkali. Do not change source without prior approval. Changing source will require new concrete mix design submission and approvals. Provide Type V where concrete is in contact with corrosive soils. Use ASTM C150, Cement Type III, from one batch by a single source for all architectural exposed concrete.

C. White Portland cement: ASTM C-150, Type 1, from one approved source.

D. Aggregates:

1. Standard weight aggregates: ASTM C33, from approved pits, free from vegetable matter and of opaline, feldspar, or siliceous magnesium substances; all washed, clean, hard, fine-grained sound crushed rock or gravel; not over 5 percent by weight of flat, thin, elongated, friable, or laminated pieces (pieces having major dimension over 5 times average dimension) or more than 2 percent by weight of shale or cherty material.

    a. Nominal maximum Aggregate Size: 3/4 inch, except maximum 1-1/2 inch size for foundations.

    b. Not exceeding 3/4 of minimum clear space between bars and forms, nor larger than 1/5 of the least dimensions between the forms.

    c. 3/8 inch maximum aggregate size may be used in congested areas and in thin sections when approved by the Engineer.

    d. Combined Aggregate Gradation: Combined aggregate gradation for slabs and other designated concrete shall be 8% - 22% for smaller top size aggregate (1 1/2 inch) or 8% - 22% for smaller top size aggregates (1 inch or 3/4 inch) retained on each sieve below the top size and above the No. 100.

2. Lightweight aggregates: ASTM C 330, approved kiln expanded shale having fire sealed surface, coarse aggregate, not produced by crushing, dry loose weight maximum 38 pounds per cubic foot, maximum 9/16 inch size; all aggregate vacuum or thermally fully saturated for pumped concrete. Control mix in accordance with ACI 211.2, standard practice for selecting proportions for structural lightweight concrete. The absolute volume of coarse aggregate in concrete mix not exceeding 8.8 cubic feet. Design for air-dry density of 110 ± 3 pounds per cubic foot per U.L. Rating maximum. With each mix design submit test reports showing concretes covered by the mix designs meet shrinkage test requirements specified under article “Field Quality Control” hereinafter or include certified test reports showing conformance as furnished by the ready-mix concrete manufacturer.

E. Admixture: Admixtures shall comply to the requirements of ACI 318-08 Section 3.6. Admixtures to be used in concrete shall be subject to prior approval by SEOR.

F. Pozzolan: ASTM C618-08, Class F or N Fly Ash (Class C Not Permitted), 100 pounds maximum per cubic yard, containing one percent or less carbon. Fly ash shall not be used in excess of 15 percent by weight of total cement quantity.

G. Water: Potable and complying with ASTM C 94.

H. Joint flller: ASTM D1751 and D1752, as specified.

I. Curing Materials:

1. Where access flooring is indicated, coordinate selection of curing and sealing compounds with access floor manufacturer to verify product is compatible with pedestal adhesive.

2. Liquid Curing compound: ASTM C309-07, fugitive dye dissipating type, complying with Rule II 13 of the South Coast Air Quality Management District and Federal Air Quality Regulation 40 CFR 52.254.

3. Curing sheet: ASTM C 171-03, non-staining white types.

4. Evaporation retardant and finishing aid: BASF "Confilm," or equal.

J. Vapor barrier: See Section 03 30 35 "Underslab Sheet Vapor Retarders" for placement of vapor retarder under slab-on-grade. The vapor barrier installation must be approved prior to the concrete placement.

K. Non-shrink grout:

1. Minimum compressive strength of non-shrink grout shall be 5000 psi.

2. For concealed areas: BASF "Embeco 885," or approved equal, non-gas-forming and free of oxidizing catalysts and inorganic accelerators, used as dry or damp pack, or mixed to a 20-second flow (CRC-C 611), without segregation or bleeding at any temperature between 45 degrees F and 100 degrees F. Working time 30 minutes or more.

3. For exposed areas: BASF "Masterflow 928," or Euclid “Euco Hi-Flow Grout,” with same characteristics as specified for concealed areas.

L. Drypack: Field mixture of I part Portland cement to 2 parts fine aggregate mixed to a damp consistency such that a ball molded in the hands will stick together and hold its shape. In lieu of field mixing, Contractor may use factory mixed drypack material, such as Master Builders “Set Grout” or approved equal. Minimum 28-day compression strength of drypack shall be 5,000 psi.

M. Epoxy Grout: BASF “Masterflow 648 CP Plus,” “Sikadur 42 Industrial Group-Pak” by Sika Chemical Corporation, Euclid “Euco High Strength Grout E3-G,” or approved equal

N. Expansion Joint Filler: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

O. Construction Joint Materials: "Form-a-Key" or "Kwik-Joint," of profiles indicated.

P. Bonding Agent: "Weld-Crete," manufactured by Larsen Products Co., BASF "Concresive," or approved equal.

2.02 CONCRETE MIXING

A. Furnish ready-mixed concrete from an approved commercial off-site plant. Conform to ASTM C94, except materials, testing, and mix designs as specified herein. Use transit mixer trucks equipped with automatic devices for recording number of revolutions of drum.

B. Admixtures: All approved admixtures shall be introduced into the concrete at the batch plant. Field additions are not acceptable.

C. Slump: Adjust quantity of water so concrete at point and time of placing does not exceed the following slumps when tested according to ASTM C143. Use the minimum water necessary for workability required by part of structure being cast.

Part of Structure	Slump Inches*	Maximum Water-Cement Ratio
Footings and foundation walls	4 ± 1”	0.5
Slabs on grade, reinforced	4 ± 1”	0.45
Reinforced concrete over 8” thick	4 ± 1”	0.5
Reinforced concrete 8" or less thick	4 ± 1”	0.5
All other concrete	4 ± 1”	0.5

PART 3 - EXECUTION

3.01 PREPARATION FOR CONCRETE PLACING

A. Remove all free water from forms before concrete is deposited. Remove hardened concrete, debris, and foreign materials from interior surfaces of forms, exposed reinforcing, and from surfaces of mixing and conveying equipment.

B. Wetting: Wet wood forms sufficiently to tighten up cracks. Wet other materials sufficiently to reduce adsorption and to help maintain concrete workability.

C. Earth Subgrade: Dampen 24 hours before placing concrete, but do not muddy. Re-roll where necessary for smoothness and remove loose material.

D. Gravel Fill: Recompact disturbed gravel and bring to correct elevation.

E. Sand Beds or Subslab Drainage Fill: Recompact disturbed material and bring to correct elevation.

F. Vapor Barrier: See Section 03 30 35 "Underslab Sheet Vapor Retarders" for placement of vapor retarder under slab-on-grade. The vapor barrier installation must be approved prior to the concrete placement.

G. Screeds: Set screeds at walls and maximum 8-foot centers between. Set to provide level floor. Check with an instrument level, transit, or laser during placing operation to maintain level floor.

H. Screeds Over Vapor Retarder: Use weighted pad or cradle type screeds and do not drive stakes through the vapor barrier. Check with an instrument level, transit, or laser.

I. Metal Floor and Roof Decking: Verify that decking joints are sealed and there are no openings or voids that will permit concrete leakage.

J. Composite Steel Beams: Provide shores for tributary construction loads to floor and roof beams as required, or camber the beams as approved by Architect.

K. Embedded Items: Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor bolts, accurately located, to elevations required.

2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3. Install dovetail anchor slots in concrete structures as indicated

3.02 CONCRETE PLACING

A. Conveying and Placing: Do not place concrete until reinforcing steel and forms or decks have been approved by the Inspector and other authorities having jurisdiction. Do not allow concrete to free fall from release points at mixer, hopper, tremie, or other conveying equipment in excess of 5-feet for concealed concrete or over 3-feet for exposed concrete. Deposit concrete so that surface is kept level throughout, with minimum being allowed to flow from one portion of forms to another. Place concrete in horizontal layers not more than 18" thick within 90 minutes after water is first added to the batch. Place all concrete by methods that prevent segregation of materials.

1. Where new concrete is placed against or on old or existing concrete, apply bonding agent to surface of old concrete prior to placement of new concrete.

B. Joints: Locate joints in concrete only where shown or approved and obtain prior approval for points of stoppage of any pour. Clean and roughen surface of construction joints by removing entire surface and exposing 1/4" of clean coarse aggregate solidly embedded in mortar matrix by sandblasting, chipping, use of an approved retarder agent, or equal. Water and keep hardened concrete wet for not less than 24 hours before placing the next lift or abutting concrete. Cover the horizontal surfaces of existing or previously placed and hardened concrete with a 2" thick layer of fresh concrete of required mix less 50 percent of coarse aggregate just before balance of concrete is placed.

C. Vertical Elements: Stop placement of concrete in walls and columns 1 1/2" below bottom of beams or supported slabs. Stop placement at sills and heads of wall openings in the same manner. Allow concrete in vertical elements to be in place at least 2 hours and until vertical settlement has ceased before placing concrete for floor framing.

D. Compacting: Compact each layer of the concrete as placed with mechanical vibrators or equivalent equipment. Transmit vibration directly to concrete and in no case through the forms unless approved. Accomplish thorough compaction. Supplement by rodding or spading by hand adjacent to forms. Compact concrete into corners and angles of forms and around reinforcement and embedded fixtures. Recompact deep sections with congestion due to reinforcing steel as required.

E. Operation of Vibrators: Do not horizontally transport concrete in forms with vibrators nor allow vibrators to contact forms or reinforcing. Push vibrators vertically into the preceding layers that are still plastic and slowly withdraw, producing maximum obtainable density in concrete without creating voids or segregation. In no case disturb concrete that has partially set. Vibrate at intervals not exceeding two-thirds the effective visible vibration diameter of the submerged vibrator. Avoid excessive vibration that causes segregation.

F. Correction of Segregation: Before placing next layer of concrete, and at the top of each placement for vertical elements, remove all concrete containing excess water or fine aggregate, or showing deficiency of coarse aggregate, and fill the space with compacted concrete of correct proportions.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by low temperatures.

1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.

2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs. Only use the specified non-corrosive accelerator in slabs below 50 degrees. Do not use calcium chloride, salts or other admixtures containing more than 0.05% chloride ions by weight.

H. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.

2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

4. Use evaporation retarder one or more times after the strikeoff when high temperatures, low humidity and wind will cause crusting and plastic cracking.

I. Slabs:

1. Compact concrete, bring 1/8" to 3/16" of coarse mortar to surface. Screed to elevation. Bull float or darby. Remove all bleed water. Float with wood hand floats or wait until the weight of a machine with steel float shoes can travel on the slab without sinking or disrupting the surface.

2. On-Grade Slabs:

a. Place with maximum 40-foot edge dimension. Generally locate joints on column lines, exact locations as directed or approved.

b. Expansion Joints: Conform to details and approved submittal. Provide expansion joint filler finished flush with slab surface except for those joints shown to be sealed with sealant. Conform to Increment 3 Section 07 92 00, where sealant sealed joints are shown or specified, including the polymer joint filler, backing, and bond breaker.

c. Control Joints: Provide for concrete slabs as indicated. Provide sawed control joints, not less than 1/4 the slab thickness, except where other types of joints are indicated. Complete sawing of joints within 12 hours following paving unless otherwise approved. If early sawing causes undercutting or washing of the concrete, delay the sawing operation and repair the damaged areas. The saw cut shall not vary more than 1/2 inch from the true joint alignment. Discontinue sawing if a crack develops ahead of a saw cut. Immediately after each joint is sawed, thoroughly clean the saw cut and adjacent concrete surface. Respray surfaces treated with curing compound which are damaged during the sawing operations as soon as the water disappears. Protect joints in a manner to prevent the curing compound from entering the joints.

J. Repair of Slab on-Grade Surfaces: Test slab surfaces for smoothness and to verify surface plan to tolerance specified. Repair defects as follows:

1. High areas: Correct by grinding after concrete has cured for not less than 14 days.

2. Low areas and replace with fresh concrete. Finish repaired areas to blend with adjacent concrete. Proprietary patching compounds may be used when approved by the Architect.

3. Cracked areas: Cut out defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with not less than 3/4 inch clearance. Dampen exposed concrete and apply bonding compound. Mix, place, compact, and finish patching concrete to match adjacent concrete.

4. Isolated cracks and holes: Groove top of cracks and cut out holes not over 1 inch in diameter for repair by dry-pack method. Dampen cleaned concrete surfaces and apply bonding compound; place dry pack while bonding compound is still active, as follows:

   a. Dry-pack mix: Per Section 2.2.K.

   b. Compact dry-pack mix in place and finish to match adjacent concrete. Keep patched areas continuously moist for not less than 72 hours.

K. Repair of Elevated Slab Surfaces: Contact Structural Engineer of Record for direction.

3.03 CURING FORMED CONCRETE

A. Keep forms containing concrete in a wet condition until removed. Keep concrete continuously moist for not less than 7 days after placement. Keep concrete moist with a fine fog water spray until protected by curing media.

B. During times of dry or excessive winds, high ambient temperature, low humidity, or other ambient conditions causing rapid drying, use specified evaporation retardant and finishing aid material according to the manufacturer's instructions and cure concrete with a fine fog spray of water, or equal, applied both during and after finishing and continued until final curing operations are started.

C. Use the water curing method, curing sheet material, or a clear liquid membrane-forming curing compound except as otherwise specified.

D. Do not use any type of finishing or curing materials or methods that interfere with the correct application or bonding of subsequent materials; verify exact requirements with all applicable trades.

3.04 PATCHING FORMED CONCRETE

A. Remove fins, projections, and offsets. Cut out rock pockets, honeycomb, and all other defects to sound concrete, with edges of cuts straight and back-beveled. Dampen cut-outs and edges, and scrub with neat portland cement slurry just before patching, or an apply approved epoxy concrete adhesive.

B. Saturate form tie holes with water and fill voids and patches with flush smooth-finished mortar of same mix as concrete (less coarse aggregate), cure, and dry.

3.05 GROUTING AND DRYPACKING

A. Install as indicated or required. Where grouting and drypacking is part of the work of other sections, it shall conform to the following requirements, as applicable.

B. Drypacking: Mix materials thoroughly with minimum amount of water. Install drypack by forcing and rodding to fill voids and provide complete bearing under plates. Finish exposed surfaces smooth and cure with damp burlap or liquid curing compound.

C. Non-Shrink Grouting:

1. Mixing: Mix the approved non-shrink grout material with sufficient water per manufacturers recommendations.

2. Application: Surfaces to receive the non-shrink grout shall be clean, and shall be moistened thoroughly immediately before placing the mortar. Before grouting, surfaces to be in contact shall be prepared per 2013 CBC section 1906A.4. All loose particles shall be removed and the surface flushed thoroughly with neat cement grout immediately before the grouting mortar is placed. Place fluid grout from one side only and puddle, chain, or pump for complete filling of voids; do not remove the dams or forms until grout attains initial set. Finish exposed surfaces smooth, and cure as recommended by grout manufacturer.

3.06 SITE CONCRETE WORK

A. Use bituminous type joint filler. Cure all concrete for at least 10 days with liquid curing compound or sheet material except as otherwise specified. Construct all site concrete of 2500 psi concrete minimum unless otherwise indicated or specified. Provide reinforcing bars or mesh only where indicated. Conform to requirements specified herein before for slab finishing and curing as applicable.

B. Concrete Curbs: Provide 1/2” thick expansion joints at beginning and at end of curves, intersections, and 20-foot intervals between, set plumb, square, and to same profile as the curbs. Edge curb tops to 1/2” radius and vertical joints to 1/4” radius. Apply smooth finish followed by fine hair brush finish.

C. Concrete Gutters: Provide 1/2” thick expansion joints as above for curbs and apply a light broom finish with a 3 “ wide steel trowel finish at flow line.

D. Combination Curb and Gutter: As above for curbs and gutters, including expansion joints, 3” troweled flow line at base of curb.

E. Concrete Walks: Provide 1/2” expansion joints as specified for curbs and where walks abut rigid structures, aligned with joints in curbs where adjoining, and apply light broom finish perpendicular to traffic direction. Score walks as shown or directed.

F. Control Joints: Provide for concrete walks and exterior concrete pavement as indicated. Provide “Zip Strip” as distributed by S.C.A. Construction Supply, Santa Fe Springs, Calif., or equal. Install tops of the joints flush with the concrete surface and depth of joint a minimum of 1/4 the thickness of slab.

3.07 OFF-SITE CONCRETE WORK

A. Provide new concrete items where indicated, and replace existing items damaged by Contractor's operations. Secure and pay for required permits, inspections, engineering, and surveying.

3.08 MISCELLANEOUS CONCRETE WORK

A. Provide areaways, cast-in-place valve boxes, pits, splash blocks, bases, and other miscellaneous concrete as indicated and required to complete all Work. Conform to applicable requirements herein.

3.09 INSTALLATION OF WATERSTOPS

A. Heat fuse waterstop joints and connections in accordance with manufacturer's instructions including heating tools and devices. Run waterstops continuous in joints, following offsets and angles in joints until spliced to waterstops at inter section joints, completely scaling the structure. Align and center waterstops in joints unless otherwise indicated.

B. Tie flanges to reinforcing with 18 gage wire ties spaced at maximum 18" intervals. Test all waterstops, including splices, intersections, and welds, with approved holiday spark detector before concrete is placed.

3.10 FIELD QUALITY CONTROL

A. Comply with pertinent provisions of Division 01, Section 01 43 00, “Quality Assurance Requirements.”

B. Level of Floors: Continuously monitor concrete placing to maintain level floor by use of an instrument level, transit, or laser.

C. Continuous Inspection: Construct structural concrete under continuous inspection of Inspector per 2013 CBC section 1705.3. Obtain inspection and approval of forms and reinforcing by the Inspector before placing structural concrete.

D. Testing/Evaluation of Concrete: The Owner’s testing laboratory shall perform following tests. Samples for testing shall be obtained in accordance with ASTM C 172-04, and shall be taken from as close to point of placement as possible.

1. Compressive Strength Tests: Cast one set of four or more cylinders from each days placing and each 50 cubic yards, or fraction thereof, or not less than once for each 2,000 square feet of surface area for slabs and walls, of each strength of structural concrete. Date cylinders, assign record number, and tag showing the location from which sample was taken. Also record slump test result of sample. Do not make more than two series of tests from any one location or batch of concrete. Additional samples for seven day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or when ever the mix or aggregate is changed.

2. Test Cylinders: Samples will be made in accordance with ASTM C172-04. Cast cylinders according to ASTM C31-06; 24 hours later, store cylinders under moist curing conditions at about 70 F. Test according to ASTM C39 at 7 and 28 day ages. The remaining cylinder shall be kept in reserve in case tests are unsatisfactory.

3. Control Test Cylinders: Cast a set of two or more cylinders for each day's placing of concrete for slabs supported on shoring. Place test cylinders on slabs represented by cylinders and cure the same as slabs. Test cylinders to determine proper times for removal of shores and reshoring. A strength test shall be the average of the compressive strengths of 2 cylinders made from the same sample of concrete and tested at 28 days.

E. Tests for Lightweight Structural Concrete:. Perform following test for each 50 cubic yards of lightweight structural concrete.

1. Along with slump test, ASTM C143, and from same sample, determine air content, unit weight and yield per ASTM C138.

2. Shrinkage Test: Cast 4" by 4" by 11" long bars with 10" effective gauge length, cured for 7 days in moist room and as specified in ASTM C157. Make measurements at 7-day intervals to 35 day age. Shrinkage shall not exceed 0.07 percent after period of 35 days.

3. Previous Shrinkage Tests: Ready-mix concrete manufacturer may furnish certified test reports from an approved Testing Laboratory as proof of meeting shrinkage requirements provided aggregates used and concrete covered by such test reports conform to the mix design approved for use on the Work.

F. Core Tests: If tests show that compressive strength of any concrete falls below required minimum at 28 day age, additional curing and testing of concrete which unsatisfactory test reports represent may be directed. Testing Laboratory shall take and test drilled cores as directed in accordance with ASTM C42. Contractor shall refill core holes with drypack concrete of the same compressive strength required for cored concrete. If core tests results are unsatisfactory, Contractor shall furnish required labor, equipment, and weights, and the Testing Laboratory shall conduct load testing on involved parts of building or structure as directed. Contractor shall bear additional curing and test costs, including Testing Laboratory costs, for concrete not meeting required compressive strength at 28 day age even if testing demonstrates that concrete has eventually attained required minimum compressive strength, and all costs for required corrections or removals and replacements as directed and required for approved construction.

END OF SECTION

SECTION 04 22 03
CONCRETE MASONRY UNITS (CMU)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. This Section includes unit masonry assemblies as indicated on the drawings and specified, consisting of the following:

1. Concrete masonry units (CMUs).
2. Mortar and grout.
3. Reinforcing steel.
4. Masonry joint reinforcement.

1.03 SUBMITTALS

A. Product Data: Submit literature that describes each product indicated. Include a certificate, signed by the CMU supplier, that CMUs have cured not less than 30 after their manufacture.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.

2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement.

3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

PART 2 - PRODUCTS

2.01 CONCRETE MASONRY UNITS (CMU)

A. Integral Water Repellent: Provide units made with integral water repellent for exposed units.

1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive according to ASTM E 514, with test period extended to 24 hours, show no visible water or leaks on the back of test specimen.

a. Products:

1) Addiment Incorporated; Block Plus W-10.

2) Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block.

3) Master Builders, Inc.; Rheopel.

B. Concrete Masonry Units: ASTM C 90 or UBC Standard 21-4.

1. Weight Classification: As indicated on the drawings.

2. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions, 8” by 8” block per drawings.

3. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

4. Color: Gray.

2.02 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207 or UBC Standard 21-13, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement complying with ASTM C 150, Type I or Type III, and hydrated lime complying with ASTM C 207, Type S.

D. Mortar Cement: ASTM C 1329 or UBC Standard 21-14.

1. Products:

a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.

E. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products:

a. Bayer Corporation, Industrial Chemicals Div.; Bayferrox Iron Oxide Pigments.
b. Davis Colors; True Tone Mortar Colors.
c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.

F. Colored Cement Product: Packaged blend made from portland cement and lime or mortar cement and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

2. Pigments shall not exceed 10 percent of portland cement by weight.

3. Pigments shall not exceed 5 percent of mortar cement by weight.

4. Products:

a. Colored Portland Cement-Lime Mix:

1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.

2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.

3) Lafarge North America Inc.; Eaglebond.

4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

b. Colored Mortar Cement:

1) Lafarge North America Inc.; Magnolia Superbond Mortar Cement.

G. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.

3. White-Mortar Aggregates: Natural white sand or crushed white stone.

4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

H. Aggregate for Grout: ASTM C 404.

I. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent by same manufacturer.

1. Products:

a. Addiment Incorporated; Mortar Tite.

b. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.

c. Master Builders, Inc.; Color Cure Mortar Admix or Rheomix Rheopel.

J. Water: Potable.

2.03 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

2.04 MISCELLANEOUS ANCHORS

A. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

B. Post-installed Anchors: Provide chemical or torque-controlled expansion anchors, with capability to sustain, without failure, a load equal to six times the load imposed when installed in solid or

grouted unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

1. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

2. Corrosion Protection: Stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors.

2.05 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Pre-molded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells with loops for holding reinforcing bars in center of cells. Units are formed from 0.142-inch steel wire, hot-dip galvanized after fabrication. Provide units with either two loops or four loops as needed for number of bars indicated.

1. Products:

a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.

b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.

c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.

d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.06 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.07 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

2. Limit cementitious materials in mortar to portland cement, mortar cement, and lime.

3. Limit cementitious materials in mortar for exterior and reinforced masonry to portland cement, mortar cement, and lime.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270 or UBC Standard 21-15, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

D. Mortar for Unit Masonry: Comply with ASTM C 270 or UBC Standard 21-15, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.

E. Grout for Unit Masonry: Comply with ASTM C 476 or UBC Standard 21-19.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

2. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

F. Epoxy Pointing Mortar: Mix epoxy pointing mortar to comply with mortar manufacturer's written instructions.

2.08 SOURCE QUALITY CONTROL

A. Owner may engage and pay a qualified independent testing agency to perform source quality-control testing indicated below:

1. Payment for these services will be made by Owner.

2. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

B. Concrete Masonry Unit Test: For each type of unit furnished, per ASTM C 140.

PART 3 - EXECUTION

3.02 INSTALLATION

A. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:

1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.

3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.

5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.

6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.02 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: As indicated on the drawings.

C. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

3.03 MASONRY JOINT REINFORCEMENT

A. Interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

B. Provide continuity at wall intersections by using prefabricated T-shaped units.

C. Provide continuity at corners by using prefabricated L-shaped units.

D. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.04 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.

1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in the California Building Code (CBC).

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.

1. Comply with requirements in CBC, including minimum grout space and maximum pour height.

3.05 FIELD QUALITY CONTROL

A. Inspectors: Owner may engage and pay a qualified independent inspectors to perform inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform inspections.

1. Place grout only after inspectors have verified compliance of grout spaces and grades, sizes, and locations of reinforcement.

B. Testing Agency: Owner may engage and pay a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports:

1. Retesting of materials failing to comply with specified requirements shall be done at Contractor's expense.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Concrete Masonry Unit Test: For each type of unit provided, per ASTM C 140.

G. Mortar Test (Property Specification): For each mix provided, per UBC Standard 21-16. Test mortar for mortar air content and compressive strength.

H. Grout Test (Compressive Strength): For each mix provided, per UBC Standard 21-18.

I. Prism Test: For each type of construction provided, per UBC Standard 21-17 at 7 days and at 28 days.

END OF SECTION

SECTION 05 12 22
STRUCTURAL AND MISCELLANEOUS STEEL

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE

A. Provide steel columns, beams and miscellaneous metal work as indicated and specified, complete. Principal items of work include:

1. Erection and temporary rigging.

2. All bolts, straps, anchors, plates, fastener and other items necessary for attaching steel to steel and steel to concrete or masonry.

3. All holes required for work of other trades.

4. All welding, shop and field.

5. Shop painting.

6. Shop drawings.

1.02 GENERAL REQUIREMENTS

A. Verification of Conditions: Verify conditions at site affecting work of this section, and obtain accurate dimensions. Report major discrepancies between drawings and field dimensions in writing to the architect prior to commencing work.

B. Shop Drawings: Submit shop drawings for approval showing materials, construction and fabrication details, layout and erection diagrams as required, finish or exposed welds, and method of anchorage to adjacent construction. Prior to submittal, coordinate shop drawings with related trades to insure proper mating of assemblies.

C. Standards:

1. Building Code: Conform to all applicable requirements of local public authority Building Code amended edition with latest revisions, addenda, and amendments; also other Codes having jurisdiction.

2. Trade Standards: Current rules and practices set forth in "Code of Standard Practice" of the American Institute of Steel Construction shall govern, except as required by the Building Code. Welding shall conform to 01.0 "Code for Welding in Building Construction" of the American Welding Society, and to requirements of ASTM.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel: ASTMA36

B. Bars, Flats, Round sand Miscellaneous Steel Items: Standard grade mild steel.

C. Threaded Bolts and Nuts: ASTMA307, zinc coated where used with galvanized work.

D. Welding Electrodes: ASTMA233, #60 series or #70 series as required for intended use.

E. Steel Pipe: Standard weight, ASTM A53 for grade "B" pipe; ASTM A36 for tube members.

F. Primer: Approved per manufacturer's recommendation.

G. Galvanizing: ASTM A123, with average weight per sq.ft. of less than1-8 ounces per sq. ft. where indicated.

2.02 MATERIALS AND WORKMANSHIP

New stock of standard sizes specified or detailed; fabricated in shop producing high grade metal work. For and fabricate to meet required conditions. Include clips, strapes, bolts, screws, and other fastenings necessary to secure work. Conform work to latest edition of AISC Specification to applicable provisions of Building Code.

2.03 BUILT-IN ANCHORAGE

Provide bolts, anchors, inserts and other miscellaneous Steel or iron fastenings installed in concrete forms. Provide steel plates, channels and angles for attaching work of other trades. Examine and check architectural, structural, mechanical and electrical drawings for number, type and location of such items.

2.04 BOLTING

Make connections as indicated with bolts noted or required. Draw machine bolts up tight and upset threads to prelude loosening.

2.05 WELDING

Weld joints, unless otherwise indicated or specified, using shielded electric-arc method. Use coated welding rods, not fluxed, or type recommended by manufacturer for use with parent metal. Use only certified welders for structural construction.

A. Grinding: Grind welds on surfaces subject to traffic or contact, and wherever exposed in architectural surfaces such as railings, to smooth hand flush joints.

B. Peening: On other exposed welds, remove flux and weld splatter, peen welds as necessary to eliminate unsightly conditions, and grind off sharp projections.

C. Permanently Concealed Welds: No treatment required other than preparation for painting or galvanizing.

2.06 FABRICATION

A. All fabrication shall be performed in a licensed shop.

B. All welding shall be performed by certified welders.

C. Fabrication shall be in accordance with the American Institute of Steel Construction, "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings" unless otherwise indicated.

PART 3 - EXECUTION

3.01 ERECTION

A. Structural steel shall be erected using professional riggers and shall be carefully planned and laid out so that a minimum of cutting shall be necessary. The work shall be erected plumb, square and true to line and level, and in precise positions as indicated. Temporary bracing and guys shall be introduced wherever necessary to provide for loads and stresses to which the structure may be subjected, including those due to erection equipment and their operation, and shall be left in place as long as it may be necessary for safe-guarding all parts of the work. Welded connections shall be made in accordance with the American Welding Society recommendations by certified welders. Burning of holes will not be permitted without written approval of the Structural Engineer.

3.02 SHOP PAINTING

A. After fabrication and before erection, all rust, mill scale, oil alkali, dirt and other deleterious substances shall be removed, and all steel shall receive a shop coat of red lead and oil, except surfaces embedded in concrete masonry.

B. All machined surfaces shall be adequately protected against rust by a suitable coating of tallow or other corrosion resisting materials.

C. After erection, all field connections and all marred surfaces shall be touched up with the paint specified above.

D. All structural steel shown exposed to be true and clean and free from blemishes with trade mark signs removed. Prime paint ready for painting contractor.

3.03 INSPECTION AND TESTING

A. The Owner will pay for special inspection and testing which is required by governing authorities, but the Contractor shall be responsible for scheduling said inspection and testing.

B. The Contractor shalll pay for all inspection and testing which may be required due to error in fabrication or erection.

END OF SECTION

SECTION 05 21 00
OPEN WEB STEEL JOISTS

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install open web steel joists and shear stud connectors, with bridging, attached seats and anchors, as shown on the drawings and specified, including:

1. Loose bearing plates and anchor bolts for site placement.
2. Framed openings greater than 18 inches.

1.02 REFERENCES

A. SJI (Steel Joist Institute) - Specifications, Load tables, and Weight Tables for Steel Joists and Joist Girders.

B. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

1. SSPC SP 1 - Sealant Cleaning.
2. SSPC SP-10 - Near White Blast Cleaning.

1.03 SUBMITTALS

A. Shop Drawings: Submit the following:

1. Indicate standard designations, configuration, sizes, spacing, locations of joists and joist leg extensions.

2. Joist bridging, connections, and attachments.

3. Connection details.

B. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with SJI, Load Tables, and Weight Tables, including headers and other supplementary framing.

B. Perform Work in accordance with Chapter 22 of the CBC.

C. Sheet and strip steels and steels other than those listed in U.B.C. Standard No. 22-1, if used for structural purpose, shall be specifically approved by the local building official.

1.05 QUALIFICATIONS

A. Fabricator: Company specializing in performing Work of this section with minimum five years documented experience.

B. Erector: Company specializing in performing Work of this section with minimum five years documented experience.

C. Design connections not detailed on the drawings under direct supervision of a professional engineer experienced in design of this Work and licensed in the State of California.

PART 2 - PRODUCTS

2.01 OPEN WEB STEEL JOISTS

A. Manufacturers: Subject to the review by the Architect for compliance with requirements, materials shall be those indicated on the drawings or the product of one of the following (or equal):

1. Butler Manufacturing Co.
2. New Columbia Joist Co.
3. Vulcraft Steel Joist.
4. Valley Joist Co.

B. Open Web Joists Members: Comply with SJI Standards.

C. Anchor Bolts, Nuts and Washers: ASTM A307, galvanized to ASTM A153.

D. Shear Stud Connectors: ASTM A108 Grade. Forged steel, headed, uncoated.

E. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A36/A36M.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.02 FABRICATION

A. Provide bottom and top chord extensions as indicated on the drawings.

B. Fabricate to achieve end bearing of not less than:

1. 2 1/2 inches on steel
2. 4 inches on masonry.

C. Drill holes in chords necessary for attachment of wood nailers. Weld threaded lugs to chords for attachment of wood nailers.

D. Frame special sized openings in joist web framing as detailed.

E. Space stud shear connectors as indicated on the drawings.

2.03 FINISH

A. Prepare joist component surfaces in accordance with SSPC SP 2.

B. Shop prime joists and supplementary framing members. Do not prime surfaces that will be fireproofed, field welded, and in contact with concrete.

C. Galvanize steel ledge angles and other anchors to ASTM A123. Provide minimum 1.25 oz/sq feet galvanized coating.

PART 3 - EXECUTION

3.01 ERECTION

A. Comply with the manufacturer's erection instructions and the approved shop drawings. Erect and bear joists on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate placement of anchors in masonry construction for securing bearing plates.

D. After joist alignment and installation of framing, field weld joist seat to bearing plates.

E. Position and field weld joist chord extensions and wall attachments as detailed.

F. Frame openings greater than 18 inches with supplementary framing.

G. Do not permit erection of decking until joists are braced bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

H. Do not field cut or alter structural members without approval of joist manufacturer.

I. After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.

3.02 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

3.03 FIELD QUALITY CONTROL

A. Tests: Test specimens shall be furnished by steel fabricator and taken under direction of the Testing Laboratory to dimensions required by "Standard Methods and Definitions for Mechanical Testing of Steel Products", ASTM A370.

1. Cost of tests of stock will be paid by the Owner, except that if a test fails to comply with requirements of Specifications, cost of testing shall be paid by Contractor.

2. If after fabrication and inspection, work is found to be defective and requires re-inspection, costs of such re-inspection shall be paid by Contractor.

3. Steel fabricator shall provide all labor, equipment and facilities necessary for moving and handling materials to be inspected.

B. Welding Inspections:

1. Inspection of all shop and field welding operations shall be made by a qualified Welding Inspector approved by the Architect. Record the following:

a. Identification marks of welders.
b. List of defective welds.
c. Manner of correction of defects.

2. The Welding Inspector shall be notified at least 2 days before shop or field welding inspection is to be required.

3. The Welding Inspector shall check the material, equipment and procedures, as well as welds and competence of welder. He shall furnish a report that welding which is required to be inspected is proper and has been done in conformity with approved Drawings and Specifications.

4. The Welding Inspector shall use all means necessary to determine quality of weld and may use gamma ray, magnaflux, trepanning sonics or any other aid to visual inspection deemed necessary to assure adequacy of welding.

C. Inspection of Shop Fabrication: Shall be in accordance with the CBC, and the local building official.

D. Inspection of High Strength Bolt Installation: Shall be in accordance with the UBC Standards and as required by CBC.

END OF SECTION

SECTION 05 31 12
STEEL ROOF DECKING

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install steel roof decking as indicated on the drawings and specified.

1.02 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.

C. ASTM A635 - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip process.

D. AWS D1.1 - Structural Welding Code.

E. MIL-P-24441 - Paint, Epoxy-Polyamide, General Specification For.

F. SDI (Steel Deck Institute) - Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution.

G. SSPC (Steel Structures Painting Council) - Painting Manual.

1.03 PERFORMANCE REQUIREMENTS

A. Design metal deck in accordance with SDI Design Manual.

B. Calculate to structural working stress design and maximum vertical deck deflection of 1/240.

C. Lateral deflection of diaphragm shall not exceed 1/500 of the height of story height.

1.04 SUBMITTALS

A. Shop Drawings: Indicate deck plan, support locations, projections, openings and reinforcement, pertinent details, and accessories.

B. Product Data: Provide deck profile characteristics and dimensions, structural properties and finishes.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.05 QUALITY ASSURANCE

A. Installer: Company specializing in performing the work of this Section with minimum 5 years documented experience.

B. Design deck layout, spans, fastening and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of California.

C. When the materials of this Section are used as part of an assembly indicated on the Contract Drawings in which fire-resistive construction ratings are required, demonstrate approval by Underwriters' Laboratories, Inc. and the governmental agencies having jurisdiction.

1.06 REGULATORY REQUIREMENTS

A. Perform Work in accordance with Chapter 22A, "Steel", of the California Code of Regulations, Title 24 - Building Standards, Part 2, 1998 California Building Code (CBC) with State Amendments .

B. American Welding Society Code D1.1, Structural Welding Code.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Manufacturers: As indicated on the drawings

B. Sheet Steel: Conform to the requirements indicated on the drawings.

C. Bearing Plates/Angles: ASTM A36 steel.

D. Welding Materials: AWS D1.1.

E. Touch-Up and Primer for Galvanized Surfaces: Epoxy polyurethane in accordance with SSPC-PS 13.01 and with MIL-P-24441, Formula 150.

F. Valley Strips, Eave Strips, Ends, Flute Closures: Fabricated of metal of same type and finish as deck, profiled to fit tight to the deck.

G. Related Deck Accessories: Metal closure strips, wet concrete stops, cover plates, 20 gage thick galvanized sheet steel; of profile and size as indicated.

H. Roof Sump Pan: Fabricate of 14 gage sheet steel, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.

I. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Erect metal deck in accordance with SDI Manual and in accordance with approved Shop and Erection Drawings. Strictly adhere to all indicated elevations. Report deviations of supporting members from required elevations to the District Construction Inspector before decking is fastened to the supporting structure

B. Bear deck on steel supports with 2 inch minimum bearing. Align and level.

C. Fasten deck to steel support members at ends and intermediate supports with puddle welds through weld washers at 12 inches O.C. maximum, parallel with the deck flute and at each transverse flute.

D. Weld in accordance with AWS D1.1.

E. Reinforce steel deck openings from 6 to 18 inches in size with 2 x 2 x 1/4 inch steel angles. Place framing angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.

F. Install 6 inch minimum wide sheet steel cover plates, of same thickness as deck, where deck changes direction. Fusion weld 12 inches O.C. maximum.

G. Install sheet steel closures and angle flashings to close openings between deck and walls, columns, and openings.

H. Position roof sump pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

I. Place metal cant strips in position and fusion weld.

J. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up prime paint.

END OF SECTION

SECTION 05 41 01
STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install load-bearing metal stud systems as indicated on the drawings and specified.

1.02 ACTION UBMITTALS

A. Shop Drawings: Submit drawings showing framing, connection details, accessories and anchorage. Indicate location of assemblies, size and spacing of framing components.

B. Product Data: Submit manufacturer's catalog data for each item proposed for installation.

C. Certificates: Furnish manufacturer's certification that materials meet or exceed Specification requirements.

1.03 QUALITY ASSURANCE

A. Comply with following as a minimum requirement:

1. AISI - Specifications for Design of Cold Formed Steel Structural Members.

2. Welds shall be performed by AWS certified welders. Welding shall be performed in accordance with requirements of American Welding Society (AWS) Structural Welding Code-Steel D1.1 and D1.3. Structural welding Code-Sheet Steel.

3. ASTM C954 – Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks) and Bracing or Bridging for Screw Application of Gypsum Panel Products and Plaster Bases.

4. ASTM C955 – Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.

5. ASTM C1007 – Standard Specification for Installation of Structural (Axial and Transverse) Steel Framing Members and Accessories.

6. Manufacturer shall be a member of the Steel Stud Manufacturers Association (SSMA).

B. Tolerances: Install walls and partitions on straight lines, plumb, free of twists or other defects, and contacting a 10-foot straight edge for its entire length at any location within a 1/8 inch tolerance. Install horizontal framing level within a tolerance of 1/8 inch in 12 feet in any direction.

PART 2 - PRODUCTS

2.01 STRUCTURAL METAL STUD FRAMING

A. Subject to review by the Architect of action submittals, provide studs, tracks, joists, header, and accessories manufactured the company indicated on the drawings, or an acceptable substitution by one of following:

1. ClarkWestern Building Systems.

2. Dietrich Industries, Inc.
3. Marino/WARE.
4 Cemco.

B. Connection Accessories: Products manufactured by The Steel Network, Inc., or equal.

C. Light Gage Metal Framing:

1. Metal framing shall be formed from corrosion resistant-steel conforming to requirements of ASTM A653, 50 ksi minimum.

2. Metal framing shall be zinc coated in conformance to requirements of ASTM A926, G60.

3. Metal framing shall be manufactured in conformance to ASTM C955.

4. Install metal framing per ASTM C1007, Standard Specification for Installation of Load-Bearing (Transverse and Axial) Steel Studs and Related Accessories.

D. Gages, dimensions, profiles, and properties of studs shall be as indicated on Drawings.

E. Mechanical anchors to concrete and masonry shall be metal cinch at least 3/8 inch in diameter threaded bolt head type. Anchor bolts to be installed in concrete shall be hook type ½ inch diameter or more. Unless otherwise indicated.

F. Mechanical anchors to metal framing shall be No. 10 self-tapping and self-drilling wafer-head screws.

G. Accessories: Special top tracks, angles, fasteners, and strips as required for fire rating assembly required at each condition.

H. Mineral Wool Safing Insulation: 4.0 pcf density. Thermafiber, Fibrex, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install plumb and true. Install necessary accessories for proper installation.

B. Anchor top and bottom runner track to ceiling or roof structure overhead and to floor structure below.

C. Install studs squarely in top and bottom runner track with firm abutment against track webs.

D. Align and plumb studs, and fasten to flanges of both top and bottom runner tracks.

E. Provide three studs minimum at corners of stud walls. Locate so as to provide surfaces for attachment of interior and exterior facing materials.

F. Members not indicated to be welded together shall be attached with manufacturer recommended screws with minimum one screw at each flange of stud to top and bottom track. Wire tying of framing members is not permitted.

G. Provide lateral bracing and bridging in accordance with manufacturer's written recommendations or as required by CBC.

H. Splices in axially loaded studs are not permitted.

I. Splice or butt weld butt joints in runner tracks. No splices are permitted in tracks over lintels, diaphragm sheathing, or diagonal bracing.

J. Weld connections by fillet welds or plug welds in accordance with AWS recommended procedures and practices.

K. Studs that frame door openings shall be clipped to floor with 14 gage angle clips. Each clip to have two fasteners into studs and two fasteners into floor.

L. Provide additional joists or blocking adjacent to exterior and interior walls, openings and elsewhere as required to provide support for indicated ceiling construction.

M. Provide an additional joist under parallel partitions where partition length exceeds ½ joist span and around roof openings which interrupt one or more spanning members.

3.02 CONNECTIONS TO METAL DECKING

A. Provide premolded neoprene filler strips matching flute profile for non-fire-rated walls and partitions covered on one or both sides up to metal decking.

B. Top runner track of fire-rated partitions shall be a minimum of 36 mils (20 gage), unless noted otherwise, and attached to metal deck with required fasteners at spacing required for fire rating, but in no case over 16 inches on center. Areas above runner shall be friction fit with a minimum depth of 2 ½ inches of 4 pounds per cubic foot density mineral wool insulation. A minimum of ½ inch of firestopping compound shall be installed to each side of mineral wool insulation for a one-hour system, and one inch of firestopping for a two-hour system. Install required special tracks, angles, fasteners and strips of gypsum wallboard to provide required fire resistance rating.

C. Fire-rated top tracks shall be installed in accordance with manufacturer's recommendations and fire rating approval requirements.

3.03 FIELD QUALITY CONTROL

A. Welding Inspection: Inspection of field welding operations shall be performed by special inspector. The special inspector shall inspect material, equipment, procedures, welds, and welder qualifications.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 DESCRIPTION

A. This section includes supply and installation of all metal fabrications not included elsewhere in the specifications.

1.03 SUBMITTALS

A. All submittals shall be made in accordance with Section 01340.

B. Submit shop drawings showing installation and anchoring details.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel Shapes: Conform to ASTM A 36.

B. Steel Bolts: "Standard Specification for Carbon Steel Externally and Internally Threaded Standard Fasteners", ASTM A 307, Grade A, with bolt head and nut dimensions conforming to ANSI B 18.2.1.

C. Primer: "Tnemec Series 10" or the fabricator's standard rust inhibitive primer.

2.02 SHOP PRIMING

A. All steel shall receive a coat of primer.

B. The primer applied, filling all joints and corners and covering all surfaces with a smooth unbroken film. The minimum dry film thickness of the primer shall be 2.0 mils.

2.03 FABRICATED ROUGH HARDWARE

A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels, and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6.

B. Fabricate items to sizes, shapes, and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.04 MISCELLANEOUS FRAMING, STRUTS, BACKING, AND SUPPORTS

A. Provide steel framing, struts, backing, and supports for chandeliers, shelving, accordion partitions, toilet partitions, handrailings, ceilings, built-in items, and concealed supports.

B. Fabricate units to sizes, shapes, and profiles required to receive adjacent other construction retained by framing and supports. Fabricate from structural steel shapes, plates, and steel bars of welded construction using mitered joints for field connection. Cut, drill, and tap units to receive items to be supported.

2.05 SHEET METAL FABRICATIONS

A. Items fabricated of sheet metal shall be of galvanized steel conforming to ASTM 525, G90. Sheets shall be not lighter than 16-gauge steel with welded joints and finished with anchorage devices for securing into existing construction.

B. Seams and joints shall be welded or joined by mechanical means equivalent to welding.

C. Exposed metal surfaces shall be pretreated for adhering paint to galvanizing, and have a shop-applied prime coat.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install fabrications in accordance with approved shop drawings.

3.02 ADJUSTING AND CLEANING

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 requirements for touch-up of surfaces.

1. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

END OF SECTION

SECTION 06 10 50
MISCELLANEOUS ROUGH CARPENTRY

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Provide miscellaneous wood roof blocking and plywood, including nailers for roofing system and related flashing.

B. Provide plywood panel boards.

C. Preservative treat wood members as indicated.

1.02 QUALITY ASSURANCE

A. Lumber: Provide visible grade stamp of an agency certified by NFPA.

B. Lumber Standard: Comply with US Product Standard PS20 for each indicated use, including moisture content and actual sizes related to nominal sizes.

C. Plywood Standard: Comply with PS1 (ANSI A199.1)

1.03 REFERENCES

A. National Forest Products Association (NFPA) National Design Specification for Stress Grade Lumber and its Fastening.

B. Product Data: Wood treatment certification and instructions for proper use of each type of treated material.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Blocking: Dimensional lumber graded in accordance with NFPA Grading Rules; Construction Grade, Douglas Fir; minimum S-Dry.

B. Plywood: Minimum APA C-D exterior (CD EXT) plywood, stress rated where spanning between supporting members; minimum 1/2” thick unless otherwise indicated. Oriented strand board of equal or greater rating may be substituted in lieu of plywood.

C. Plywood Panel Boards: For electrical and communication panel boards, APA C-D plugged, interior type plywood with exterior glue, fire retardant treated; minimum 1/2” thick.

D. Nails, Spikes and Staples: Galvanized; size and type of suite application.

E. Bolts, Nuts, Washers, Lags, Pins and Screws: Medium carbon steel; galvanized, size and type of suite application.

F. Fasteners: Provide fasteners as required for complete, secure installation of miscellaneous rough carpentry.

1. Solid Masonry or Concrete: Expansion shield and lag bolt type.

2. Steel: Bolts or power activated type.

2.02 WOOD PRESERVATIVE

A. Treat lumber and plywood to comply with applicable requirements of American Wood Preservers Association.

B. Pressure treat following items with water-borne preservatives for above ground use with AWPA C-2.

1. Wood members in connection with roofing, flashing, vapor barriers and waterproofing.

2. Wood members in contact with masonry, concrete, or below grade.

3. Kiln-dry wood to a maximum moisture content of 15 percent after treatment with water-borne preservative.

C. Complete fabrication of treated items prior to treatment, wherever possible, if cut after treatment, coat cut surfaces with heavy brush coat of same chemical used for treatment.

D. Inspect each piece after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Place miscellaneous rough carpentry true to lines and levels. Correlate location so attached work will comply with design requirements and be properly located.

B. Fit carpentry work to other work; scribe and cope as required for accurate fit. Shim with metal or slate for bearing on concrete and masonry. Securely attach carpentry work to substrates by anchoring and fastening as required by recognized standards.

1. Provide washers under bolt head and nuts in contact with wood.

C. Wood Blocking: Provide blocking of S4S lumber not less than 1-1/2” wide and of thickness required to provide adequate support or to properly located attached material.

1. Provide attachment to other work; form to shapes shown.
2. Countersink bolts and nuts flush with surfaces.
3. Remove temporary blocking when no longer needed.
4. Anchor to formwork before concrete placement.

D. Plywood: Comply with recommendations of American Plywood Association (APA) for fabrication and installation of plywood work.

END OF SECTION

SECTION 06 16 33
PLYWOOD AND OSB ROOF SHEATHING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install plywood and OSB roof sheathing as indicated on the drawings and specified.

1.03 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For following products, from ICC-ES:

1. Preservative-treated plywood.
2. Fire-retardant-treated plywood.

PART 2 - PRODUCTS

2.01 ROOF SHEATHING

A. Plywood Sheathing: Exterior sheathing of the thickness as indicated on the drawings.

1. Span Rating: As noted on the Drawings.
2. Nominal Thickness: Not less than 15/32 inch

B. Oriented-Strand-Board Roof Sheathing: Exposure 1 sheathing.

1. Span Rating: As noted on the Drawings.
2. Nominal Thickness: Not less than 15/32 inch.

C. Provide fasteners of size and type indicated that comply with requirements of the authority having jurisdiction. For roof sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

D. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 or ASTM D 3498 that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

END OF SECTION

SECTION 07 13 07
POLYOLEFIN UNDER SLAB VAPOR RETARDERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install polyolefin under slab vapor retarders as indicated on the drawings and specified.

1.03 REFERENCES

A. ASTM D1709 - 09 Standard Test Methods for Impact Resistance of Plastic Film by the Free-Falling Dart Method.

B. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

C. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs.

D. ASTM E1643 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.

E. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.

F. ASTM F1249-01 Standard Test Method for Water Vapor Transmission Rate Through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

1.04 SUBMITTALS

A. Submit manufacturer's product data and application instructions.

1.05 QUALITY ASSURANCE

A. Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of the vapor retarder.

B. Obtain vapor retarder materials from a single manufacturer regularly engaged in manufacturing the product.

C. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.06 PRECONSTRUCTION MEETING

A. Pre-Construction Meeting: Convene one week prior to installation of under slab vapour retarder. Attendees to be as follows: - Architect, Engineer, General Contractor, Vapor Retarder Installer, and Vapor Retarder Manufacturer to discuss the application in detail.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Store materials in a clean, dry area in accordance with manufacturer's instructions.

C. Protect materials during handling and application to prevent damage or contamination.

D. Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness at intervals of no more than 85" (220 cm).

1.08 ENVIRONMENTAL REQUIREMENTS

A. Product not intended for uses subject to abuse or permanent exposure to the elements.

B. Do not apply on frozen ground.

PART 2 - PRODUCTS

2.01 POLYOLEFIN UNDER SLAB VAPOR RETARDERS

A. Subject to review by the Architect of product data for compliance with requirements, retarders shall be "Perminator" by W. R. MEADOWS, INC. or an acceptable substitution by Stego Industries, or equal.

B. Polyolefin Vapor Retarders shall have the following features:

1. Not less than 15 mils thick.

2. Performance-Based Specification: Vapor retarder membrane shall be manufactured from virgin polyolefin resins, and when tested according to all requirements of ASTM E1745, shall meet the following minimum performance requirements:

a. Maximum Water Vapor Permeance (ASTM E154 Sections 7, 8, 11, 12, 13, by ASTM E96, Method B or ASTM F1249)

(1) As received: 0.0063 perms.
(2) After Wetting and Drying: 0.0052 perms.
(3) Resistance to Plastic Flow and Temperature: 0.0057 perms.
(4) Effect Low Temperature and Flexibility: 0.0052 perms
(5) Resistance to Deterioration from Organisms and Substances in Contacting Soil: 0.0052 perms.

b. Puncture Resistance (ASTM D1709): >3,200 grams.

c. Tensile Strength ASTM E154, Section 9: 72 Lb. Force/Inch

2.02 ACCESSORIES

A. Seam Tape: High Density Polyethylene Tape with pressure sensitive adhesive. Minimum width 4" (100 mm).

B. Pipe Collars: Construct pipe collars from vapor retarder material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Prepare surfaces in accordance with manufacturer's instructions.

B. Level, tamp, or roll earth or granular material beneath the slab base.

3.02 EXAMINATION

A. Examine surfaces to receive membrane. Notify architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.

3.03 APPLICATION

A. Install the vapor retarder membrane in accordance with manufacturer's instructions and ASTM E 1643–98.

B. Unroll vapor retarder with the longest dimension parallel with the direction of the pour.

C. Lap vapor retarder over footings and seal to foundation walls.

D. Overlap joints 6" (152 mm) and seal with manufacturer's tape.

E. Seal all penetrations (including pipes) with manufacturer's pipe boot.

F. No penetration of the vapor retarder is allowed except for reinforcing steel and permanent utilities.

G. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6" (152 mm) and taping all four sides with tape.

END OF SECTION

SECTION 07 14 07
FLUID-APPLIED EMULSION WATERPROOFING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install fluid applied emulsion waterproofing as indicated on the drawings and specified..

1.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C-719 Standard Test Method for Adhesion and Cohesion of Elastomeric Joint Sealants Under Cyclic Movement (Hockman Cycle).

2. ASTM C-836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.

3. ASTM D-2939 Standard Test Methods for Emulsified Bitumens Used as Protective Coatings.

4. ASTM E-96 Standard Test Method for Water Vapor Transmission of Materials.

5. ASTM D-466 Standard Test Method for Films Deposited from Bituminous Emulsions

6. ASTM D-412 Standard Test Method for Vulcanized Rubber and Thermoplastic Elastomers-Tension

7. ASTM D-3274 Standard Test Method for Emulsified Bitumens Used as Protective Coatings

8. ASTM D-2196 Standard Test Method for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield type) Viscometer

1.04 ACTION SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit manufacturer’s product data and installation instructions.

1. Quality Assurance/Control Submittals: Submit certificate that applicator complies with requirements of this section.

1.05 QUALITY ASSURANCE

A. Applicator Qualifications: Utilize an applicator approved by the waterproofing manufacturer.

B. Regulatory Requirements: California Title 24

1.06 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 01 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.07 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Comply with application temperature range of 20 - 130°F (-6.67 - 55°C).

1.08 WARRANTY

A. Manufacturer's Material Warranty: Ten years following Substantial Completion.

PART 2 - PRODUCTS

2.01 FLUID-APPLIED EMULSION WATERPROOFING

A. Subject to review of action submittals by the Architect for compliance with requirements, provide "Armor Membrane 363 WB" by Marflex Waterproofing & Building Products, or an acceptable substitution by one of the following:

1. Marflex Waterproofing & Building Products.
2. W.R. Meadows Inc.
3. Carlisle Coatings.
4. Tremco.

B. Fluid-Applied Waterproofing and related products, including the following:

1. Source Limitations for Waterproofing System: Obtain waterproofing materials, drainage panels, mastics, and protection course from a single source from single manufacturer.

2. Waterproofing Membrane:

a. Material: Emulsion

b. Color: Black

c. Total Solids: 60-70%

d. Application Method: Spray. Brush, or Roller, as appropriate.

e. Coverage Rate: 5-gal/100 ft2

f. Film Thickness, Dry: 80 mil (1.5 mm) min.

g. Total Cure Time: 24 hours

h. Weight/Gallon: 7.6 lb (3.4 kg)

i. Elongation at 70°F (21°C) (ASTM D-412 Die C): 1672%

j. Tensile Strength (ASTM C-719): 48 psi (331 kPa)

k. Low Temperature Flexibility at -15°F(ASTM C 719): No cracking

l. Crack Bridging (ASTM C-836): 10 cycles without bond failure

m. Viscosity/Centipoise: (ASTM D-2196): 3600 centipoise

n. Resistance to Water Flow (ASTM D-466): Bond strength not affected

o. Water Solubility (ASTM D-2939): No blistering or re-emulsion

p. Resistance to Hydrostatic Pressure (Federal Spec TT-C-555B, Par.4.4.7.):

(1) Water Leaks: None
(2) Weight Gain: None

q. Water Vapor (ASTM E-96):

(1) Transmission: 0.11grains/sf/h.
(2) Permeability: 0.35 perms (13 ng/(Pa × s × m2).

r. Foundation Drainage Rate: 18 gal/min/ft

3. Drainage Panels:

a. Material: Polystyrene compressed into a moderate-duty dimpled core bonded to a single layer of non-woven filter fabric.

b. Foundation Drainage Rate: 21 g/pm/ft width

C. Provide proprietary accessory materials as appropriate.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the most current written installation instructions and recommendations of the waterproofing manufacturer.

3.02 EXAMINATION

A. Site Verification of Condition:

1. Verify that site conditions are acceptable for application of the waterproofing system.
2. Do not proceed with application until unacceptable conditions are corrected.

3.03 PREPARATION

A. Surface Preparation:

1. Ensure that the surfaces to receive waterproofing are structurally sound and free of moisture, dust, mud, loose mortar, fins, metal projections or any substances that would be detrimental to the bonding of the membrane to the surface.

2. Remove wall ties.

3. Patch cracks, voids and holes with nonshrink grout or mastic.

3.04 APPLICATION

A. For vertical application spray apply a uniform coat of waterproofing to entire wall area. Obtain a seamless membrane free of entrapped gasses, with a minimum dry film thickness of 80 mil (2 mm) at 10 feet (3.1 m) below-grade wall application, 100 mil (2.5 mm) at 20 feet (6.1 m) below-grade wall application and 120 mil (3 mm) at 30 feet (9.2 m) or more for below-grade wall application.

1. Apply fluid membrane onto footing area a minimum of 4 inches (102 mm) to prevent water pooling.

2. Allow membrane to cure for 24 hours before placing any backfill against the wall.

3. Follow the current installation instructions.

B. Can be applied to “Green” concrete that is dry to the touch, however not if a freeze exists on surface.

3.05 INSULATING/DRAINAGE BOARD/ROLL INSTALLATION

A. When using boards or rolls, install after membrane has been applied. Place and secure to substrate according to manufacturer’s current written instructions.

1. While the membrane is still tacky, begin installation at a corner. Install horizontally against the waterproofing membrane with the non-woven filter fabric side facing out-ward.

2. Install panels from top of footing extending to finish grade level. If there is overlapping off the membrane once you have reached the grade line, a utility knife or similar tool can be used to cut the rolls to the correct height.

3. For good adherence, apply uniform pressure throughout the surface area, not just the edges and corners.

4. When two edges come together from two separate pieces, overlap the dimples to create a continuous coverage of the wall.

5. If needed, secure the panels to the wall using a powder actuated mechanical fastener or concrete nail.

6. If the board overlaps the membrane once you have reached the grade line, a utility knife or similar tool can be used to cut the boards to the correct height.

B. Protect installed insulation/drainage panels during subsequent construction.

C. Backfill and Drainage

1. #57 Gravel or equivalent must go no less than 2’ high at the base of the foundation and 1’ in depth away from the foundation walls.

2. Adequate interior and exterior foundation drainage at the base of the foundation walls, across any floors or adjacent flower beds must be properly installed and functioning properly.

3. Backfilling should begin no sooner than 24 hours after the installation of the board, but must be backfilled within 15 days.

D. 12” GeoDrain Tile Vertical Collection System Installation

1. Unroll material along foundation base; adhere to partially cured waterproofing material; use adhesive acceptable to waterproofing material manufacturer for cured waterproofing or other sheet waterproofing not requiring curing.

2. Install preformed corner fittings at foundation interior and exterior corners.

3. Install outlet fittings where indicated; connect to corrugated drainage pipe if present at time of modular system installation; leave ready for connection to corrugated drainage pipe if not present.

3.06 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 22 22
POLYISOCYANURATE INSULATION BOARD

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install polyisocyanurate insulation board as indicated on the drawings and specified.

1.03 ACTION SUBMITTALS

A. Submit product Data: Manufacturer's data sheets on each product to be used, including:

B. Submit shop Drawings: Roof plan showing slopes, layout of boards and fastening patterns.

C. Verification Samples: For each finish product specified, two samples, representing actual product.

D. Manufacturer's Certificates: Manufacturer's certification that materials meet or exceed specification requirements.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall be a company that regularly manufactures polyisocyanurate and fully assembled nail base insulation panels in-house with no outside fabrication operations.

B. Comply with the following as a minimum requirement:

1. ASTM C 1289 - Faced Rigid Cell Polyisocyanurate Thermal Insulation Board; Type II Class 1 Grade 2.

2. Provide systems complying with requirements for FM Class 1.

3. Provide systems complying with requirements for UL Class A.

4. Achieve a minimum thermal resistance value of R-7 for re-roofing projects, unless noted otherwise.

5. UL 2818 Green Guard Gold certification. Gold Standard for Chemical Emissions for Building Materials.

C. Installer Qualifications: Minimum five years' experience installing specified type of insulation under roofing systems, and certified by the insulation manufacturer to install the Work of this section.

D. Pre-installation Meetings: In accordance with related Division 01 sections, conduct a pre-installation meeting on the Project site.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in accordance with the manufacturer recommendations.

B. Store product on a solid flat foundation and elevate a minimum of 2 inches above the finished surface.

C. Slit the bundle packaging vertically down the center of the two sides and cover with a waterproof tarpaulin

D. Protect insulation from open flame and keep dry at all times.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Do not install insulation on roof deck when water of any type is present. Do not install insulation or roofing materials when substrate is damp or wet or when proper adhesive temperature cannot be maintained.

1.07 COORDINATION

A. Coordinate work with installation of roof covering and associated roof penetrations and counter-flashings installed by other sections as work of this section proceeds.

PART 2 - PRODUCTS

2.01 POLYISOCYANURATE INSULATION BOARD

A. Subject to review of action submittals by the Architect for compliance with requirements, provide Hunter Panels, or an acceptable substitution by one of the following:

1. Dyplast.
2. Celotex Insulation.
3. GAFTEMP.
4. Sarnatherm.

B. Roof and Deck insulation shall consist of polyisocyanurate foam panels, chemically bonded during the foaming process to special organic/inorganic facers on the top and bottom surfaces, and shall conform to the following:

PROPERTIES	TEST METHOD	VALUE
Compressive Strength	ASTM D 1621	20PSI min.
Dimensional Stability (Thermal and Humid Aging)	ASTM D 2126 (-4 degrees F, amb RH) (158 degrees F, 97 percent RH) (200 degrees F, ambient RH)	 Less than 2 percent linear change Less than 2 percent Linear change Less than 2 percent linear change
Flexural Strength (Modulus of Rupture) (Break load)	ASTM C 203	40 PSI min. 17 PSI min.

Tensile Strength (Perpendicular to surface)	ASTM C 203	500 PSF min.
Water Absorption	ASTM C 209	
Water Vapor Transmission	ASTM E 96	
Core Foam Flame Spread	ASTM E 84	

C. Roof Insulation with Fiber-Reinforced Facers: H-Shield; closed-cell polyisocyanurate foam core and bonded to fiber-reinforced facers on both sides; conforming to ASTM C 1289, Type II, Class 1 with square edges.

D. Approved Fasteners: Appropriate for purpose intended and approved by FM Approvals and system manufacturer; length required for thickness of insulation material and penetration of deck substrate, with distribution plates if required.

E. Cant Strip and Tapered Edge Strip: Standard machine cut perlite or wood fiberboard strips in sizes indicated or required.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Examine roof deck for suitability to receive insulation. Verify that substrate is dry, clean, and free of foreign material that will damage insulation installation.

C. Verify that roof drains, scuppers, roof curbs, nailers, equipment supports, vents, and other roof accessories are secured properly and installed in conformance with drawings and submittals.

D. Verify that deck is structurally sound to support installers, materials, and equipment without damaging or deforming work.

E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install specified insulation in accordance with manufacturer's latest printed instructions and as required by governing codes and Owner's insurance carrier.

B. Do not leave installed insulation exposed to weather. Cover and waterproof immediately after installation.

C. Seal exposed insulation joints at the end of each day. Remove seal when work resumes.

D. Remove installed insulation that has become wet or damaged and replace with new solid and dry insulation material.

E. Mechanically Attached Single-Ply Systems: Affix panels securely in place as recommended by the product manufacturer.

3.04 CLEANING

A. Remove trash and construction debris from insulation before application of roofing membrane.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Protect installed insulation traffic by use of protective covering materials during and after installation.

C. Cover the top and edges of unfinished roof panel work to protect it from the weather and to prevent accumulation of water in the cores of the panels. Only apply enough insulation per day that can be covered by the finished roofing system.

D. Do not leave panels exposed to moisture. Wet panels shall be removed or allowed to completely dry prior to application of vapor barrier and/or roof covering.

E. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 27 00
VAPOR IMPERMEABLE SELF ADHERED SHEET AIR AND WATER BARRIERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install vapor-impermeable self-adhered air and water barriers as indicated on the drawings.

1.03 ACTION SUBMITTALS

A. Submit product data: the manufacturer's data sheets on each product to be used, including:

1. Physical properties, performance criteria, compliance reports, material compatibility, product limitations, and recommendations.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

B. Submit dimensioned shop drawings. Provide manufacturer’s typical, scalable, shop drawings with actual product names on details of:

1. Typical conditions.
2. Transitions to adjacent systems.
3. Mock-up, including plans and elevations.

C. Manufacturer’s Letter Indicating Compatibility: Submit letter or technical bulletin listing specific air barrier materials, and typical adjacent system materials; that are compatible, both chemically and adhesively.

D. Qualifications:

1. Submit manufacturer and installer qualifications.
2. Submit 5 project references within the last 5 years of similar-sized projects with self-adhered sheet membrane air barrier assembly installation by the proposed installing contractor.
3. Warranty: Submit manufacturer’s sample warranty.

1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Provide primary weather barrier materials from a single manufacturer. Secondary and accessory materials by other manufacturers shall be approved for compatibility by the primary manufacturer.

B. Testing Laboratory Qualifications: Accredited by the International Accreditation Service (IAS), American Association for Laboratory Accreditation (A2LA), or Standards Council of Canada (SCC).

C. Manufacturer Qualifications: Minimum 10 years of experience manufacturing similar products.

D. Installer Qualifications: Minimum 5 years of experience installing similar products and

1.05 PERFORMANCE REQUIREMENTS

A. Assembly Performance:

1, Standards Compliance: ASTM E 2357.

2. Air Leakage: ASTM E2357:

a. Opaque Wall: Less than 0.002 cfm/ft2 at 1.57 psf (0.01 L/s/m2 at 75 Pa).
b. Penetrated Wall: Less than 0.006 cfm/ft2 at 1.57 psf (0.03 L/s/m2 at 75 Pa).

3. Loads from imposed pressures: Withstands design wind, fan, and stack pressures, both positive and negative, without damage or displacement of the air barrier assembly or adjacent materials. Allows transfer of these loads to the structure.

4. Movement: Allows for thermal, creep, and anticipated seismic and building movement within the air barrier assembly, each air barrier detail, and transitions to adjacent systems without breaching the air barrier system or negating specified air leakage performance.

5. Continuity: Joins air barrier materials and adjacent compatible materials and systems preventing air leakage and maintaining specified air leakage performance at the following locations and as shown on the Drawings:

a. Transitions from roof air barrier to wall.
b. Transitions from window, curtain wall, storefront, louvers, and doors to wall.
c. Transitions from foundation waterproofing to wall.
d. Transitions from one type of exterior cladding to another.
e. Across construction, control, expansion, and seismic joints.
f. Penetrations of utilities, pipes, conduit, and ducts.
g. Penetrations of ties, anchors, and channels for exterior finishes.
h. Pathways for potential air leakage into the building envelope.

1.06 COORDINATION

A. Coordinate Work of this Section with the work of other Sections that have work or materials connected to or passing through the air barrier assembly.

1. Sequence of construction to ensure continuity of the barrier assembly at openings, transitions, and penetrations.

2. Coordinate with installation of materials which cover the air barrier assemblies, to ensure exposure period does not exceed 12 months.

3. Coordinate field observations and testing by specified parties.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Store in accordance with the manufacturer's instructions in clean, dry location protected from exposure to direct sunlight. Material that has been unwrapped shall be covered with opaque, light colored tarp or re-wrapped in manufacturer's packaging.

C. Use air barrier materials within 24 months from date of manufacture.

D. Handle materials to avoid damage.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results.

1. Install membrane in temperature range from 0 degrees F to 150 degrees F (-18 degrees C to 66 degrees C).

2. Install sealant in temperature range from 40 degrees F to 95 degrees F (5 degrees C to 35 degrees C). For application temperatures outside this range, please contact 3M Technical Services

B. Install on substrates clear of dirt, debris, oils, other chemicals, snow, ice, frost, and moisture above the allowable limitations of the product.

C. Maximum exposure time of the air barrier without cover or cladding is 12 months.

D. Provide weather protection at the top of walls and unfinished roofs at the end of each day.

1.09 WARRANTY

A. Manufacturer's Product Warranty: Provide manufacturer’s product warranty for a minimum of ten years from date of Substantial Completion with installation completed by a certified 3M applicator.

B. Installer's Workmanship Warranty: Provide workmanship warranty for a minimum of one year from date of Substantial Completion including all air barrier assembly materials and accessories, against failures including loss of air tight seal, loss of watertight seal, loss of attachment, loss of adhesion, and failure to cure properly.

PART 2 - PRODUCTS

2.01 SELF ADHERED SHEET AIR AND VAPOR BARRIERS

A. Subject to review by the Architect of action submittals, provide “3M 3015” by 3M Industrial Adhesives and Tapes, or an “or equal” substitution that is acceptable to the Architect and the product of one of the following:

1. 3M Industrial Adhesives and Tapes.
2. Dupont.
3. Raven Industries.
4. Tremco.

B. Features of the self-adhered, vapor-impermeable sheet membrane:

1. Description: Tan colored, semi-transparent proprietary film with acrylic adhesive and silicone coated release liner.

2. Impermeable to air, water vapor, and water.

3. Resists UV exposure for up to 12 months.

4. Meets requirements of ASTM E2178 and CAN/ULC S741-8.

5. Weight: 13.4 oz/sq.yd. (464 g/sq.m.).

6. Total Membrane Thickness (ASTM D3652): 10 mils (0.25 mm).

7. Air Permeance: Not to exceed 0.00005 cubic feet per minute per square foot under a pressure differential of 0.3 inch water (1.57 psf) (0.0002 L/sm at 75 Pa) when tested in accordance with ASTM E2178.

8. Elongation at Break (ASTM D882): 700 percent.

9. Tensile Strength (ASTM D882): 1740 psi (12 MPa).

10. Lap Adhesion (ASTM D3330): 40 oz/inch (0.44 N/mm).

11. Low Temperature Flexibility (ASTM D1970, Section 7.6): At -22 degrees F (-30 degrees C) passes bend test and no leakage during water head test.

12. Nail Sealability:

    a. ASTM D1970, Section 7.9: 5 inches (127 mm) of water head after 3 days, dry and passes.

    b. ASTM E331/547, as modified per AAMA-711-07, Annex 1: Passes initial and after thermal cycling.

13. Water Vapor Permeance (ASTM E96, Water method): Not to exceed 1 US Perm (57 ng/Pa s m2).

14. Water Resistance (AATCC-127): Deviated, 2.16 inches (55 cm) of water for 5 hours; no leakage.

15. Service Temperature: -40 to 240 degrees F (-40 to 80 degrees C).

16. Flammability:

    a. ASTM E84: Flame spread index less than 15, smoke developed value less than 45. Rating: Class A.

    b. Membrane in an approved wall assembly meets performance requirements of NFPA 285.

2.02 ACCESSORIES

A. Sealant: Polyurethane Sealant, one component, moisture curing: ASTM C920, Type S, Grade NS, Class 25:

1. Tack free: 60-90 minutes at 73 degrees F at 50% relative humidity.

    a. Elongation at Break (ASTM D882): 600 percent.
    b. Tensile Strength (ASTM D882): 300 psi (2.1 MPa).

B. Flashing: Self-Adhered Air and Vapor Barrier Membrane in detail widths indicated on the drawings.

C. Primer for Difficult Substrates: Test adhesion before application:

PART 3 - EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. Substrate surfaces shall be free of grease, oil, un-bonded paint, corrosion or other substances.

C. Verify that substrate construction is complete, clean, dry, and ready to receive barrier system with no damaged or unsupported areas; or sharp protrusions or voids. Substrate must meet the following requirements:

1. Exterior gypsum sheathing: Moisture content below 19 percent; no open joints or cracks wider than 1/4 inch (6 mm).

2. Plywood: Moisture content below 16 percent; no open joints or cracks wider than 1/4 inch (6 mm).

3. Concrete surfaces: Cured minimum 7 days, fins and extrusions ground flush and void areas filled and cured.

4. Masonry: Mortar joints struck flush.

5. Metal: Wipe down to remove any release agents or coatings.

D. If substrate preparation is the responsibility of another installer, notify Architect and General Contractor of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Connection to Difficult Substrates and Other Systems:

1. Test adhesion by installing a 6 inch (152 mm) square test patch of barrier product over the difficult substrate or other system. Removal of the test patch should not be possible without permanent damage to either the test patch or substrate material.

2. Consult the manufacturer for detailing connections that fail this test.

B. Gaps or cracks in substrate exceeding 1/4 inch (6 mm) width: Fill gap or crack with sealant and tool surface flush and smooth.

C. Penetrations of air barrier assembly: Fill gaps or cracks exceeding 1/4 inch (6 mm) width between the substrate and the penetration with sealant.

D. Gaps or cracks in substrate exceeding 1/2 inch (12 mm) width: Fill gap or crack with closed-cell backer rod or spray foam. Once the spray foam is cured, shave flush to adjoining substrate.

3.03 INSTALLATION, VAPOR IMPERMEABLE MEMBRANE

A. Install flashing widths in accordance with manufacturer’s instructions in locations shown on the drawings to provide a continuous weather barrier.

1. The membrane may be installed horizontally or vertically

2. A 2 inch overlap is required

3. Horizontal applications should be applied so the top row overlaps the lower row, creating a shingling effect

4. Cut material to desired length

5. Wind up into a roll for easy handling

6. Fold the starting edge back over itself to crease the paper release liner

7. Peel back the liner to expose a starting 2-3 inch adhesive strip

8. Keep clean – do not contaminate the starting strip with dust or debris before applying it to the intended surface

9. Once aligned, set the membrane in place by rolling the product back against the exposed adhesive

10. Wipe the membrane down with a feathering motion from the middle outward to obtain a smooth surface

11. Unwind the roll while simultaneously pulling the release liner, maintaining a pressure against the wall to tack the membrane in place.

12. Roll the membrane with a rubber roller to ensure a tight seal against the wall and between overlapped edges.

13. Install membrane at inside and outside vertical corners and construction joints, lapping a minimum of 2 inches (51 mm) on either side.

14. Carefully execute detail work to ensure a continuously sealed building envelope.

15. Through-wall flashings: Seal top edge of through-wall flashing with air barrier sealant. Lap membrane over sealed through-wall flashing top edge minimum 2 inches (51 mm).

16. Transitions to adjacent systems: See the Drawings for project specific detailing of transitions to the roof, foundation waterproofing, and door systems.

17. Repair all wrinkles and fish mouths extending within 2 inches (51 mm) of the membrane edge with a repair membrane piece extending 6 inches (152 mm) beyond the defect.

B. Window and Louver Openings:

1. Wrap rough openings as detailed in the Drawings with either flashing or membrane material in detail widths.

2. Install sealant at each inside corner of the window sill, jamb, and head.

3. Apply detail strips of membrane at each inside corner extending the full depth of the sill and a minimum 2 inches (51 mm) onto the face.

4. Install detail strips at the sill, jambs, and head in lengths beyond window opening extending the full depth of the sill.

5. Apply reinforcing piece cut into a football, bowtie, or butterfly shape at each corner.

6. Install membrane in “weatherboard” or “shingle fashion” with a minimum 2 inch (51 mm) overlap at all detail strips.

C. Penetrations:

1. Seal all penetrations with sealant. Install flashing or membrane material cut to length to allow installation around the full circumference of penetration.

2. Masonry Ties or Anchors:

a. Post-applied: Install back plate of tie or anchor over the air barrier with self-tapping screws. Apply sealant over the screw heads.

b. Knife plate: Cut a one piece membrane to overlap minimum 2 inches (51 mm) in each direction of the knife plate. Cut a slot for the knife plate and apply the membrane over. Apply sealant at the knife plate penetration perimeter.

3. Utilities, Pipes, Conduit, and Duct Penetrations:

a. Apply sealant between the penetration and the exterior wall.

b. Apply membrane to allow continuous 2 inch (51 mm) overlap onto vent/pipe penetration and cut “fingers” to transition to the exterior wall.

c. Install a narrow membrane collar strip around the circumference of the penetration perimeter, lapping onto the penetration and substrate.

d. Install one piece membrane with penetration shape cut out on to the substrate. Apply over “fingers” on the substrate and extend a minimum of 2 inches (51 mm) beyond the penetration perimeter.

e. Apply sealant at the penetration and cut edge of the one piece membrane.

D, Substrate transitions and building joints: See Drawings for project specific detailing with backer rod, sealant, and membrane.

E. Repairs: Apply membrane 2 inch (152 mm) larger than test or damage area. Seal leading cut edges of membrane with sealant.

3.04 FIELD QUALITY CONTROL

A. Coordinate with Owner's testing agency to inspect installation areas with the manufacturer's authorized representative and the Architect. Do not cover weather barriers until accepted.

B. Test: Perform the following tests as recommended by the manufacturer:

1. Qualitative air leakage: ASTM E11.

2. Quantitative air leakage: ASTM E783.

3. Water penetration: ASTM E1105.

4. Membrane adhesion: ASTM D4541, modified. Use a Type II Pull Tester. Cut through the membrane at the perimeter of the disc.

a. Record the mode of failure and area where material failed.
b. Record the adhesion level from the gauge at the end of the test.

5. Repair all test areas to conform to the project specifications.

6. Repair or take corrective action all non-conforming work to meet the project specifications.

3.05 CLEANING AND PROTECTION

A. Clean soiling from adjacent surfaces using cleaning agents and procedures recommended by manufacturer and acceptable to the air barrier assembly manufacturer. Protect air barrier materials from damage during installation and the remainder of the construction period. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 52 12
PREPARATION FOR REROOFING (PARTIAL TEAR OFF)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Section includes requirements for removal of existing roofing materials in preparation for a new roof membrane system to the extent necessary to provide the required warranty).

B. The substrate shall be prepared to be acceptable to the manufacturer of the new roofing materials, and suitable to afford the required warranty.

1.03 QUALITY ASSURANCE

A. Preliminary Reroofing Conference: Conduct conference at Project site. Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner; Owner's Architect; Owner's insurer if applicable; testing and inspecting agency representative; deck Installer; roofing Installer including project manager, superintendent, and foeman; and installers whose work interfaces with or affects reroofing including installers of roof accessories and roof mounted equipment.

2. Review the existing warranty provisions (if any is in force). Apply methods and procedures related to reroofing preparation, including membrane roofing system manufacturer's written instructions.

3. Review temporary protection requirements for existing roofing system that is to remain, during and after installation.

4. Review roof drainage during each stage of reroofing and review roof drain plugging and plug removal procedures.

5. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

6. Review existing deck removal procedures and Owner notifications.

7. Review procedures to determine condition and acceptance of existing deck and base flashing substrate for reuse.

8. Review structural loading limitations of deck during reroofing.

9. Review base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect reroofing.

10. Review shutdown of fire-suppression, protection, and alarm and detection systems.

11. Review procedures for asbestos removal or unexpected discovery of asbestos-containing materials.

12. Review governing regulations and requirements for insurance and certifications if applicable.

13. Review existing conditions that may require notification of Architect before proceeding.

B. Mechanical and electrical installers shall coordinate their work with roofing installer. Flashing, counterflashing and thru-roof penetration flashing shall be performed in accordance with roofing Manufacturer's recommendations.

C. Fire Hazard Classification: The resulting reroofing shall conform to UL Class A.

1.04 REGULATORY REQUIREMENTS

A. Conform to Chapter 15, Roof and Roof Structures, of the California Code of Regulations, Title 24 - Building Standards, Part 2, California Building Code (CBC).

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not begin the tear off of roofing membrane during inclement weather or when there is a forecast of rain.

B. Do not tear off roofing membrane on damp or moist deck surfaces.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 PARTIAL ROOF TEAR-OFF

A. Examine the surfaces and situations to confirm the condition of the in-place deck. Verify the serviceability and suitability of materials that will receive the new mission tile.

B.

C. Notify Owner each day of extent of roof tear-off proposed.

B. Remove aggregate ballast from roofing membrane.

C. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

D. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen and felts and wet felts.

3.02 DECK PREPARATION

A. Inspect deck after partial tear-off of membrane roofing system.

B. If broken or loose fasteners that secure deck panels to one another or to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.

C. If deck surface is not suitable for receiving new roofing, or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.03 EXISTING BASE FLASHINGS

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean subtrates of contaminants such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain. Replace metal counterflashings damaged during removal with counterflashings of same metal.

3.04 DISPOSAL

A. Collect and place demolished materials in containers. Promptly dispose of materials. Don not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site will not be permitted.

B. Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION

SECTION 07 54 34
25-YEAR WARRANTY TPO ROOFING

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install 25-year warranty TPO roofing as indicated on the drawings and specified, including the following:

1. Thermoplastic Polyolefin (TPO) Single-Ply Roofing Membrane
2. Thermoplastic Polyolefin Flashings
3. Thermoplastic Polyolefin Accessories
4. Roof Insulation

1.02 COMPLY WITH THE FOLLOWING REFERENCES

A. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards

1. ASTM E-96 - Standard Test Methods for Water Vapor Transmission of Materials

2. ASTM D1204 - Standard Test Method for Linear Dimensional Changes of Nonrigid Thermoplastic Sheeting or Film at Elevated Temperature

3. ASTM D-471 - Standard Test Method for Rubber Property—Effect of Liquids

4. ASTM D-1149 - Standard Test Methods for Rubber Deterioration—Cracking in an Ozone Controlled Environment

5. ASTM C-1549 - Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer

6. ASTM C-1371 - Standard Test Method for Determination of Emittance of Materials Near Room Temperature Using Portable Emissometers

7. ASTM E 903 – Standard Test Method for Solar Absorptance, Reflectance, and Transmission of Materials Using Integrating Spheres.

B. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) - Architectural Sheet Metal Manual

C. National Roofing Contractors Association (NRCA)

D. Factory Mutual (FM Global) - Approval Guide

E. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306)

F. California Title 24 Energy Efficient Standards

G. ENERGY STAR.

1.03 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.04 ACTION SUBMITTALS

A. Product Data: Provide product data sheets for each type of product indicated in this section.

B. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.

C. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.

D. Certificates: Installer shall provide written documentation from the manufacturer of their authorization to install the roof system, and eligibility to obtain the warranty specified in this section.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications: GAF® shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installer's Qualifications: Installer shall be classified as an Authorized as defined and certified by the manufacturer.

C. Source Limitations: All components listed in this section shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

D. Final Inspection; Manufacturer's representative shall provide a comprehensive final inspection after completion of the roof system. All application errors must be addressed and final punch list completed.

1.06 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, architect, owner, manufacturer representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions and agreements reached (or disagreements), and furnish copies of recorded discussions to each attending party. The main purpose of this meeting is to review foreseeable methods and procedures related to roofing work.

1.07 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water, and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. The manufacturer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.08 REGULATORY REQUIREMENTS

A. All work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.

B. Exterior Fire Test Exposure: Provide a roofing system achieving a UL Class A rating for roof slopes indicated.

C. Windstorm Classification: Provide a roofing system which will achieve a Factory MutuaL 1-90 wind uplift rating, as listed in the current FM Approval Guide.

1.09 DELIVERY, STORAGE AND HANDLING

A. Deliver all roofing materials to the site in original containers, with factory seals intact.

B. Store all pail goods in their original undamaged containers in a clean, dry location within their specified temperature range. Reference data sheets for product storage requirements.

C. Do not expose materials to moisture in any form before, during or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

D. Use “breathable” type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.

1.10 PROJECT CONDITIONS

A. Weather

1. Proceed with roofing only when existing and forecasted weather conditions permit.

2. Ambient temperatures must be above 45°F (7.2°C) when applying hot asphalt or water based adhesives.

1.11 WARRANTY/GUARANTEE

A. Provide manufacturers single source coverage and no monetary limitation, where the manufacturer agrees to repair or replace components in the roofing system, which cause a leak due to a failure in materials or workmanship for a period of 25 years from substantial completion..

1. Provide manufacturers TPO Reflectivity Limited Warranty. The manufacturer warrants to the original building owner, that the TPO white roof membrane will meet or exceed the initial and “aged” ENERGY STAR® reflectivity requirements for low slope roofing membranes (65% initial, 50% aged) when installed and maintained in accordance with GAF®’s requirements. The aged reflectivity shall meet or exceed these requirements when measured after cleaning the membrane in accordance with manufacturer’s recommendations.

PART 2 - PRODUCTS

2.01 25-YEAR WARRANTY TPO ROOFING

A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D 6878, internally fabric or scrim reinforced, uniform, flexible fabric backed TPO sheet.

1. Manufacturers: Subject to review by the Architect of action submittals for compliance with requirements, the product named on the drawings (GAF) shall be provided, or available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Carlisle SynTec Incorporated.
    b. Firestone Building Products Company.
    c. GAF Materials Corporation.
    d. Johns Manville.
    e. Mule-Hide Products Co., Inc.

2. Minimum Thickness: As required to provide the specified 25-year warranty but not less than 60 mils (1.5 mm), nominal.

3. Exposed Face Color: White.

B. Rigid polyisocyanurate board, with a strong white or black fibrous glass facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972, and as required to provide the specified warranty.

2.02 MEMBRANE MATERIALS

A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, California Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. Each half sheet roll contains approximately 500 sq.ft. of roofing material, 5’ X 100’, weighing 162 lbs. thermoplastic single-ply roofing membrane.

B. A fleece-backed, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 350 lbs. Each half sheet roll contains approximately 500 sq.ft. of roofing material, 5’ X 100’, weighing 175 lbs.

2.03 FLASHING MATERIALS

A. A smooth type, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. UL Listed, FM Approved, Dade County Product Approval, Florida Building Code Approved. White membrane is Energy Star Listed, CRRC Listed and Title 24 Compliant. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 322 lbs. Each half sheet roll contains approximately 500 sq.ft. of roofing material, 5’ X 100’, weighing 162 lbs.

B. A fleece-backed, polyester scrim reinforced thermoplastic polyolefin membrane with a nominal 0.060 inch (60 mil) thickness, for use as a single ply roofing membrane. Meets or exceeds the minimum requirements of ASTM D-6878. Each full roll contains approximately 1000 sq.ft. of roofing material, 10’ X 100’, weighing 350 lbs. Each half sheet roll contains approximately 500 sq.ft. of roofing material, 5’ X 100’, weighing 175 lbs.

2.04 ADHESIVES, SEALANTS AND PRIMERS

A. Low VOC solvent-based Bonding Adhesive: Solvent based rubberized adhesive for use with EverGuard® TPO membranes.

B. Two-part VOC free low rise polyurethane foam adhesive for use with fleece-back membranes.

C. Solvent based liquid, required to protect field cut edges of EverGuard® TPO membranes. Applied directly from a squeeze bottle.

D. Low VOC solvent based cleaner used to clean exposed or contaminated seam prior to heat-welding or priming.

E. 100% solids urethane based two-part sealant suitable for filling sealant pans at irregularly-shaped penetrations.

2.05 BITUMEN

A. Asphalt bitumen: ASTM D 312 Type III & IV

2.06 PLATES AND FASTENERS

A. Standard duty alloy steel plates and fasteners as required to provide the specified warranty.

2.07 ACCESSORIES AS REQUIRED TO PROVIDE THE SPECIFIED WARRANTY

A. Unreinforced thermoplastic polyolefin based membrane for use as an alternative flashing/reinforcing material for penetrations and corners. Required whenever preformed vent boots cannot be used,

B. Pre-manufactured expansion joint covers used to bridge expansion joint openings in a roof structure. Fabricated to accommodate all roof to wall and roof to roof applications, made of .060" reinforced TPO membrane.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set, and that all flashings are tapered.

3.02 SUBSTRATE PREPARATION

A. Steel Deck

1. Metal decks must be a minimum uncoated thickness of 22 gauge (0.8 mm) and shall have a G-90 galvanized finish on all panels. FM requirements may supersede those set forth in this section. Consult the current FM Guide for more information.

2. Decks must comply with the gauge and span requirements in the current Factory Mutual FM Approval Guide and be installed in accordance with Loss Prevention Data Sheet 1-28 or specific FM approval.

3. When re-roofing over steel decks, surface corrosion shall be removed, and repairs to severely corroded areas made. Loose or inadequately secured decking shall be fastened, and irreparable or otherwise defective decking shall be replaced.

3.03 INSTALLATION - GENERAL

A. Install TPO roofing system as required to provide the specified warranty, and according to all current application requirements.

B. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.04 AIR AND VAPOR BARRIER

A. GENERAL

1. Air/vapor barrier sheet shall typically be installed when required by design professional to address internal air pressure or humidity conditions.

2. Insulation must be installed over the air/vapor barrier sheet and mechanically attached to the deck.

B. APPLICATION

1. Install air/vapor barrier sheet loose-applied to the deck or fire board so that wrinkles and buckles are not formed.

2. Overlap air/vapor barrier sheets a minimum of 6" for side and end laps. Tape laps together with duct tape or double sided tape.

3. Seal perimeter and penetration areas with foam sealant.

3.05 INSULATION

A. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder must be repaired.

1. Do not install wet, damaged or warped insulation boards.

2. Install insulation boards with staggered board joints in one direction (unless taping joint).

3. Install insulation boards snug. Gaps between board joints must not exceed ¼” (6 mm). All gaps in excess of ¼” (6 mm) must be filled with like insulation material.

4. Wood nailers must be 3-1/2” (89 mm) minimum width or 1” (25.4 mm) wider than metal flange. They shall be of equal thickness as the insulation, and be treated for rot resistance. All nailers must be securely fastened to the deck.

5. Do not kick insulation boards into place.

6. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

7. Insulation should not be installed over new lightweight insulating concrete.

8. Roof tape, if required over insulation joints, must be laid evenly, smoothly and embedded in a uniform coating of hot steep asphalt with 4" (102 mm) end laps. Care must be taken to assure smooth application of tape, and full embedment of the tape in the asphalt.

9. Do not install any more insulation than will be completely waterproofed each day.

B. INSULATION – BASE LAYER APPLICATION

1. The insulation must be securely attached to the roof deck. A minimum FMRC 1-60 attachment is recommended. Refer to FMRC Approval Guide for FM fastening patterns. Factory Mutual requires fastener density increased in corner areas for FM 1-60 as well as perimeter and corner area fastener density increases for FM 1-90 or greater. Refer to FM Loss Prevention Data Sheets 1-7, 1-28, and 1-49.

2. Use only fasteners with a minimum 3 inch (76 mm) stress plate when mechanically attaching insulation. Do not attach insulation with nails.

3. Apply LRF O Adhesive directly to the substrate using a ribbon pattern. Space beads as required by job specification, typically 6" or 12" (152 mm or 305 mm) o.c.

4. LRF O Adhesive should be approximately 70°F (22°C) when being dispensed. As adhesive is applied, allow the adhesive to begin rising, then place board.

C. INSULATION – SUBSEQUENT LAYERS APPLICATION

1. The insulation must be securely attached to the roof deck. A minimum FMRC 1-60 attachment is recommended. Refer to FMRC Approval Guide for FM fastening patterns. Factory Mutual requires fastener density increases in corner areas for FM 1-60 as well as perimeter, and corner area fastener density increases for FM 1-90 or greater. Refer to FM Loss Prevention Data Sheets 1-7, 1-28, and 1-49.

2. Multiple layers of insulation of the same, non-tapered insulation material may be simultaneously mechanically fastened with approved fasteners and plates through the top layer of insulation to the structural deck. Individual layers of insulation must not exceed 3" (76 mm) in thickness nor should total thickness of all layers not exceed 5" (127 mm) without written approval of GAF® Contractor Services. FM Type attachments may differ

3. Use only fasteners with a minimum 3 inch (76 mm) stress plate when mechanically attaching insulation. Do not attach insulation with nails.

3.06 PROTECTION LAYER

A. GENERAL

1. The protection layer shall be installed between the roofing membrane and the substrate.

2. Fire resistant fiberglass sheet protection layer shall typically be installed when required by design professionals or code authority to address code or approval requirements or as a separator layer.

3. Install fiberglass sheet or polymat protection layer loose-applied over substrate surface so that wrinkles and buckles are not formed.

4. Overlap sheets a minimum of 6" (152 mm) for side and end laps.

5. Install VersaShield Solo loose-applied over substrate surface so that wrinkles and buckles are not formed perpendicular to the direction of the TPO membrane.

6. Overlap membrane a minimum 2" (52 mm) at the side laps and minimum 4" (102 mm) at the end laps.

7. Use corrosive resistant nails with 1” (25.4 mm) diameter metal head or plastic caps to fasten in place. Only use enough fasteners to hold in place until primary roof covering is in place.

8. Do not install more VersaShield Solo than can be covered in one day.

3.07 MEMBRANE APPLICATION

A. Mechanically Attached

1. Place membrane so that wrinkles and buckles are not formed. Any wrinkles or buckles must be removed from the sheet prior to permanent attachment. Roof membrane shall be mechanically fastened immediately after it is rolled out, followed by welding to adjacent sheets.

2. Overlap roof membrane a minimum of 6” (152 mm) for side laps and 3” (76 mm) for end laps.

3. Install membrane so that the side laps run across the roof slope lapped towards drainage points.

4. All exposed sheet corners shall be rounded a minimum of 1” (25.4 mm).

5. Use full width rolls in the field of roof and half width rolls in the perimeter and corner region of the roof and mechanically fastened in the side lap area to the roof deck.

6. Membrane laps shall be heat-welded together. All welds shall be continuous, without voids or partial welds. Welds shall be free of burns and scorch marks.

7. Weld shall be a minimum of 1-1/2” in width for automatic machine welding and a minimum 2” (52 mm) in width for hand welding.

8. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.

9. The membrane shall be mechanically fastened in the side lap area to the roof deck with appropriate Drill-Tec™ fasteners and plates as required by roof system specification and/or Factory Mutual classification requirements.

10. The metal plates must be placed within ¼” to ½” of the membrane edge. Plates shall not be placed less than ¼” from the membrane edge.

11. In the corner regions, additional fasteners shall be installed through the perimeter membrane to form a grid pattern, with an 8” (305 mm) wide EverGuard® TPO reinforced membrane flashing-strip welded over the additional fasteners. Corners include both outside and inside corners that measure 75 - 105 angle degrees.

12. Membrane attachment to the roof deck is required at locations of deck angle changes in excess of five (5) angle degrees (1” in 12”).

13. Supplemental membrane attachment is required at the base of all walls and curbs, and where the angle of the substrate changes by more than ten (10) degrees (1” in 12”). Roofing membrane shall be secured to the structural deck with screws and plates of the same type and spacing used for in-lap attachment. The screws and plates must be installed no less than ½” (13 mm) from the membrane edge. Alternatively, the roofing membrane may be turned up the vertical plane a minimum of 3” (76 mm) and secured with screws and termination bar Fastener spacing is the same as is used for in-lap attachment. The termination bar must be installed within 1-1/2” to 2” of the plane of the roof membrane, with a minimum of 1” (25.4 mm) of membrane extending above the termination bar.

14. Supplemental membrane attachment to the structural deck is required at all penetrations. Roofing membrane shall be secured to the deck with appropriate Drill-Tec™ screws and plates.

15. Fasteners must be installed to achieve the proper embedment depth. Install fasteners without lean or tilt.

16. Install fasteners so that the plate or termination bar is drawn down tightly to the membrane surface. Properly installed fasteners will not allow the plate or termination bar to move (underdriving), but will not cause wrinkling of the membrane (overdriving).

3.08 FLASHINGS

A. General

1. All penetrations must be at least 24” (610 mm) from curbs, walls, and edges to provide adequate space for proper flashing.

2. Flash all perimeter, curb, and penetration conditions with coated metal, membrane flashing, and flashing accessories as appropriate to the site condition.

3. All coated metal and membrane flashing corners shall be reinforced with preformed corners or non-reinforced membrane.

4. Heat-weld all flashing membranes, accessories, and coated metal. A minimum 2” (52 mm) wide hand weld or minimum 1-1/2" (39 mm) automatic machine weld is required

5. All cut edges of reinforced membrane must be sealed with EverGuard® TPO Cut Edge Sealant.

6. Consult the EverGuard® Application and Specifications Manual or GAF® Contractor Services for more information on specific construction details, or those not addressed in this section.

B. Coated Metal Flashings

1. Coated metal flashings shall be formed in accordance with current EverGuard® construction details and SMACNA guidelines.

2. Coated metal sections used for roof edging, base flashing and coping shall be butted together with a ¼" (7 mm) gap to allow for expansion and contraction. Heat-weld a 6" (152 mm) wide reinforced membrane flashing strip to both sides of the joint, with approximately 1" (25.4 mm) on either side of the joint left un-welded to allow for expansion and contraction. 2" (52 mm)wide aluminum tape can be installed over the joint as a bond-breaker, to prevent welding in this area.

3. Coated metal used for sealant pans, scupper inserts, corners of roof edging, base flashing and coping shall be overlapped or provided with separate metal pieces to create a continuous flange condition, and pop-riveted securely. Heat-weld a 6" (152 mm) wide reinforced membrane flashing strip over all seams that will not be sealed during subsequent flashing installation.

4. Provide a ½" (13 mm) hem for all exposed metal edges to provide corrosion protection and edge reinforcement for improved durability.

5. Provide a ½" (13 mm) hem for all metal flange edges whenever possible to prevent wearing of the roofing and flashing membranes at the flange edge.

6. Coated metal flashings shall be nailed to treated wood nailers or otherwise mechanically attached to the roof deck, wall or curb substrates, in accordance with construction detail requirements.

C. Reinforced Membrane Flashings

1. The thickness of the flashing membrane shall be the same as the thickness of the roofing membrane.

2. Membrane flashing may either be installed loose or fully adhered to the substrate surface in accordance with "Construction Detail Requirements".

3. Where flashings are to be fully adhered, apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

4. Apply the adhesive only when outside temperature is above 40°F. Recommended minimum application temperature is 50°F to allow for easier adhesive application.

5. The membrane flashing shall be carefully positioned prior to application to avoid wrinkles and buckles.

D. Un-Reinforced Membrane Flashings

1. Un-reinforced membrane is used to field-fabricate penetration or reinforcement flashings in locations where preformed corners and pipe boots cannot be properly installed.

2. Penetration flashings constructed of un-reinforced membrane are typically installed in two sections, a horizontal piece that extends onto the roofing membrane and a vertical

piece that extends up the penetration. The two pieces are overlapped and hot-air welded together.

3. The un-reinforced membrane flashing shall be adhered to the penetration surface. Apply bonding adhesive at a rate resulting in 60 square feet/gallon of finished roofing material for solvent-based bonding adhesives, and at a rate of 125 square feet/gallon of finished roofing material for water-borne bonding adhesive. Apply bonding adhesive to both the underside of the membrane and the substrate surface at 120 square feet per gallon (Solvent Based) and 250 square feet per gallon (Water Based). A greater quantity of bonding adhesive may be required based upon the substrate surface condition. The bonding adhesive must be allowed to dry until tacky to the touch before flashing membrane application.

E. Roof Edges

1. Roof edge flashings are applicable for gravel stop and drip edge conditions as well as for exterior edges of parapet walls.

2. Flash roof edges with coated metal flanged edging with a minimum 3" (76 mm) wide flange nailed 4" (102 mm) on center to wood nailers, and heat weld roof membrane to metal flanges.

3. When the fascia width exceeds 4” (102 mm), coated metal roof edging must be attached with a continuous cleat to secure the lower fascia edge. The cleat must be secured to the building no less than 12” (305 mm) o.c.

4. Flash roof edge scuppers with a coated metal insert that is mechanically attached to the roof edge and integrated as a part of the metal edging.

3.09 ROOF PROTECTION

A. Protect all partially and fully completed roofing work from other trades until completion.

B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.10 CLEAN-UP

A. All work areas are to be kept clean, clear and free of debris at all times.

B. Do not allow trash, waste, or debris to collect on the roof. These items shall be removed from the roof on a daily basis.

C. All tools and unused materials must be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.

D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.

E. Properly clean the finished roof surface after completion, and make sure the drains and gutters are not clogged.

F. Clean and restore all damaged surfaces to their original condition.

3.11 MAINTENANCE

A. Inspections to the roof shall be performed annually by the Installing Contractor.

B. Submit copies of the roof inspection form, accompanying photographs (a minimum of 6 photos showing the condition of the roof and critical details), and a record of all roofing system maintenance to the manufacturer's Services Department within sixty (60) days of the anniversary date of the completion of the roofing system. Annual roof inspections must be started within the first two (2) years of the guarantee term.

END OF SECTION

SECTION 07 62 00
ZINC TIN ALLOY COATED STAINLESS STEEL SHEET METAL FLASHING AND TRIM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install zin tin alloy coated stainless steel sheet metal flashing and trim as indicated on the drawings and specified.

1.03 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing shall not rattle, leak, or loosen, and shall remain watertight.

B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.

1. Temperature Change (Range): 120 deg F ambient; 180 deg F material surfaces.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory indicated with factory-applied color finishes involving color selection.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

D. Sheet Metal flashing: 4 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.

E. Qualification Data: For qualified fabricator.

F. Maintenance Data: For sheet metal flashing, trim, and accessories to include in maintenance manuals.

G. Warranty: Sample of special warranty.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

B. Sheet Metal Flashing: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.01 PRE-WEATHERED GREY SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Zinc-Tin Alloy-Coated Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead-soft, fully annealed stainless-steel sheet of minimum uncoated thickness indicated; formulated to weather over time to a grey patina. The sheet shall be coated on both sides with a zinc-tin alloy (50 percent zinc, 50 percent tin), and able to pass 30,000 hours of ASTM salt spray testing.

1. Products: Subject to compliance with requirements, provide the following:

   a. Follansbee Steel; TCS II.
   b. Or equal, however there is no known equal.

2.02 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal unless otherwise indicated.

2.03 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.

3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

E. Expansion Provisions: Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

F. Do not use graphite pencils to mark metal surfaces.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 `INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.

2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

3. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

4. Torch cutting of sheet metal flashing and trim is not permitted.

5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.

1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.

D. Seal joints as shown and as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F, set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.03 FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Reglet: Saw cut ¼ inch wide by 1 ½ inch deep reglet in mortar joint in CMU foundation wall a minimum of 4 inches above grade. Saw cut ¼ inch wide by ½" deep reglet in concrete porch foundation wall 4 inches above grade. At window sill saw cut ¼ inch wide by 1 ½ inch deep reglet below brick masonry sill.

C. Counterflashing: Coordinate installation of counterflashing with installation of waterproofing membrane. Insert counterflashing in reglets with ¼ inch upturned back lip into reglet and secure with lead wedges 16 inches on center. Fit counterflashing tightly to membrane to create spring action. Extend counterflashing 4 inches over membrane. Lap counterflashing joints a minimum of 4 inches and bed with sealant. At CMU and brick reglets point with mortar, at concrete reglet point with sealant.

3.04 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

B. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.05 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 84 00
FIRE STOPS AND SMOKE SEALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install fire stops and smoke seals and indicated on the drawings and specified.

1.03 SYSTEM DESCREPTION

A. Provide fire stops and smoke seals to prevent the passage of fire, smoke, toxic gasses or water from one floor or area to another. Seal openings in floors, fire rated walls and permanent partitions penetrated by pipes, ducts, conduits and other items as shown, specified, and as required for the type of construction.

B. Mineral fiber insulation installed as fire safing at non-rated penetrations not containing pipes, ducts, conduits, and other items in floor slabs, wall partitions, construction-joint conditions between slabs and adjacent construction and where indicated or required.

C. Provide damming material, clips, and closures as required for support and containment of dams, and other insulation materials required for tested and rated fire stop systems.

1.04 QUALITY ASSURANCE

A. Performance Criteria:

1. Provide materials and Work to conform to source quality control criteria specified herein and CBC requirements in fire resistant wall and floor assemblies to prevent the passage of fire, smoke, and toxic gases.

2. Installed fire stops shall be of sufficient thickness, width, and density to provide a fire resistance rating at least equal to the floor, wall, or partition construction into which it is installed.

B. Comply with CBC requirements for fire rated construction.

C. Qualifications of Manufacturer: Products furnished for fire stopping and smoke seals shall be manufactured by a firm which has been continuously and regularly employed in the manufacture of these materials for a period of at least 5 years; and which can provide evidence of these materials being satisfactorily installed on at least 5 projects of similar size and type within such period.

D. Qualifications of Installer: The Work of this section shall be installed by a firm which has been in the business of installing similar materials for at least 5 consecutive years; and can provide evidence of satisfactory completion of 5 projects of similar size and scope. Installer shall have applicators trained and certified by manufacturer for performing this Work.

1.05 ACTION SUBMITTALS

A. Product Data:

1. Submit manufacturer's Product Data for each type of fire stop and smoke seal material proposed for installation. Indicate product characteristics, typical installations, performance, and limitation criteria and test data.

2. Submit manufacturer's printed installation instructions for each type of product, system, and construction required for the Work. Indicate fire resistance rating of each installation.

3. Submit fire test reports from independent testing agency indicating the following:

a. Fire test report of fire stop material installed to substrate and penetration materials similar to the Work of this section. Test to indicate both Flame (F) and Temperature (T) Ratings.

b. Test reports of products to be installed shall indicate conformance to ASTM E 814, UL rating with UL classified system description, and UL classified system detail.

B. Field Samples: No less than 10 days before commencing the Work of this section, provide field installed Samples of fire stop materials and systems.

1. Apply one Sample of fire stop material for each different penetration and related fire rating required for the Work.

2. Sample areas shall comply with thickness, fire resistance ratings, and finished appearance.

C. Manufacturer's Qualifications: Submit evidence of conformance with qualification requirements specified above.

D. Installer’s Qualifications: Submit evidence of conformance with qualification requirements specified above.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver products to the Project site in manufacturer's original, unopened containers bearing correct UL labeling.

B. Fire stop material shall be stored above grade in an area protected from detrimental weather and moisture conditions.

C. Fire stop and seal materials shall be installed before expiration of shelf life.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Unless otherwise noted, products of this section shall be as manufactured by Bio Fireshield Inc.(Bio), Concord, Massachusetts; 3M Fire Protection Products; General Electric (GE); or Nelson Electric, Tulsa, Oklahoma 74101.

B. Provide materials and systems of specified manufacturers to suit penetration and substrate as determined by various conditions of installation.

2.2 MATERIALS

A. Fire Stop Sealant: Single component, noncombustible fire stop sealant Biotherm "S" gun grade, or Biotherm "T" self leveling silicone by Bio, Pensil 100 by GE, CP25WB by 3M, or equal.

B. Fire Stop Putty: One-part intumescent type FSP by Nelson, MPS/MPP by 3M, or equal.

C. Cementitious Fire Stop Mortar: Novasit K-10 (55 lb. density) by Bio, 3M mortar by 3M, or equal. Cementitious mortar shall be non-shrinking, asbestos free type.

D. Fire Stop Pillows: Manufactured by Bio Fireshield, Nelson, or equal.

E. Fire Safing, Mineral Fiber or Ceramic Wool Non-Combustible Insulation:

1. Mineral Fiber: Density 4 pounds per cubic foot, USG Thermafiber, Fibrex "FBX Safing Insulation," or equal.

2. Ceramic Wool: Density 6 pounds per cubic foot, Johns Manville "Ceramic Fiber Insulation", Carborundum "Fiberfrax" ceramic fiber, or equal. Provide material in tested thickness for required hour rating.

   a. Flame Spread: 0.
   b. Smoke developed: 0.

3. For mineral fiber, provide 20 gage minimum size metal retainer clips and plates for fire safing support in vertical applications and in compliance with tested rating.

F. Supplemental Material: Provide supplementary materials required for complete, fire rated, installation.

2.03 SOURCE QUALITY CONTROL

A. Fire stop and smoke seal material shall be tested by an independent testing agency for conformance to Flame (F) and Temperature (T) requirements of ASTM E-814/UL 1479.

B. Conform to UL Fire Hazard Classification Requirements. Material shall be classified as a fill, void, or cavity material and system for UL Through Penetration Firestop System. Comply with UBC 43-6.

C. Material shall be tested and classified noncombustible per ASTM E 84.

PART 3 - EXECUTION

3.01 APPLICATION REQUIREMENTS

A. Provide single component, noncombustible, fire stop sealant or putty:

1. Within penetrations subject to movement including conduit, cable bundles, buss duct, and noncombustible pipe.

2. As a sealant or caulking for smoke barrier construction, fire, and smoke dampers, mechanical/electrical framed elements in masonry and gypsum board partition systems, and other conditions.

B. Provide mineral fiber insulation for fire safing at joints and openings through floor slabs, walls, and partitions not indicated to be grouted, gaskets, sealed or otherwise made sound or air tight in this or other sections. Fire safing shall be packed and wedged solidly from both sides of walls and partitions, and from both top and bottom sides of slabs with noncombustible mineral fiber insulation.

3.02 PREPARATION

A. Examine the areas and conditions where fire stops and smoke seals are to be installed for conditions detrimental to the proper completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected for rated fire protection.

B. Surface to receive fire stops or smoke seals shall be free of dirt, dust, grease, form release agents, or other matter that would impair the bond of the fire stop material to the substrate or penetrating items. Substrate shall be frost free and when required, dry.

C. Voids and cracks in substrate shall be filled and unnecessary projections removed before installation of fire stops.

D. Penetrating items shall be permanently installed before fire stop and smoke seal installation.

E. Assure that all pipes, conduit, cable, and other items, which penetrate fire rated construction, have been permanently installed before installation of fire stops. Schedule and sequence the Work to assure that partitions and other construction, which would conceal penetrations, are not installed before the installation of fire stops and smoke seals.

3.03 INSTALLATION

A. General: Provide installation in accordance with manufacturer's installation procedures, as required. Install fire stops in accordance with fire test reports, UL fire resistance requirements, and reviewed Sample installations.

B. Dam Construction:

1. Install dams when required to properly contain fire stopping materials within openings and as required to achieve fire resistance rating as tested and rated.

2. Provide in conformance with installation requirements for type of floor, wall, and partition construction, and as recommended by fire stop manufacturer.

3. Combustible damming material shall be removed after appropriate curing. Noncombustible damming material may be left as a permanent component of the fire stop system.

4. Placement of dams shall not interfere with function, or adversely affect the appearance, of adjacent construction.

C. Installation of Single Component Fire Stop Sealant:

1. Provide noncombustible insulation as required to achieve fire resistance rating.

2. Install with manual or powered caulking gun. For up to 3 hour rating, install in 1/2 inches total thickness to both sides of wall penetrations, and to one side in floor penetrations.

3. Surface of gun grade fire stop sealant shall be tooled with clean potable water.

4. Remove excess materials from adjacent surfaces within 10 minutes, with either water or other material compatible with sealant and recommended by sealant manufacturer, leaving the Work in a neat, clean condition.

D. Installation of Cementitious Fire Stop Mortar:

1. Mixing: Add dry powder to water and mix with mechanical mixer or hand mixing tools. Ratio and duration of mix shall be as instructed by fire stop mortar manufacturer. Average wet density of mortar shall be 70 pounds per cubic foot (+/- 5).

2. Wet surfaces before installation of fire stop mortar. Mortar may be hand installed or pumped into the opening.

3. When installing around layered and/or grouped cables, vibrate or move the cables slightly to prevent voids from forming between the cables.

4. Exposed surfaces shall be finished with conventional plastering tools before curing.

5. Allow at least 48 hours for initial cure before form removal. For full cure allow 27 days.

END OF SECTION

SECTION 07 92 00
SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install sealants as indicated on the drawings and specified.

1.03 REFERENCES

A. ASTM C834 - Latex Sealing Compounds.

B. ASTM C920 - Elastomeric Joint Sealants.

C. ASTM D695 - Compressive Properties of Rigid Plastics.

D. ASTM D732 - Aging Effects of Artificial Weathering on Latex Sealing Compounds.

1.04 SUBMITTALS

A. Samples: Submit color mockups showing the standard colors available for each sealant material intended for installation in an exposed location.

B. Certificates: Submit certificate that materials specified and proposed for use are suitable for intended application.

C. Manufacturer's installation instructions.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in the unopened, original containers or unopened packages with manufacturer's name, labels, product identification, and lot numbers where appropriate. Store materials in the original, unopened containers or packages, and under conditions recommended by manufacturer.

1.06 GUARANTEE

A. Guarantee sealant Work against leakage for 2 years. Include coverage of installed sealants and accessories which fail to achieve air tight and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Type A Sealant:

1. Manufacturers

a. Mameco International "Vulkem 245".

b. Sika Corp. "Sikaflex 2C-SL".
c. Sonneborn Building Products "Sonolastic Paving Joint Sealant".
d. Euclid Chemical Company, "Eucolastic II - Pourable.

2. Multiple component, self-leveling polyurethane based sealant conforming to ASTM C920, Type M, Grade P, Class 25.

B. Type B Sealant

1. Manufacturers

a. Mameco International "Vulkem 922".
b. Sika Corp. "Sikaflex 2C-NS".
c. Sonneborn Building Products "Sonolastic NP II".
d. Tremco "Dymeric".
e. Euclid Chemical Company "Eucolastic II - Gun Grade.

2. Multiple component, non-sag, polyurethane-based sealant conforming to ASTM C920, Type M, Grade NS, Class 25.

C. Type C Sealant

1. Manufacturers

a. Adco Seal "No. B-100".
b. Pecora Corp. "BC-158".
c. PTI Sealants "No. 707".
d. Tremco "Butyl Sealant".

2. Butyl rubber based sealant conforming to ASTM C920, Type S, Grade NS, Class 7.5.

D. Type D Sealant

1. Manufacturers

a. Pecora Corp. "AC-20".
b. Sonneborn Building Products "Sonolac".
c. Tremco "Acrylic Latex Caulk".

2. Latex acrylic based sealant conforming to ASTM C834.

E. Type E (Acoustical) Sealant

1. Tape

a. Manufacturers

1) Norton Co. "Norseal V30 Series".
2) Arlon "Series 6A".

b. Polyvinylchloride foam tape with pressure sensitive adhesive on one side, 3/4 inch wide by the thickness required to accommodate unevenness of substrate and completely fill openings between partition framing and building floors and concrete walls.

2. Compound

a. Manufacturers

1) Ohio Sealants "Sound Caulk (solvent type)".
2) Pecora Corp. "BA-98".
3) Tremco "Acoustical Sealant".

b. Permanently resilient type manufactured specifically for acoustical applications.

F. Type F Sealant

1. Manufacturers

a. Dow Corning Corp. "No. 795".
b. General Electric Co. "Silpruf".
c. Sonneborn Building Products "Omniseal".
d. Tremco "Spectrem 1".
e. Substitution under provisions of Division 1.

2. Low-modulus silicone sealant conforming to ASTM C920, Type S, Grade NS, Class 50.

2.02 ACCESSORY MATERIALS

A. Backer Rod

1. Material: Closed-cell foam, nonstaining, resilient material such as neoprene, butyl, or polyurethane, compatible with sealant to be used.

2. Sized and shaped to control depth of sealant and to provide 20 percent to 50 percent compression upon insertion.

B. Joint Cleaner

1. For metal and glass: Xylol, xylene, toluol, or toluene.

2. For removing lacquer coatings: Lacquer thinner.

C. Primer: As recommended by sealant manufacturer for use intended.

D. Masking Tape: Pressure-sensitive adhesive paper type.

E. Bond Breaker: Pressure-sensitive adhesive polyethylene tape.

2.03 SEALANT COLORS

A. Sealant color for use in exposed locations shall be as selected by the Architect from manufacturer's standard colors.

B. Wherever sealants are not exposed to view, provide manufacturer's standard color which has the best overall performance characteristics for the application indicated.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect joints to be sealed to determine if conditions are satisfactory for the proper installation of joint sealants.

B. If unsatisfactory conditions exist, do not commence Work until such conditions have been corrected.

3.02 GENERAL

A. Provide sealants wherever required to prevent light leakage as well as moisture leakage; and at exposed joints around plumbing fixtures, casework, door and window frames, and at other locations as required to facilitate cleaning and sanitation.

B. Consult the Architect if in doubt as to whether sealant is required at a given location.

3.03 PREPARATION

A. Cleaning: Clean joint surfaces, using joint cleaner as necessary, of dust, dirt, oil, grease, rust, lacquers, laitance, release agents, moisture, and other matter which could adversely affect adhesion of sealants.

B. Masking: Mask areas adjacent to joints.

C. Priming: Apply primer, if required, following manufacturer's printed instructions.

D. Joints shall enclose sealant on three sides. Where adequate joints for sealants have not been provided, suitable joints shall be cleaned out to the depth required, or as indicated, and ground to a minimum width of 1/4 inch without damage to the adjoining Work, unless otherwise specified or indicated. No grinding shall be performed on metal surfaces.

3.04 APPLICATION

A. Install sealant and backing materials in accordance with manufacturer's instructions.

B. Install backing materials in joints using blunt instrument to avoid puncturing.

1. Do not twist backing while installing.

2. Install backing so that joint depth is 50 percent of joint width, minimum 1/4 inch deep.

C. Apply sealants in joints using pressure gun with nozzle cut to fit joint width.

D. Place sealants in uniform, continuous beads without gaps or air pockets.

E. Tool joints to required configuration within 10 minutes of sealant application.

F. If masking materials are used, remove immediately after tooling.

G. Seal joints adjacent to painted Work before the final coat of paint is applied.

3.05 CLEANING

A. Remove spilled and excess materials adjacent to joints without damaging adjacent surfaces.

B. Leave finished Work in neat, clean condition with no evidence of spill-overs or damage to adjacent surfaces.

3.06 SCHEDULE

A. Type A: Joints in concrete paving, and concrete floors surfaces subject to foot traffic.

B. Type B

1. Exterior joints in plaster walls.

2. Around metal door, window and louver frames penetrating plaster surfaces.

3. Do not use single component sealants when excessive movement is expected within the curing time of the sealant.

C. Type C

1. Interior wall penetrations for pipe and conduit that will be concealed by escutcheons and other trim and plate, and for lap joints in sheet metal.

D. Type D

1. Joints, voids and penetrations not otherwise specified for interior surfaces exposed to view and requiring painting.

2. Bedding of fixtures, partitions, equipment and accessories fastened to walls and floors, flanges and escutcheons of items penetrating surfaces in Kitchens, Toilet Rooms, and other areas requiring sanitary conditions to eliminate any open joints between contact surfaces.

E. Type E

1. Perimeter joints around sound-retardant partitions and electrical boxes and other penetrations in such partitions.

F. Type F

1. Exterior and interior joints in contact with anodized aluminum and plaster.

3.07 CURING

A. Sealants shall cure in accordance with manufacturer's printed recommendations. Exercise care not to disturb seal until completely cured.

B. Damaged sealants shall be repaired as recommended by product manufacturer.

END OF SECTION

SECTION 08 10 20
STEEL (HOLLOW METAL) DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install hollow metal doors and frames as indicated on the drawings and specified.

1.03 SUBMITTALS

A. The following shall be submitted in accordance with Section 01 33 10:

1. Manufacturer's Catalog Data.

2. Shop Drawings: Show the location and identification for each door, its size, materials of construction, and finish hardware.

B. Coordinate approved shop drawings with all other trades and manufacturers whose products are used.

C. The steel door and frame supplier will furnish to the architect six (6) sets of steel door and frames schedule and/or shop drawings; using the same reference number for details and openings as those on the contract drawings.

1.04 QUALITY ASSURANCE

A. Provide Steel Doors and Frames complying with the Steel Door Institute recommended specifications for Standard Steel Doors and Frames ANSI/SDI 100 (Latest Edition).

1.05 DELIVERY, HANDLING, AND STORAGE

A. Doors, frames and accessories shall be protected from damage during handling, transportation, and at the job site. Materials shall be stored at the site under cover on wood blocking or on suitable floors.

PART 2 - PRODUCTS

2.01 STEEL (HOLLOW METAL) DOORS AND FRAMES

A. Subject to compliance with the specified requirements, hollow metal doors and frames shall be the product of one of the following manufacturers:

1. Curries Mfg. Co.
2. Mesker Company
3. Ceco Corporation
4. Krieger Steel Products Corporation
5. J-Door Company
6. Steelcraft Manufacturing Company

B. Doors shall be the manufacturer's standard doors conforming to SDI-100 and the requirements specified. Steel shall be cold rolled or hot rolled, pickled, and oiled. Exposed welded or soldered joints shall be dressed smooth.

C. Internal Construction: Provide the manufacturer's standard honeycomb, polyurethane, unitized steel grid, vertical steel stiffeners, or rigid mineral fiber core with internal sound deadener on inside of face sheets.

D. Doors shall be phosphate treated and primed at the factory. Do not paint over fire rating labels.

E. Doors shall be swinging type, 1-3/4 inch thick, flush design, and for the door-opening sizes indicated.

2.02 FIRE-RATED DOORS AND FRMAES

A. Fire-rated doors shall be provided where indicated. Fire-rated doors require the use of fire-rated frames.

B. Fire-rated doors shall be type that has been tested as a fire door assembly, complete with the type of fire-door hardware to be used in the work in accordance with UL 10B.

1. Fire-rated doors shall be identified by UL labels.

2. The labels shall indicate the applicable fire rating of the door construction provided.

C. Reinforce, drill, and tap doors to receive finish hardware. Build in reinforcing for surface applied hardware at the factory.

2.03 LOUVERS

A. Louvers shall be vision proof, inserted, stationary type, with inverted "Y" or "V" blades, not lighter than 20 gage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Doors and frames accessories shall be installed in accordance with the approved drawings, descriptive data, and as specified.

3.02 FINISH-HARDWARE INSTALLATION

A. Hardware shall be installed and adjusted in accordance with the hardware manufacturer's printed directions. Surface-mounted finish hardware shall be template-located and drilled and tapped as required for installation.

B. After the installation is completed, hardware shall be adjusted and lubricated to ensure proper performance.

3.03 FINAL ADJUSTMENT

A. Before final acceptance, finish hardware shall be checked and readjusted as required to ensure proper operation of the finish hardware.

3.04 ACCEPTANCE PROVISIONS

A. Doors will be rejected for defects. Defective work shall be removed and replaced with materials that meet the requirements of the specifications. Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primer.

END OF SECTION

SECTION 08 11 13
ENERGY EFFICIENT HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and install energy efficient hollow metal doors and frames as indicated on the drawings and specified:

B. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.

3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.

4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.

6. ANSI/SDI A250.13 - Testing and Rating of Severe Windstorm Resistant Components for Swing Door Assemblies.

7. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.

8. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

9. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.

10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.

11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.

12. ASTM E1332 - Standard Classification for Determination of Outdoor-Indoor Transmission Class.

13. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.

14. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.

15. ANSI/NAAMM/HMMA 867-06 - Guide Specifications for Commercial Laminated Core Hollow Metal Doors and Frames.

16. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.

17. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.

18. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.

19. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.

20. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.

21. NFRC 102 – Procedure for Measuring the Steady State Thermal Transmittance of Fenestration Systems.

22. NFRC 400 – Procedure for Determining Fenestration Product Air Leakage.

23. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

24. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.03 ACTION SUBMITTALS

A. Product Data: Submit information for each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Submit the following the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of anchorages, joints, field splices, and connections.
6. Details of accessories.
7. Details of moldings, removable stops, and glazing.
8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:

1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.

1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with NFRC 102 and/or ASTM C1363 and meet or exceed the following requirements:

a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.374, R-Value 2.53, including insulated door and thermal-break frame.

2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with NFRC 400 and/or ASTM E283 to meet or exceed the following requirements:

a. Rate of leakage of the door assembly shall not exceed 0.1 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

3. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

D. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.07 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period of 5 years following the date of substantial completion.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of pre-consumer recycled content not less than 38 percent.

D. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.02 ENERGY EFFICIENT DOORS

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, and ANSI/SDI A250.4 for physical performance level.

1. Design: Flush panel.

2. Core Construction: Foamed in place polyurethane and steel reinforced core with no stiffener face welds.

    a. Provide 18 gauge steel vertical reinforcements 6 inches apart and welded in place. Foamed in place polyurethane core is chemically bonded to all interior surfaces. No face welding is permitted.

    b. Thermal properties to rate at a fully operable minimum U-Factor 0.374 and R-Value 2.53, including insulated door, Mercury thermal-break frame and threshold.

c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.378 and R-Value 2.5, including insulated door, kerf type frame, and threshold.

3. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch - 1.0-mm) thick steel, Model 2.

4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8 inch in 2 inches (3 mm in 50 mm).

5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.

6. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9".

7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Manufacturers Basis of Design:

1. CECO Door Products.
2. Curries Company (CU).
3. Steelcraft.
4. Security Metal Products.
5. Amweld Metal Doors and Frames.

2.03 0THERMAL BREAK FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Thermal Break Frames: Subject to the same compliance standards and requirements as standard hollow metal frames. Tested for thermal performance in accordance with NFRC 102, and resistance to air infiltration in accordance with NFRC 400. Where indicated provide thermally broken frame profiles available for use in both masonry and drywall construction. Fabricate with 1/16” positive thermal break and integral vinyl weatherstripping.

C. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.

1. Fabricate frames with mitered or coped corners.

2. Frames: Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.

3. Manufacturers Basis of Design:

a. CECO Door Products.
b. Curries Company (CU).
c. Steelcraft.
d. Security Metal Products.
e. Amweld Metal Doors and Frames.

2.04 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.

2. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

3. FEMA 361 Storm Shelter Anchors: Masonry T-shaped, wire masonry type, or existing opening type anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.05 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.

1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

2.06 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.07 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.

2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

2. Knocked Down Frames: Provide frames with locking corner tabs which permit field assembly. Factory install compression type anchors and countersunk screw holes to secure the bottom of the jambs.

3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.

4. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

6. Jamb Anchors: Provide number and spacing of anchors as follows:

a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:

1) Two anchors per jamb up to 60 inches high.
2) Three anchors per jamb from 60 to 90 inches high.
3) Four anchors per jamb from 90 to 120 inches high.
4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.

7. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

8. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a 3rd party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.

3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.

4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.08 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.

1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

B. Factory Pre-Finished: Factory apply electrostatic paint finish to doors and frames in accordance with ANSI A250.3 test procedure acceptance criteria for factory applied finished coatings. Color as selected by the architect from manufacturer’s full range of standard colors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.03 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.

1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.

3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.

4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

3.04 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

END OF SECTION

SECTION 08 33 33
ASHRAE AND IECC COMPLIANT INSULATED MOTORIZED ROLL-UP DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install ASHRAE and IECC compliant insulated motorized roll-up doors as indicated on the drawings and specified.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Air Infiltration to Comply With:

   a. ASHRAE (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) Standard 90.1-2007, 2010 & 2013 requirements of less than .3 CFM/FT2

   b. IECC (International Energy Conservation Code) 2012 requirements of less than 1.0 CFM/FT2

2. Wind Loading: Supply doors to withstand up to 21 psf design wind load

3. Cycle Life: Design doors of standard construction for normal use of up to 20 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the door

4. Seismic Performance: Provide manufacturer's seismic calculations confirming ASCE7-10

5. Insulated Door Slat Material Requirements:

   a. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84

   b. Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly

   c. Minimum R-value of 8.0 (U-value of 0.125) as calculated using the ASHRAE Handbook of Fundamentals

   d. Insulation to be CFC Free with an Ozone Depletion Potential (ODP) rating of zero

6. Safety: Chain operated doors shall be designed so that the door immediately stops upward or downward travel and is maintained in a stationary position when the hand chain is released by user.

1.03 ACTION SUBMITTALS

A. Submit the following items:

1. Product Data: Submit technical information that fully describes all door components. Include installation instructions.

2. Shop Drawings: Submit unique materials and fabrications not detailed in Product Data. Show interface with adjacent work.

3. Quality Assurance/Control Submittals:

   a. Provide manufacturer ISO 9001 registration
   b. Provide manufacturer and installer qualifications
   c. Provide manufacturer's installation instruction
   d. Manufacturer must provide independent testing lab results proving .3 CFM/FT2 or less air infiltration

4. Closeout Submittals:

   a. Operation and Maintenance Manual
   b. Certificate stating that installed materials comply with this specification

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: ISO 9001:2008 registered and a minimum of five years experience in producing doors of the type specified

2. Installer Qualifications: Manufacturer's approval.

1.05 DELIVERY STORAGE AND HANDLING

A. Follow manufacturer's instructions.

1.06 WARRANTY

A. Standard Warranty: Two years from date of shipment against defects in material and workmanship

B. Maintenance: Submit for owner’s consideration and acceptance of a proposed maintenance service agreement for installed products

PART 2 - PRODUCTS

2.01 ASHRAE AND IECC COMPLIANT MOTORIZED INSULATED ROLL-UP DOORS

A. Subject to review by the Architect of action submittals for compliance with requirements, provide Cookson Model ESD30, or an acceptable substitution by one of the following:

1. Cookson
2. Cornell
3. Lawrence.
4. Overhead.

B. Curtain: Air infiltration rate of less than .3 CFM/FT2, as tested per ASTM E283 validated by an independent testing agency. Test report required.

1. Fabrication:

a. Slat Material: No. 6F, (Listed Exterior/Interior):

1) Galvanized Steel/Galvanized Steel: Manufacturer recommended gauge based on performance requirements. Minimum 24/24 gauge, Grade 40, ASTM A 653 galvanized steel zinc coating

b. Insulation: 7/8 inch (22 mm) foamed-in-place, closed cell urethane

c. Total Slat Thickness: 15/16 inch (24 mm)

d. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84

e. R-value: 8.0

f. STC Rating: Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly

2. Exterior Slat Finish: As selected by the Architect.

a. GalvaNex™ Coating System (Standard Colors):

1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and white baked-on polyester enamel finish coat

3. Interior Slat Finish: As selected by the Architect.

a. GalvaNex™ Coating System (Standard Colors):

1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and white baked-on polyester finish coat

C. Endlocks: Fabricate interlocking sections with high strength galvanized cast iron endlocks on alternate slats each secured with two ¼" (6.35 mm) rivets. Provide windlocks as required to meet specified wind load.

1. Galvanized cast iron: Required if above 21'-5" width (DBG - Distance Between Guides)

D. Bottom Bar

1. Configuration:

a. Insulated Bottom Bar: Reinforced extruded aluminum interior face with full depth insulation and exterior skin slat to match curtain material and gauge. Minimum 4" tall x 1-1/16" thickness.

2. Finish:

a. Exterior: Match slats
b. Interior: Mill finish

3. Air Infiltration Certification Label: Must be affixed to bottom bar

E. Guides:

1. Fabrication:

a. Thermal break required. Minimum 3/16 inch (4.76 mm) structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.Top 16 ½" (419.10 mm) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service

2. Finish:

a. Powder Coat (Standard Colors): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

F. Counterbalance Shaft Assembly:

1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches per foot (2.5 mm per meter) of width

2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

G. Brackets: Fabricate from minimum 3/16 inch (5 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures

1. Finish:

a. Powder Coat (Standard Colors): Zirconium treatment followed by a gray baked-on polyester powder coat; minimum 2.5 mils (0.065 mm) cured film thickness

H. Hood: Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.

1. Finish: As selected by the Architect/

a. GalvaNex Coating System (Standard Colors):

1) ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding baked-on base coat and gray baked-on polyester finish coat

I. Weatherstripping:

1. Bottom Bar:

a. Manually Operated Doors: Replaceable, bulb-style, compressible EDPM gasket extending into guides

a. Motor Operated Doors: Sensing/weather edge with neoprene astragal extending full width of door bottom bar

2. Guides: Replaceable vinyl strip on guides sealing against fascia side of curtain

3. Lintel Seal: Double brush seal with EPDM sandwiched between the two brush seals at door header to impede air flow.

4. Hood: Neoprene/rayon baffle to impede air flow above coil

2.02 OPERATION

A. Motor Operator: Electric Motor Operator with back-up power control box, Limited Duty (up to 10 cycles per hour), UL listed, TENV gear head operator, 24DVC. Horsepower as recommended by manufacturer. Provide complete with electric motor and factory pre-wired motor control terminals, maintenance free solenoid actuated brake, emergency manual chain hoist and control station(s). Motor shall be high starting torque, industrial type, with overload protection. Primary speed reduction shall be heavy-duty gears running in maintenance free, sealed gear box with mechanical braking to hold the door in any position. The emergency manual chain hoist assembly is automatically disengaged when motor is energized. A disconnect chain shall not be required to engage or release the manual chain hoist. Operator shall be capable of driving the door at a speed of 6 to 9 inches per second (15 to 23 cm/sec). Fully adjustable, driven linear screw type cam limit switch mechanism shall synchronize the operator with the door. The motor shall be removable without affecting the limit switch settings. The electrical contractor shall mount the control stations and supply the appropriate disconnect switch, all conduit and wiring per the overhead door wiring instructions.

1. Supply Control Box with programmable logic board and back-up power supply. 120v AC input power with auto switch to 24v DC back-up power. Back-up power to provide minimum 10 open/close cycles and 48 hr stand-by.

a. (2) 12v rechargeable lead sealed batteries.

b. Programmable battery load testing

c. Monitoring points for open/close position, AC power loss and battery low voltage

d. 12’-0” (standard) wiring whip to connect control box and motor up to 120’-0” available.

e. Emergency Push Button (EPB): Flush mounted, single red push button station wired for emergency OPEN function only. If grille is at full open (normal business hours), depressing EPB will not affect the grille’s position.

f. Door power indicator: Flush mounted voltage monitor for battery back-up system. Flashing red light indicates low battery power and maintenance check-up. Can be located up to 150 ft. away from motor control box.

g. Non-resettable cycle counter

h. UL325 & UL864 compliant system.

B. Control Station:

1. Surface mounted: "Open/Close" key switch with "Stop" push button; NEMA 3R.

C. Control Operation:

1. Sensing/Weather Edge: Automatic reversing control by an automatic sensing switch within neoprene or rubber astragal extending full width of door bottom bar

a. Pneumatic sensing edge device. Provide self-coiling cable connection to control circuit.

D. Locking: Provide a cylinder lock keyed to the building system.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates

C. Commencement of work by installer is acceptance of substrate

3.2 INSTALLATION

A. General: Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports

B. Follow manufacturer's installation instructions

3.03 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion

3.04 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site

3.05 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative

B. Instruct Owner's Representative in maintenance procedures

END OF SECTION

SECTION 08 51 13
ALUMINUM PICTURE WINDOWS

PART 1 – GENERAL

1.01 SUMMARY

A. Furnish and install aluminum picture windows as indicated on the drawings and specified.

1. Solid and tubular aluminum extruded windows of the following type(s):

1.02 ACTION SUBMITTALS

A. Submit following items:

1. Product Data. Describe the windows, their materials and fabrication. Include installation instructions.

2. Shop Drawings: Include window schedule, window elevations, sections and details, and multiple window assembly details.

3. Samples: Colors shall be as selected by the Architect.

a. Color samples: Minimum 1x4 inch (25x100 mm) samples of Aluminum with painted or anodized color.

b. Glass, showing specified tint color.

4. Quality Assurance/Control Submittals:

a. Qualifications: Proof of manufacturer's qualifications.

b. U-Factor and structural rating charts required for AAMA and NFRC labeling requirements.

c. Installation Instructions – AAMA 2400 (“Mounting Flange Installation”) or AAMA 2410 (“Flush Fin Installation”).

B. Closeout Submittals: Submit the following items:

1. Temporary window labels marked to identify windows that labels were applied to.
2. Maintenance instructions.
3. Warranties.

1.03 QUALITY ASSURANCE

A. Overall Standards: Comply with ANSI/AAMA 101.I.S.2, except as otherwise noted herein.

1. Manufacturer Qualifications:

a. Minimum five years experience in producing aluminum windows of the type(s) specified.

b. Member AAMA, NFRC.

B. Regulatory Requirements: California Title 24 Energy Code.

C. Certifications for insulated glass windows:

1. AAMA: Windows shall be Gold Label certified with label attached to frame per AAMA requirements.

2. NFRC: Windows shall be NFRC certified with temporary U-factor label applied to glass and an NFRC tab added to permanent AAMA frame label.

1.04 DELIVERY, STORAGE AND HANDLING

A. Follow manufacturer's instructions on label applied to windows.

1.05 WARRANTY

A. Manufacturer's Warranty:

1. 10-year guarantee from the date of substantial completion.

2. Guarantee windows against defects in manufacturing and workmanship including costs for parts and labor.

PART 2 – PRODUCTS

2.01 ALUMINUM PICTURE WINDOWS

A. Subject to the Architect's review of action submittals provide Window Series: Milgard Aluminum Windows, or an acceptable substitution by one of the following:

1. Peerless.
2. Arcadia.
3. Milgard.
4. Traco.
5. EFCO.

B. Aluminum: Comply with requirements of AAMA/WDMA/CSA 101/I.S.2/A440-05, 6063-T5 temper for strength, corrosion resistance and application of required finish.

C. Extruded frame members are to be not less than 0.060" in thickness for structural walls.

2.02 GENERAL PERFORMANCE REQUIREMENTS:

A. Thermal Performance: Comply with NFRC 100.

B. Air Leakage, Water Resistance, And Structural Test: Comply with ANSI/AAMA 101/I.S.2.

C. Forced-Entry Resistance: Comply with ASTM E 588.

2.03 WINDOW TYPES:

A. Milgard Picture Window and Radius – 1185H Series, block frame (no nail fin)

1. Frame: 1185H & 1285H Series, 2 1/16" (52mm)

2. Sightlines: 1185H & 1285H Series, equal to the horizontal slider and single hung

3. Performance Class: 1185H Series, 71 ½" x 71 ½" and smaller: FW-HC45

2.04 GLAZING

A. Insulated Glass Units: ASTM E 774, Class A, 3/4 inch (19mm) thick overall except 710 and 710S which are 1 inch (25mm) thick.

1. Glazing Type: Clear/Hardcoat Low-E, argon gas filled
2. Spacer Bar: Aluminum box spacer

2.05 DIVIDED LITE GRIDS

A. 5/8 inch (16 mm) wide flat, grids between the glass that are color matched to frame and sash

2.06 FABRICATION

A. Fabricate frames and sash with mechanically joined corners. Corners are fastened with corrosion resistant screws and sealed with an acrylic sealant.

B. All fixed glass is exterior glazed and all sashes are marine glazed with flexible PVC glazing. The fixed glazing shall be removed without disassembly of a sash. The vents will need to be disassembled to replace the glazing.

2.07 FINISHES

A. Frame and Sash Color: Clear Anodized Exterior Finish: Provide AA-C22-A31 Class II Clear finish, minimum 0.4 mils thick, electrolytically deposited color anodized finish.

2.09 SOURCE QUALITY CONTROL

A. Windows inspected in accordance with manufacturer's Quality Control Program as required by AAMA Gold Label certification.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine openings in which windows will be installed.

1. Verify that framing complies with AAMA 2400 ("Mounting Flange Installation") or AAMA 2410 ("Flush Fin Installation").

2. Verify that fasteners in framed walls are fully driven and will not interfere with window installation.

B. Coordinate with responsible entity to correct unsatisfactory conditions.

C. Commencement of work by installer is acceptance of substrate conditions.

3.02 INSTALLATION

A. Install windows in framed walls in accordance with AAMA 2400 ("Mounting Flange Installation") or AAMA 2410 ("Flush Fin Installation") or AAMA Installation of Block Frame to a Surface Barrier Wall.

B. Do not remove temporary labels.

3.03 CLEANING

A. Remove temporary labels and retain for Closeout Submittals.

B. Clean soiled surfaces and glass using a mild detergent and warm water solution with soft, clean cloths.

END OF SECTION

SECTION 08 71 10
FINISH HARDWARE

PART - GENERAL

1.01 SECTION INCLUDES

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

1.02 SUMMARY

A. Extent of finish hardware required is indicated on drawings and in schedules.

B. Types of finish hardware required include but are not limited to the following:

1. Hinges
2. Locks, cylinders and keys
3. Flush Bolts
4. Exit devices
5. Closers
6. Overhead holders
7. Protection plates
8. Weatherstripping for exterior doors
9. Astragal or meeting seals on pairs of doors
10. Thresholds

1.03 REGULATORY REQUIREMENTS

A. Code References:

1. Uniform Building Code (UBC).
2. National Fire Protection Association (NFPA) Fire Doors and Windows Code 80.
3. California Administrative Code (CCR), regulations and handicapped requirements.

B. Exit doors in buildings, including but not limited to doors of toilets and storage rooms, shall conform with the requirements of Section 3304 Title 24 CCR.

C. Exit doors shall be openable from the inside with non-grip openable hardware that does not require the use of a key or any special knowledge or effort.

1.04 QUALITY ASSURANCE

A. Manufacturer: Obtain each type of hardware as differentiated in this Section's "Manufacturers" list from a single manufacturer, although several may be indicated as offering products complying with requirements.

B. Supplier: Must be a direct factory contract finish hardware supplier, with warehousing facilities, who has been furnishing hardware in the project's vicinity for a period of not less than 5 years. The supplier must employ an experienced architectural hardware consultant who is available, at reasonable times during the course of the work, for consultation about project's hardware requirements, to Owner, Architect and Contractor.

C. Fire-Rated Openings: Provide hardware for fire-rated openings in compliance with NFPA Standard No. 80 and local building code requirements. Provide only hardware which has been tested and listed by UL or WHI for types and sizes of doors required and complies with requirements of door and door frame labels.

1. Where emergency exit devices are required on fire-rated doors, (with supplementary marking on doors' UL or WHI labels indicating "Fire Door to be Equipped with Fire Exit Hardware") provide UL or WHI label on exit devices indicating "Fire Exit Hardware".

D. Warranty: All hardware shall be warranted for a period of two years from date of Substantial Completion. Defects in materials and workmanship occurring during the warranty period shall be corrected to the complete satisfaction of the architect. A 10-year warranty for door closers.

1.05 SUBMITTALS

A. Product Data: Submit manufacturers technical product data for each item of hardware in accordance with Division-1 section "Submittals". Include whatever information may be necessary to show compliance with requirements, and include instructions for installation and for maintenance of operating parts and finishes.

B. Hardware Schedule: Submit vertical format hardware schedule in manner indicated below. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware.

1. Final Hardware Schedule Content: Based on finish hardware indicated, organize hardware schedule into "hardware sets" indicating complete designations of every item required for each door or opening. Include the following information:

a. Type, style, function, size and finish of each hardware item.

b. Name and manufacturer of each item.

c. Fastenings and other pertinent information.

d. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.

e. Explanation of all abbreviations, symbols, codes, etc. contained in schedule.

f. Mounting locations for hardware.

g. Door and frame sizes and materials.

h. Keying information.

2. Submittal Sequence: Submit schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work (e.g., hollow metal frames) which is critical in the project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by finish hardware, and other information essential to the coordinated review of hardware schedule.

3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.

4. Samples: When so requested by the Architect and prior to submittal of the final hardware schedule, submit one sample of each type of exposed hardware unit, finished as required, and tagged with full description for coordination with schedule.

5. Samples will be returned to the supplier. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be used in the work, within limitations of keying coordination requirements.

6. Templates: Furnish hardware templates to each fabricator of doors, frames and other work to be factory-prepared for the installation of hardware. Upon request, check shop drawings of such other work, to confirm that adequate provisions are made for proper location and installation of hardware.

1.06 PRODUCT HANDLING

A. Tag each item or package separately, with identification related to final hardware schedule, and include basic installation instructions with each item or package.

B. Inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

C. Deliver individually packaged hardware items at the proper times to the proper locations (shop or project site) for installation.

D. Provide secure lock-up for hardware delivered to the project, but not yet installed.

PART 2 - PRODUCTS

2.01 SCHEDULED HARDWARE

A. Requirements for design, grade, function, finish, size and other distinctive qualities of each type of finish hardware is indicated in the Finish Hardware Data Sheet and Hardware Schedule at the end of this section.

1. Manufacturer's Product Designations: One or more manufacturers are listed for each hardware type required. Provide either the product designated, or, where more than one manufacturer is listed, the comparable product of one of the other manufacturers which comply with requirements including those specified elsewhere in this section.

2.02 MATERIALS AND FABRICATION

A. General:

1. Hand of door: Drawings show direction of slide, swing or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

a. Base Metals: Produce hardware units of basic metal and forming method indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units by applicable ANSI A156 series standard.

2. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

3. Furnish screws for installation, with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of such other work as closely as possible, including surfaces to receive painted finish.

4. Provide sex nuts and bolts for door closers and exit devices.

5. Provide machine screws and anchors for all thresholds to be installed over concrete floor material.

6. Tools and Maintenance Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.03 HINGES

A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Screws: Furnish Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head or wood screws for installation of units into wood. Finish screw heads to match surface of hinges or pivots.

C. Hinges:

1. Number of hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" or less of additional height.

2. Furnish 4½" x 4½" hinges, except at the following door widths:
Heavy Weight 5" x 4½" at doors 3'6" or wider.

3. Furnish hinges of sufficient width to permit maximum door swing.

4. Furnish heavy-weight hinges where specified.

2.04 LOCK CYLINDERS AND KEYING

A. General: Supplier will meet with Owner to finalize keying requirements and obtain final instructions in writing.

B. Locksets and cylinders to be construction keyed with temporary construction cylinders. Provide 10 construction keys.

C. Equip locks with cylinders in a key section to match Schlage Key System.

D. Metals: Construct lock cylinder parts from brass/bronze, stainless steel or nickel silver.

E. Comply with Owner's instructions for masterkeying and, except as otherwise indicated, provide individual change key for each lock which is not designated to be keyed alike with a group of related locks.

1. Permanently inscribe each key with number that identifies cylinder, and notation "DO NOT DUPLICATE".

G. Key Material: Provide keys of nickel silver only.

H. Key Quantity: Furnish 3 change keys for each lock; 5 master keys for each master; 5 grandmaster keys for each grandmaster.

I. Provide a key control system including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of the number of locks required for the project.

1. Provide complete cross index system set up by key control manufacturer and place keys on markers and hooks in the cabinet as determined by the final key schedule.

2. Provide hinged-panel type cabinet, for wall mounting.

J. Interior Doors: Provide Schlage large format removable core cylinders with temporary construction cores. Permanent cores and keys shall be furnished with "1" Bitted 23-030 convertional cores.

Exterior Doors: Medeco Keying System. Provide temporary construction cores and Temporary masterkeys. Provide Medeco M^3 32-Series key cylinders and permanent Keying.

2.05 LOCKS, LATCHES AND BOLTS

A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set.

B. Lock Throw: Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.

C. Lever Trim: Typical Lever use "SPARTA" for all doors.

D. Flush Bolt Heads: Minimum of 1/2" diameter rods of brass, bronze or stainless steel, with minimum 12" long rod for doors up to 7'-0" in height.

2.06 EXIT DEVICES

A. Furnish modern push-pad type, reversible stainless steel exit devices with heavy duty metal chassis and touchbar with metal end caps.

2.07 CLOSERS

A. Surface mounted closers shall be full rack and pinion type with pressure cast shell, with no more than 2-1/8" projection from the door surface.

1. Provide drop plates, brackets, mortise shoes, long arms and low profile arms as required.

2. Provide non-handed door closers with sized or multi-sized springs, with separate adjustable valves for latch, sweep speed, and back check.

3. Unitrol closers shall have integral spring cushion stop.

4. Template and adjust closers per manufacturer's recommendations and to meet barrier free requirements.

5. Mount surface closers on side of door away from corridor, inside rooms. Provide regular or parallel rigid arm closers as required.

B. Provide adjustable closer units complying with ANSI A117.1, Title 24 CCR and ADA provisions for door opening force and delayed action closing. The sweep period of the door closers shall be adjusted so that from an open position of 70 degrees the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

C. The maximum force for pushing or pulling open a door shall be as follows:

1. Fire doors shall have the minimum opening force allowable by the appropriate administrative authority.

2. Other Doors:

a. Interior hinged, non-labeled doors: 5 lbs.
b. Exterior hinged, non-labeled doors: 8½ lbs.

2.08 DOOR TRIM SETS

A. Fabricate protection plates (armor, kick or mop) not more than 2" less than door width on stop side and by the height indicated.

1. Metal Plates:

a. Stainless steel, .050" (U.S. 16 ga.) with heavy B4E.

2.09 STOPS

A. Furnish carpet risers for floor stops where required.

B. Where specified floor or wall stop would present a pedestrian hazard or cannot be used, furnish Rixson model overhead stop or provide closer with integral stop as appropriate.

2.10 SILENCERS

A. Furnish silencers at hollow metal or wood door frames that are without seals in quantities as follows:

1. Single Doors: 3 silencers

2. Pairs: 4 silencers

2.11 SEALS

A. General: Except as otherwise indicated, provide continuous seals each edge of every exterior or fire-rated door leaf. Provide type, sizes and profiles shown or scheduled. Provide stainless steel fasteners for extruded seals and dark bronze fasteners at dark bronze finish.

B. Door Sweeps:

1. Nylon Brush Sweep Seals.

2.12 THRESHOLDS

A. General: Except as otherwise indicated provide standard metal threshold unit of type, size and profile as shown or scheduled. Furnish all thresholds with Return Closed Ends (RCE).

1. Where required by fire code, furnish appropriate model thresholds at openings where combustible floor material extends through the door opening.

2.13 HARDWARE FINISHES

A. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI A156.18 "Materials & Finishes Standard".

1. Dull Chrome Plated-Steel (US26D, 652)
   Dull Chrome Plated-Zinc (US26D, 682)
   Dull Chrome Plated-Brass (US26D, 626)
   Satin Stainless Steel (US32D, 630)
   Anodized Aluminum (US28, 628)
   Sprayed Aluminum Paint (689)
   Satin Aluminum, Clear Coated (627)

2.14 MANUFACTURERS

A. Manufacturers: Substitutions with architect's and school district's written approval prior to bidding only.

Item	Listed	Approved Mfrs.
Hinges	STA-Stanley	Hager, McKinney
Continuous Hinge	PEM-Pemko	Markar, Stanely
Barrel Hinges	DAR-Daro	Brookfield
Push Button Lock	ALL-Alarm Lock	None
Lever Locks	SCH-Schlage	None
Cylinders for Interior Doors	SCH-Schlage	None
Cylinders for Exterior Doors	MED-Medeco	None
Exit Devices	Von-Von Duprin	Precision
Surface Closers	LCN	Norton
Gate Closers	DKT-Dictator U.S.	None
OHC Closers	RIX-Rixson	None
Auto Flush Bolt	DCI-Door Control International	or Equal
Coordinator, Dust Proof Strike,	DCI-Door Control International	or Equal
Kick Plates, Stops	TRM-Trimco	Rockwood
Door Sweep	ZER-Zero Int'l	or Equal
Door Bottom	PEM-Pemko	Zero
Seals	PEM-Pemko	Zero
Push & Pulls, Coat Hook	TRM-Trimco	Rockwood
Lock Astragal	TRM-Trimco	Rockwood
Thresholds & Seals	PEM-Pemko	Nat'l Guard
Overhead Stop	RIX-Rixson	Glynn Johnson
Floor Closer, Pivots	RIX-Rixson	Glynn Johnson
Cane Bolts	CRW-Crown Industrial	or Equal
Gate Latch	ROC-Rockwood	or Equal
Key Box	TEL-Telkee	or Equal
Knox Box	KNX-Knox Co.	or Equal

2.15 FINISH HARDWARE SCHEDULE

To be determined.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Door opening hardware shall be centered between 30 and 44 inches above the floor as indicated on the drawings.

B. Location of Hand-Operable Hardware shall be as follows unless otherwise indicated or approved:

1. Door levers, centered 38" above floor.
2. Door pulls, centered 42" above floor.
3. Strike of rim or mortise exit devices, centered 40-5/16" from floor.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations.

D. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

E. Drill and countersink units which are not factory-prepared for anchorage fasteners.

F. Set thresholds for exterior doors in full bed of butyl-rubber or polyisobutylene mastic sealant.

3.02 ADJUST AND CLEAN

A. Adjust and check each operating item of hardware and each door, to ensure proper operation or function of every unit. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

B. Clean adjacent surfaces soiled by hardware installation.

C. Instruct Owner's Personnel in proper adjustment and maintenance of hardware and hardware finishes, during the final adjustment of hardware.

END OF SECTION

SECTION 08 80 00
GLAZING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Furnish and perform glazing as indicated on the drawings and specified, including those specified in other Sections where glazing requirements are mentioned:

1. Windows.
2. Doors.
3. Glazed curtain walls.
4. Storefront framing.
5. Glazed entrances.
6. Interior borrowed lites.

1.03 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit.

1.04 PERFORMANCE REQUIREMENTS

A. Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

1.05 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass, and the following products; 12 inches square.

1. Tinted glass.
2. Tempered glass.
3. Fire-resistive glazing products.
4. Insulating glass.

C. Glazing Accessory Samples: For gaskets, sealants and colored spacers, in 12-inch lengths. Install sealant Samples between two strips of material representative in color of the adjoining framing system.

D. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturers of insulating-glass units with low-e coatings.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass. insulating glass, glazing sealants, and glazing gaskets.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

F. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

G. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F, and the fire-resistance rating in minutes.

H. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

I. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install glazing in mockups specified in "Aluminum-Framed Entrances and Storefronts," "Aluminum Windows," and "Glazed Aluminum Curtain Walls" to match glazing systems required for Project, including glazing methods.

2. Approved mockups may become part of the completed Work if undisturbed at time of Final Completion.

J. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

2. Review temporary protection requirements for glazing during and after installation.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B, Comply with insulating-glass manufacturer's written recommendations for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.09 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or below 40 deg F.

1.10 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form in which coated-glass manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.

1. Warranty Period: 10 years from date of Final Completion.

B. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Final Completion.

PART 2 - PRODUCTS

2.01 GLAZING TYPES

A. Glazing shall include products of the following descriptions, assemblies and manufacturers:

TYPE	DESCRIPTION	ASSEMBLY	MANUFACTURER
GL-A	3/8” Temp. Clear Glazing	3/8” PPG Tempered Clear	PPG
GL-B	1” Insulated Temp. Tinted Low-E Glazing	1/4" PPG Temp. Solarbronze Series + 1/2" Air Space + 1/4" PPG Temp. Clear w/ Solarban 60 (Layer 3) – Verify in field to match existing High School West Entry Door.	PPG
GL-C	45 Min. Fire Rated Temp. Clear Glazing	3/4" Contraflam 45 (UL# 14515)	Vetrotech
GL-D	60 Min. Fire Rated Temp. Clear Glazing	1-1/4” Contraflam Structure 60 (UL# 14515)	Vetrotech
GL-E	1” Insulated Temp. Tinted Spandrel Glazing	1/4" PPG Temp. Clear w/ ICD OPACI-Coat 300 Series Coating (Layer 2) + 1/2" Air Space + 1/4" PPG Temp. Clear	PPG & ICD
NOTE: Refer to Door Schedule for location of glazing types			

COLOR GLAZING (WHERE INDICATED)	
CG-1	249 BRZ SLV – 2 Laminated Pieces Back to Back
NOTE: Refer to Door Schedule for location of glazing types	

B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

C. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites 6.0 mm thick.

2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

3. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.

4. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.02 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2. For uncoated glass, comply with requirements for Condition A.

3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Uncoated Tinted Float Glass: Class 2, complying with other requirements specified.

D. Opcacitying water based glass coatings are specified in Section 08 80 01.

E. Tempered Patterned Glass: ASTM C 1048, Kind FT (fully tempered), Type II, Class 1 (clear), Form 3; Quality-Q6.

2.03 INSULATING GLASS

A Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified according to ASTM E 2190, and complying with other requirements specified.

1. Sealing System: Dual seal, with manufacturer's standard primary and secondary.
2. Spacer: Manufacturer's standard spacer material and construction.
3. Desiccant: Molecular sieve or silica gel, or blend of both.

B. Glass: Comply with applicable requirements in "Glass Products" Article as indicated by designations in “Glazing Types" Article.

2.04 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies and NFPA 257 for window assemblies.

B. 60 Minute Fire-Reistance-Rated

1. `Testing / Standard Conformity: UL 9.10b, 10c, NFPA 80/251/252/25, ASTM E119.
2. Building Code Marking: D-H-T-60, OH-60
3. Impact Safety Rating: CPSC 16CFR 1201-CAT.
4. Nominal Thickness: 1”
5. Tolerance: + 1/8” to – 1/16”
6. U-Value (BTU/hr sq.ft. 0F): 0.76
7. STC Rating (dB): 40
8. Visible Light Transmission (%): 85
9. Weight (lbs./ft.2): 10.3
10. Groove: Depth: 7/8”, Width: 1-1/4”

C. 45 Minute Fire-Protection-Rated

1. Testing / Standard Conformity: UL 9.10b, 10c, NFPA 80/252/257.

2. Building Code Marking: D-H-NT-45, OH-45
3. Impact Safety Rating: CPSC 16CFR 1201-CAT.
4. Nominal Thickness: 3/4”
5. Tolerance: + 1/16” to – 1/16”
6. U-Value (BTU/hr sq.ft. 0F): 0.79
7. STC Rating (dB): 39
8. Visible Light Transmission (%): 84
9. Weight (lbs./ft.2): 8.0
10. Groove: Depth: 5/8”, Width: 7/8”

2.05 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4, Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene, EPDM, silicone or thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.06 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.

3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

4. Sealants used inside the weatherproofing system shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

5. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range or colors.

B. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.07 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 804.3 tape, where indicated.

2. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

3. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.

2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.08 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.09 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product

manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.

2. Presence and functioning of weep systems.

3. Minimum required face and edge clearances.

4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.

2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.04 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.05 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D, Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.06 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a substantial wash away from glass.

3.07 LOCK-STRIP GASKET GLAZING

A. Comply with ASTM C 716 and gasket manufacturer's written instructions. Provide supplementary wet seal and weep system unless otherwise indicated.

3.08 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 09 13 11
BLAST CLEANING IN PREPARATION FOR REPAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Blast clean existing surfaces as in preparation for repainting indicated on the drawings and specified.

1.03 SUBMITTALS

A. Product Data: Submit technical data, specifications and information that fully describe the abrasives and equipment to be used.

PART 2 - PRODUCTS

2.01 ABRASIVES

A. Only uncontaminated abrasives that has been certified by the California Air Resources Board shall be used. Provide either non-metallic or metallic abrasives. Factors such as on-site handling and recycling can allow contamination of abrasive. Contractors are cautioned to verify that the chosen abrasive, along with work and storage processes, allow the final surface cleanliness requirements to be achieved.

B. Non-metallic Abrasive: Conform to MIL-A-22262. Use non-metallic abrasive that is specifically selected and graded to provide a sharp, angular profile to the required depth. Do not use ungraded abrasive. Make adjustments to processes or abrasive gradation to achieve the required surface profile.

C. Metallic abrasive shall conform to the chemical and physical properties of SSPC AB 3.

PART 3 - EXECUTION

3.01 ABRASIVE BLASTING

A. Abrasive blasting equipment shall have a permit issued by the State of California, or other authority having jurisdiction. No contaminant shall be released into the atmosphere during surface preparation that will cause a public nuisance. Conform to Title 17 of CCR, Public Health.

B. Use abrasive blasting equipment of conventional air, force-feed, or pressure type. Maintain a minimum pressure of 95 psig at nozzle. Confirm that air supply for abrasive blasting is free of oil and moisture when tested in accordance with ASTM D 4285. Test air quality at each startup, but in no case less often than every five operating hours.

C. Following completion of the work, remove debris, equipment, and materials from the site. Remove temporary connections to Contractor furnished water and electrical services.

END OF SECTION

SECTION 09 91 08
PAINTING AND REPAINTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Provide painting and repainting as indicated on the drawings and specified.

1.03 REGULATORY REQUIREMENTS

A. Paint materials shall comply with Food and Drug Administration's (FDA) Lead Law and current rules and regulations of local, state and federal agencies governing use of paint materials.

B. Comply with OSHA requirements.

C. Comply with South Coast Air Quality Management District (SCAQMD) requirements.

1.04 SUBMITTALS

A. Submit a complete list of all materials to be furnished stating supplier and distributor's names with product recommendations.

1. Submit manufacturer's standard color samples for each type of paint specified. Once colors have been selected, submit 6 samples of each color selected for each type of paint, on standard 8-1/2" x 11" spray-out panel.

2. Before any coating is applied, Contractor shall submit to the Inspector samples of each color to be used on contract. If more than one batch of material and color is to be used, samples from each batch shall be submitted.

B. Paint and Enamel Spray-Outs

1. Samples of Paint and Enamel shall be submitted on standard 8-1/2" x 11" Leneta Opacity-Display Charts. Each display chart shall have color in full coverage. Sample shall be prepared using material from batch to be used on actual job. Identify the building on which paint is to be used, batch number, color number, type of material, name of manufacturer and name of Contractor.

2. Contractor shall furnish samples of all colors to the Inspector and approved samples shall be kept on job until painting is completed.

3. Contractor shall be responsible for finish color on surface to be painted; where different materials of same color are specified to be applied on same, or adjoining surfaces, final color match shall match approved color sample on those surfaces.

C. Elastomeric coating shall be submitted in duplicate samples of texture coating. Samples shall be not less than 2-1/2 inches by 3-1/2 inches in size and made upon adequate backing

D. All materials and color samples shall be approved before a job start meeting will be scheduled.

1.05 QUALITY ASSURANCE

A. Certification of Materials: With every delivery of paint materials, manufacturer shall certify, on form supplied by Owner that materials comply with requirements of this Section.

B. Master Painters Institute (MPI) Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

C. Paint materials shall comply with applicable requirements of Food and Drug Administration's (FDA) Lead Law and SCAQMD.

D. All painters working on Lead related work shall be Lead Certified by State of California, Department of Health Services (DHS).

1.06 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered to project site in original unbroken containers bearing manufacturer's name, brand number, batch number, and MSDS Sheets.

B. Open and mix ingredients on premises in presence of the Inspector. Immediately remove rejected materials from premises.

1.07 METAL STORAGE CONTAINER

A. Storage and Mixing of Materials: Store materials and mix only in spaces designated for purpose by the Inspector. Keep such spaces clean and take necessary precautions to prevent fire. Hang out oily rags singly in open air. Stack paint containers so that manufacturer's labels are clearly displayed.

B. Paint, combustible materials and gasoline fueled equipment shall not be stored or left in any building overnight.

C. In event that equipment and material storage sheds must be placed on asphalt pavement less than six months old, each wheel, leg or other supporting member shall be centered on a 4'x 8' x 3/4" sheet of plywood. Shed shall be set down in such a manner as to prevent damage to pavement. Contractor shall be responsible for any damage to pavement caused by improper placement of shed.

1.08 WARRANTY

A. Manufacturer shall provide a 3 year material warranty from date of Substantial Completion.

B. Contractor warrants all work executed and materials furnished under contract shall be free from defects of materials and work for a period of three years from date of Substantial Completion.

1.09 PROTECTION

A. All fire alarm boxes, fire sprinkler heads, smoke detectors and intrusion alarm systems shall be uncovered and available to perform function that it was designed for each and every night.

B. All pressure relief grilles with barometric damper leading to a corridor shall be masked off before spraying and then uncovered immediately after spraying.

C. Contractor shall conspicuously post sufficient "Wet Paint" signs continuously to alert personnel to existing conditions until paint is completely dried.

D. Provide and maintain all necessary or required barriers, guards, lights, warning signs, etc. for complete protection as directed by the Inspector.

E. Do not impede emergency egress.

PART 2 - PRODUCTS

2.01 PAINT MATERIALS

A. Paint materials shall be those indicated on the drawings. Only those materials which are approved by Owner shall be used. Acceptable manufacturers, unless otherwise noted are as follows (or acceptable substitute):

1. Dunn-Edwards Corporation
2. Vista Paints
3. Frazee Paints and Wall coverings
4. Benjamin Moore & Co.

B. Factory mix paint materials to correct color, gloss, and consistency for installation to maximum extent feasible.

C. All paint materials shall be by one manufacturer

D. All paint materials shall be of a minimum "Premium Architectural Grade".

E. Gloss degree standards shall be as follows:

High Gloss	70 And Above	Eggshell	30 To 47
Semi-Gloss	48 To 69	Satin	15 To 29

PART 3 - EXECUTION

3.01 CONTRACTOR SHALL REMOVE AND REINSTALL

A. Contractor shall remove coat and hat hooks, name plates, label frames, sash lifts, sash locks, pencil sharpeners, flag brackets, drawer handles and locks, switch and receptacle plates, mirrors, and thermometers, and reinstall all of above after painting is completed.

B. Contractor shall remove exposed nails, hooks, tacks, screws, staples and pins in surface to be painted and patch holes with an approved material. Remove all obsolete screens, grille hangers, and fasteners that are not in use and then patch holes with an approved material.

C. All paper labels shall be soaked off and all glue residue from tape removed.

D. Contractor shall remove metal or plastic room numbers, letters, signs, and, after painting is complete, clean and reinstall them neatly.

E. All sash locks shall be reset in accordance with instructions for locking doors and windows each night.

3.02 REPLACEMENT SCREWS AND HARDWARE

A. All hardware shall be replaced using new screws, of same diameter, but one size longer than those removed. All screws used shall be of finish design and material to match hardware on which they are used.

B. Contractor shall remove all paint from all hardware, including paint from previous painting.

3.03 GENERAL PREPARATION OF EXISTING PAINTED SURFACES

A. All previously painted surfaces will be assumed to contain lead. Provide personnel protective measures accordingly.

B. To ensure a consistently uniform horizontal, vertical and curved surface, with a maximum deformation of 1/8 inch in a five foot span, a brown scrub coat may be required. Also, along with assurance for a uniform color of dashed texture, a fog coat may be necessary as deemed by the Inspector.

C. Examine surfaces to receive paint finish. Surfaces which are not properly prepared, and cleaned or which are not in condition to receive finish specified, shall be corrected before paint is applied. Painting shall not be done on existing painted surfaces until surfaces are approved by the Inspector.

D. Remove all items fastened to existing painted surfaces and patch holes with an approved material, and re-fasten in original location upon completion of painting work.

E. Existing painted surfaces indicated to be painted, shall be prepared as follows:

1. Wood, plaster and metal surfaces shall be washed with TSP (tri-sodium phosphate) substitute to remove dirt, grease and other foreign materials and rinsed with clean water and then sand papered and dusted off. Surfaces shall have wax completely removed before washing, which includes all base, shoe base, and concrete base.

    a. Checked, cracked, blistered, scaled, peeling, and alligator paint on wood and metal surfaces shall have paint removed down to original finished surface, then hand-sanded and dusted clean.

    b. Surfaces shall then be considered as new work.

    c. Woodwork shall be hand sanded smooth after each and every coat, except last coat. All coats shall be free from dust, dirt or other imperfections.

    d. Steel and aluminum sash to be painted shall be steel-wooled and dusted off. Sash putty shall be hand sanded smooth and dusted off.

    e. Thoroughly remove lint and grease from screens, vents, hoods, etc., which are to be painted.

3.04 SAND BLASTING

A. Provide sandblasting aggregate, equipment and materials as required for proper performance of the Work in this Section in order to produce the intended results.

1. Provide any and all permits required by the Authorities Having Jurisdiction (AHJ).

2. Blasting aggregate (sand, crushed walnut shell, glass bead, or other grit) shall be as selected by the Contractor for appropriate and effective removal of adhered material.

B. Technicians shall be especially skilled in the safe use and operation of equipment.

C. On exposed surfaces of concrete shown or indicated to be sandblasted, provide a uniform appearance which results in the surface fines being removed.

D. Careful Procedures: Protect wood, metal, and other adjacent surfaces NOT required to be sandblasted.

1. Verify that sandblasting personnel are aware of the extent of sandblasting to be performed and areas to be sandblasted.

2. Perform sandblasting in accordance with pertinent regulations of governmental agencies having jurisdiction and in order to match approved sample panel.

3. Use special care in abrading edges and corners to provide a smooth and uniform pattern consistent with other sandblasted surfaces.

E. Promptly, upon completion of sandblasting in an area, clean up all rebound and debris resulting from the operation and remove debris from the site.

3.05 WATERBLAST CLEANING FOR REPAINTING

A. Blasting equipment shall be acceptable to the State of California, or other authority having jurisdiction. No contaminant shall be released into the atmosphere during surface preparation that will cause a public nuisance. Conform to Title 17 of CCR, Public Health.

1. Use only potable water, without abrasives.

B. Perform waterblast cleaning to render the existing surface free from contaminants, laitance, loosely adhering particles, film, and dust and shall afford a sound, stable and uniform substrate that is suitable for repainting.

1. Traces of tightly adhered film will be permitted to remain in-place.

C. Sample Panel: Prior to the initial surface cleaning, waterblast as representative surface designated by the Owner. Final surface condition of remaining work shall be similar to sample panel approved by the Owner.

D. Initial Surface Cleaning: Waterblasting shall consist of washing surfaces to receive paint with a pressurized spray, to remove loose paint, dirt, and other foreign or deleterious materials. The working pressure shall be between 400 and 700 pounds per square inch gage (psig) at a nozzle operating rate of a minimum 20 gallons per minute (g/min.). Do not flood vents or damage windows and floors. If the pressure specified will cause damage to existing surfaces, advise the Owner and obtain permission to vary the pressure. Direct the wash nozzle at the surface at an angle of approximately 75 degrees with the surface and at a distance not greater than 5 feet to apply water pressure required to remove loose paint, dirt, chalking, and other foreign matter.

E. Final Surface Cleaning: After allowing the surfaces to dry for a minimum of 24 hours, remove remaining dirt, loose particles, disintegrated and loose paint, grease, oil, and other foreign matter from the surface.

F. Water runoff from the waterblast operations shall be handled as required by the authority having jurisdiction over the storm drain system.

3.06 CRACKS AND VOIDS

A. Voids between wall and ceiling surfaces and wood or metal trim or scribed edges where finish exists or is specified to be applied and including all molding, shall be thoroughly filled with putty, spackling compound or latex caulking compound.

B. All areas where finish plaster coat is loose shall have that portion removed to a solid surface. All surfaces that are broken, cracked, or damaged and areas where finish plaster coat has been removed must be coated with Weld-Crete as manufactured by Larsen Products Corporation or acceptable substitute. Surface will then be given a cement plaster finish coat consisting of one-part Plastic Portland Cement to three parts sand to match existing finish. All cracks shall be "V-eed" out, filled, finished flush with and textured to match adjoining surfaces, per Owner Representative's approval.

C. Neutralize all walls showing effects of alkali.

D. All local plaster patching shall receive 4 coats of paint. First coat shall be pigmented sealer. Second coat shall be enamel undercoat. Third and fourth coats shall be enamel as indicated.

3.07 REPAIR OF SPALLING CONCRETE

A. Remove all surface contamination, broken and spalled concrete to a sound concrete base. Concrete shall be removed to a depth of one-half (1/2) inch minimum around rebar. Sides of areas to be repaired shall be straight, not tapered or sloped.

B. All spalled or loose concrete shall be removed using a electric or compressed air chipping hammer.

C. Clean all exposed rebar by sandblasting, remove all debris/dust and treat all steel with a sealant (Sika Top/110 Armatec or acceptable substitute) compatible to patching materials same day. The sealant material application shall be subject to approval prior to any patching materials being applied.

D. Repair concrete to match existing concrete surfaces using Sika Top 123 Gel Mortar or acceptable substitute.

E. All sealant and patching materials shall be applied by qualified applicator.

3.08 SPRAYING MASONRY AND STUCCO

A. Masonry and stucco material shall be a 100 % acrylic flat paint, color as directed. Material shall be applied in strict conformity to manufacturer's directions. There shall be at least 24 hours drying time between first coat which shall be factory tinted 10 % to 15 % lighter or darker in color (at discretion of Contractor) than finish coat. Each coat applied to surface shall be sprayed using "Cross-Off" method of application by spraying horizontally with a 50% overlap on returns and doubling back with a vertical stroke with a 50% overlap on returns.

3.09 SASH PUTTY

A. Loose sash putty shall be removed and replaced by Contractor. All rough, uneven or otherwise deteriorated sash putty shall be sanded smooth or re-puttied by Contractor.

B. Sash putty and caulking compound shall be painted with same number of coats as specified for woodwork.

3.10 PUTTY

A. Holes, open joints of woodwork and sash glazing shall, after surrounding areas have been prepared as specified above, be knife puttied. On stained woodwork, putty shall be colored to match stain. Puttying shall be done after first coat of paint or varnish has been applied. Latex caulking compound may be used on open joints and woodwork. Putty or caulking shall be spot primed before finish coat is applied.

3.11 MIXING AND APPLICATION

A. Colors of all coatings shall be as selected by the Architect.

B. Three coats of paint shall be applied as follows:

1. First coat: primer or undercoat, shall be white.

2. Second coat shall be factory tinted in range of 10 % to 15 % lighter or darker than finish coat.

3. Third coat shall be factory tinted to approved color selected, but allowing for tint variations in more than one color for application to different surfaces. Color combinations in rooms and for surfaces shall be varied in accordance with color letter.

C. Any number of colors may be used on any portion of work. The Architect reserves right to change colors before work is started in an area or on a particular surface.

D. Various colors may require additional coats of paint complete coverage. No additional allowances will be made. Contractor is responsible for consulting color letter and knowing color and coverage.

E. Surfaces to be finished and each coating shall be separately inspected by the Inspector and checked for mill thickness. The requirements are (2) mills each coat wet and/or three (3) mill dry after three (3) coats. Notice that such work is ready for inspection shall be given to the Inspector. Should such notice not be given before succeeding coat is put on, finish applied shall be removed or an additional coat shall be applied, as directed by Inspector. Allow at least one day drying time between coats for exterior work or as directed by the Inspector for thorough drying.

3.12 PAINT ROLLERS AND BRUSH APPLICATION ONLY

A. Paint rollers may be used on plaster, drywall, masonry and stucco and plywood surfaces, nap not to exceed one half (1/2) inch in length, or as directed by the Inspector.

B. First coat on wood overhang and ceilings shall have material applied by roller and then shall be brushed out in a professional manner to leave surface free of imperfections. Finish coat may be sprayed.

C. All other surfaces shall have all coatings applied with brushes of proper size.

D. Do not use spray.

3.13 PRIMING

A. Surfaces from which paint finish have been removed down to original wood or metal surfaces shall be thoroughly primed as follows:

1. Wood shall be sealed or primed with a non-water borne material on both sides and all edges. Wood completely sealed with a non-water borne material shall be top coated with a water borne material as specified herein. Finish material (water borne) shall be compatible with non-water borne primer per manufacturer's recommendations. Hardwood shall be thoroughly filled and stained to an even color.

2. Galvanized Metal: Clean all oil and foreign material from surfaces. Apply vinyl wash pretreatment coating. Follow manufacturer's instructions for drying time, and then prime with one coat of metal primer.

3. Ferrous and non-ferrous metal: Prime with an approved primer for ferrous and non-ferrous metal.

3.14 FIRE AND LIFE SAFETY EQUIPMENT

A. OSHA requires the following equipment be painted as follows:

1. Gas Mains and Valves shall be painted "gun metal gray" (medium gray)

2. Fire Valves and Raisers shall be painted OSHA's "safety red".

3.15 DOORS

A. Painted or refinished wood or metal doors shall be finished on both sides and all edges with three coats of paint consisting of first coat of primer, second coat and third coat of enamel.

B. Where doors open into rooms or spaces having different finishes, communicating doors shall have all edges finished according to industry standard or as directed by the Inspector.

1. Strike edge of door shall be same color as inside face of door.

2. Hinged edge of door shall be same finish as outside face of door.

3.16 ENAMEL FINISH

A. Woodwork having an existing enameled finish shall have areas where painter's finish has been removed and where spackling has been done in repairing defects in surface, built-up with undercoat. All wood surfaces shall then be given one coat of undercoat, a second coat and third coat of finish paint to match room finish. Paint shall be applied as specified under "Colors and Number of Coats."

B. All unpainted plaster surfaces to receive an enamel finish, shall receive four (4) coats of paint. First coat of pigmented sealer, second coat of enamel undercoat, third and fourth coats of gloss or semi-gloss enamel as specified herein.

C. All previously painted surfaces shall have all patching and all places where painted finish has been removed, built up with one coat of a pigmented sealer. Then entire surface including patching shall be given one coat of an enamel undercoat, a second and third coat of gloss or semi-gloss enamel as specified herein.

3.17 UNPAINTED METAL

A. Unpainted bronze, brass, copper work, window grilles, stairways, handrails, stainless steel, open metal shelving, and aluminum will not be painted, unless otherwise specified.

3.18 PAINTED METAL

A. Exposed structural steel, miscellaneous or ornamental iron, sheet metal work, guards, steel sash, and painted aluminum, shall have surfaces thoroughly cleaned and prepared. The areas from which original painter's finish has been removed shall be spot primed with metal primer to match adjoining surfaces and then all surfaces shall be given a prime coat of metal primer, second and third coats as specified herein. All copper pipe shall be painted with one coat of enamel undercoat per manufacturer's recommendation, a second and third coat of enamel as specified herein.

3.19 METAL SURFACES

A. Clean by wire-brushing and sanding to remove all foreign debris, loose paint, and rust. After removing loose paint, feather-edge sand surrounding areas of existing finish. Remove all dust.

B. Bare metal surfaces shall be primed with an approved metal primer then painted with a first coat of enamel undercoat, then a second coat and third coat of gloss enamel.

C. Hardware having a painted finish shall have all paint removed. Doors closers shall be finished with a leather brown or aluminum paint.

3.20 PAINTING OF MECHANICAL WORK

A. All exposed heating, ventilating, air conditioning, plumbing, electrical equipment, apparatus, piping, ducts, and coverings shall be cleaned, prepared and painted.

1. In finished areas, these items shall be finished with one coat of primer and two coats of enamel to match adjoining wall or ceiling finish as specified herein.

B. Radiator branches, risers, returns, radiators, supports and all other types of heating equipment in finished spaces shall be finished with three coats of paint to match adjoining finish as specified herein.

C. Register faces and grilles, unless plated, shall be given three coats of paint to match adjoining finish as specified.

D. Coverings on pipes in finished rooms shall be finished same as adjoining wall or ceiling surfaces. Note: Care shall be taken not to break surface of any wrapped pipes.

E. All labels on fire alarm systems, bells, pulls shall be covered and kept intact. All fire alarm bells and pulls to be painted red gloss paint.

F. Valves, pipe hangers, flanges, unions, drain pipes, soil lines, exposed blow-off pipes, boiler fronts, smoke boxes, breeching, iron boiler bases, metal stacks, water column and pipe connections, damper regulators, manholes, safety valve connections, boiler appurtenances, located in boiler room shall be painted with two coats of a boiler paint as recommended by paint manufacturer.

G. All pumps, fans, fan housing, belt guards, including supports, motors, or other equipment, cover plated to sump pump, tank, manhole covers/rings mounted in floors including all conduits and piping in boiler or fan rooms shall be primed and then finished with 2 coats of gloss enamel as specified herein.

H. All mechanical work not specifically mentioned shall be painted as specified for other work of same character.

I. Finished bronze, brass fittings, plated work, name plate and fusible links and chains shall be thoroughly cleaned of all paint.

J. All pressure relief grilles with barometric dampers leading to a corridor or to exterior shall be masked off before spraying any material.

K. All automatic sprinkler valves, gas meters and water meters shall be painted as specified herein

3.21 ELECTRICAL CABINETS

A. Front side of doors and exposed lip around doors to electrical cabinets in finished areas shall be finished same as walls.

3.22 LETTERING

A. Lettering and numerals on glass, fiberglass, stucco, and surfaces to be refinished shall be reproduced in original locations and will be of size, color and design as directed by the Inspector. An experienced sign painter shall do the lettering in a professional manner.

3.23 HARDWARE AND AUTOMATIC DOOR CLOSERS

A. Any hardware having a painted finish shall have all paint removed. Doors closers shall be finished as directed by the Inspector. In any and all cases where both sides of doors are specified to be painted, door closers shall be included.

3.24 CLEANING

A. Glass, polycarbonate and fiberglass where painting has been done shall be cleaned of all paint and varnish, unless otherwise specified. Glass, fiberglass and polycarbonate that are scratched or damaged by painting work, or while cleaning, shall be replaced with same material to match original.

B. Finished bronze, copper, brass fittings, plated work, name plate and fusible links and chains shall be thoroughly cleaned of all paint.

C. Before applying finish coat of material to exterior sash. Contractor shall clean all window panes with an approved cleaner.

D. Dispose of debris, waste or unused materials, off site. Use of the Owner's dumpsters is strictly prohibited.

E. Remove all paint from all hardware, including paint from previous painting.

F. Contractor shall free sash and leave it in an easy operating condition. Two months after completion of project, the Inspector will arrange a date and time when Contractor shall return to site, check and free all painted sashes and ensure an easy operating condition.

G. Rooms, buildings, and grounds shall be cleaned of all paint debris, including dust caused by painting project to approval of the Inspector.

END OF SECTION

SECTION 09 98 62
CONCRETE FLOOR SEALER (ASHFORD)

PART 1 - GENERAL

1.01 SUMMARY

A. Furnish and install concrete floor sealer as indicated on the drawings and specified, including the following:

1. In cases where concrete slabs do not pass moisture testing as a prerequisite to the application of finished flooring, the concrete shall be sealed.

B. Product Data: Submit floor sealer manufacturer's technical data and installation instructions covering installation conditions of the Work, with copies of code approvals.

C. Regulations: Materials shall comply with the current rules and regulations of the local air quality management district, with the rules regarding volatile organic compounds, and with FDA rules and regulations for dangerous materials in sealers.

PART 2 - PRODUCTS

2.01 CONCRETE FLOOR SEALER (ASHFORD)

A. Subject to compliance with specified requirements the concrete sealer shall be the “Ashford Formula” by Curecrete or an “or equal” product of one of the following:

1. Thoro System Products.
2. ProSoCo, Inc.
3. Dependable Floor Products Co.

B. Sealer shall be water based, SCAQMD approved, clear acrylic or urethane coating, designed for installation on interior and exterior traffic surfaces. Sealer shall be designed to penetrate the pore surface of the concrete and inhibit moisture migration. Completed sealer shall have semi-gloss sheen, unless otherwise required.

PART 3 - EXECUTION

3.01 APPLICATION

A. Sealer application: Prepare surfaces in accordance with the coating manufacturers printed instructions. Remove contaminants including loose mortar, rust and other products of corrosion, disintegrated concrete, and other substances that could interfere with adhesion of the coating system to the substrate.

B. Install by experienced mechanics with methods and spray or roller equipment recommended by coating manufacturer, after surfaces to be treated are dry.

C. Mix the components and install floor sealer in accordance with manufacturer's recommendations. Install evenly over the surface in 2 coats at approximately 200 square feet per gallon per coat. Keep traffic from treated surfaces until the material is thoroughly dry.

END OF SECTION

SECTION 31 20 00
EARTH MOVING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Preparing subgrades for slabs-on-grade
2. Excavating and backfilling for buildings and structures.
3. Drainage course for concrete slabs-on-grade.
4. Subsurface drainage backfill for walls and trenches.
5. Excavating and backfilling trenches for utilities and pits for buried utility structures.

1.03 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.

1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.

2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, un-stratified masses, conglomerate deposits, and boulders of rock material 3/4 cu. yd or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.04 SUBMITTALS

A. Material Test Reports: For each borrow soil material proposed for fill and backfill as follows:

1. Classification according to ASTM D 2487.

1.05 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.

1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.

1. Do not proceed with work on adjoining property until directed by Architect.

C. Utility Locator Service: Notify Digalert (811) for area where Project is located before beginning earth moving operations.

D. Protect existing utilities from damage. Provide adequate means of support and protection during earthwork operations in compliance with applicable requirements of authorities having jurisdiction. Repair damaged utilities to the satisfaction of utility owner.

E. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures.

F. Do not direct vehicle or equipment exhaust towards protection zones.

G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.rior to starting excavation and demolition, erect positive retaining barricades and protection structures around the work areas to protect pedestrians from injury and property from damage. Perform excavation work and provide adequate means of support and protection during earthwork operations in compliance with applicable requirements of authorities having jurisdiction. Barricade off open excavations when off site. Protect surfaces surrounding work areas and in staging areas.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

PART 3 - EXECUTION

3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.

B. Protect and maintain erosion and sedimentation controls during earth moving operations. Erect fences at all storm drain locations within reasonable proximity of work area. Provide standard-strength geotextile fabric with wire fence reinforcement anchored to wood posts not more than 10 feet apart. Install posts with an inclination toward the potential silt load area of at least 2 but not more than 20 degrees. Secure fabric and wire fencing with staples. Entrench fabric into ground at least 4 inches. Splice fabric at support and lap of at least 6 inches. Provide 1 inch tuck at top edge of fabric. Provide finished height of or greater than 35 inches.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.02 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.emove rock to lines and grades indicated to permit installation of permanent construction without exceeding the following dimensions:

    a. 12 inches (outside of concrete forms at footings).
    b. 6 inches outside of minimum required dimensions of concrete cast against grade.
    c. 6 inches beneath bottom of concrete slabs-on-grade.
    d. 6 inches beneath pipe in trenches, and the greater of 24 inches wider than pipe

3.03 SHORING

A. Stage excavation and/or install temporary shoring as required to protect workers and excavation in accordance with OSHA standards.

3.04 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.05 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.

1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.

1. Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe

2. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course

D. Trenches in Tree- and Plant-Protection Zones:

1. Hand-excavate to indicated lines, cross sections, elevations, and subgrades. Use narrow-tine spading forks to comb soil and expose roots. Do not break, tear, or chop exposed roots. Do not use mechanical equipment that rips, tears, or pulls roots.Do not cut main lateral roots or taproots; cut only smaller roots that interfere with installation of utilities.

3.06 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength of 2500 psi, may be used when approved by Architect.

3.07 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.08 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, sub-drainage and waterproofing.

2. Surveying locations of underground utilities for Record Documents.

3. Testing and inspecting underground utilities.

4. Removing concrete formwork.

5. Removing trash and debris.

6. Removing temporary shoring and bracing, and sheeting.

7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

C. Use care not to damage drainage, protection board, waterproofing membrane or foundation drain pipe.

3.09 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.

B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

C. Backfill voids with satisfactory soil while removing shoring and bracing.

D. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.

1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

E. Place and compact final backfill of satisfactory soil to final subgrade elevation.

F. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:

1. Under grass and planted areas, use satisfactory soil material.
2. Under walks and pavements, use satisfactory soil material.
3. Under steps and ramps, use engineered fill.
4. Under building slabs, use engineered fill.
5. Under footings and foundations, use engineered fill.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.11 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.

1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.12 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil materials to not less than the following percentages of maximum dry unit weight.

1. Under structures, building slabs, steps, and pavements, scarify and re-compact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

2. Under walkways, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 92 percent.

3. Under turf or unpaved areas, scarify and re-compact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

4. For utility trenches, compact each layer of initial and final backfill soil material at 85 percent.

3.13 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.

B. Provide a smooth transition between adjacent existing grades and new grades.

1. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

2. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.14 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Remove loose material from compacted subbase surface immediately before placing concrete or setting beds.

B. Place drainage course on subgrades free of mud, frost, snow, or ice.

C. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs- on-grade as follows:

1. Place drainage course 6 inches or less in compacted thickness in a single layer.

2. Place drainage course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.

3. Compact each layer of drainage course to required cross sections and thicknesses to not less than 95 percent of maximum dry unit weight according to ASTM D 698.

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

1. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace soil material to depth as directed by Architect; reshape and re-compact.

B. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16. DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

B. Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 32 01 17
COLD MILLING (GRINDING) OF BITUMINOUS PAVEMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

A. Perform cold milling (grinding) of bituminous pavements as indicated on the drawings and specified.

1.03 QUALITY ASSURANCE

A. Conform the finished milled surfaces to the lines, grades, and cross sections indicated. The finished milled-pavement surfaces shall vary not more than 1/4 inch from the established plan grade line and elevation. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements. The deviations from the plan grade line and elevation will not be permitted in areas of pavements where closer conformance with planned grade and elevation is required for the proper functioning of appurtenant structures involved.

B. Finished surfaces shall not deviate from the testing edge of a straightedge more than 1/4 inch in the transverse or longitudinal direction.

C. Provide all necessary traffic controls during milling operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 EQUIPMENT

A. Provide a cold-milling machine which is self-propelled, capable of milling the pavement to a specified depth and smoothness and of establishing grade control; with means of controlling transverse slope and dust produced during the pavement milling operation. The machine shall have the ability to windrow the millings or cuttings. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

B. Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface.

C. Furnish and maintain at the site, in good condition, one 12 foot straightedge or other suitable device for each milling machine, for testing the finished surface. Make straightedge available for use by the Inspector. Straightedges shall be constructed of aluminum or other lightweight metal, with blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on the pavement.

3.02 MILLING OPERATION

A. Make sufficient passes so that the designated area is milled to the grades and cross sections indicated. The milling shall proceed with care and in depth increments that will not damage the pavement below the designated finished grade. Repair or replace, as directed, items damaged during milling such as manholes, valve boxes, utility lines, pavement that is torn, cracked, gouged,

broken, or undercut. The milled material shall be windrowed or removed from the pavement and loaded into trucks.

3.03 GRADE AND SURFACE-SMOOTHNESS TESTING

A. Test the finished milled surface of the pavement for conformance with the plan-grade requirements and for acceptance by the Inspector by running lines of levels longitudinally and transversely to determine the elevation of the completed pavement. Correct variations from the designated grade line and elevation in excess of the plan-grade requirements as directed. Skin patching for correcting low areas will not be permitted. Remove and replace the deficient low area. Remove sufficient material to allow at least 1 inch (compacted thickness) of asphalt concrete to be placed.

B. After completion of the final milling, the finished milled surface will be tested by the Inspector with a straightedge. Other approved devices may be used, provided that when satisfactorily and properly operated, such devices reveal all surface irregularities exceeding the tolerances specified. Correct surface irregularities that depart from the testing edge by more than 1/4 inch. Skin patching for correcting low areas will not be permitted. Remove and replace the deficient low area. Remove sufficient material to allow at least 1 inch (compacted thickness) of asphalt concrete to be placed.

3.04 REMOVAL OF MILLED MATERIAL

A. As directed by the Architect, material that is removed shall be transported to central plant for hot-mix or cold-mix recycling or become the property of the Contractor and removed from the site.

END OF SECTION

SECTION 33 46 00
SUBDRAINAGE PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes: Geocomposite Foundation Drainage Installation.

1.02 REFERENCES

A. Standards of the following as referenced

1. American Society for Testing and Materials (ASTM):

1.03 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit manufacturer's product data and installation instructions.

C. Quality Assurance/Control Submittals: Submit the following:

1. Certificates: Submit certificate that applicator complies with requirements of this section.

1.04 QUALITY ASSURANCE

A. Preinstallation conference: Coordinate with conference scheduled for waterproofing materials. Follow requirements indicated in waterproofing materials section.

1.05 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.06 SEQUENCING AND SCHEDULING

A. Schedule installation after waterproofing installation but prior to backfill.

1.07 WARRANTY

A. Manufacturer's Material Only Warranty available.

PART - 2 PRODUCTS

2.01 Geocomposite Foundation Drainage:

A. ArmorDrain 150-150pf Drainage Mat Foundation Drainage Roll:

1. Core Material: Black, high impact polypropylene

    a. Moderate duty, impermeable polymeric sheet
    b. Foundation drainage rate: 21gal/min/ft²

2. Fabric Material: Black, non-woven filter fabric

    a. Flow – 140 gal/min/ft²
    b. Puncture – 65 lbs

2.05 ACCESSORY MATERIALS

A. Provide proprietary accessory materials or comparable, including the following:

1. Mar-flex's ArmorMastic:

    a, Material: Plastic or resin material compatible with the waterproofing membrane.

2. Mar-flex's 6" Connectors

3. Mar-flex's 12" Connectors

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the most current written installation instructions and recommendations of the manufacturer.

3.02 EXAMINATION

A. Site Verification of Condition:

1. Verify that waterproofing is in place.
2. Verify that site conditions are acceptable for application of the roll.
3. Do not proceed with application until unacceptable conditions are corrected.

3.03 PREPARATION

A. Surface Preparation:

1. Application of waterproofing membrane

3.04 APPLICATION/INSTALLATION

A. Install ArmorDrain 110 or 150/150pf Drainage Mats after membrane has been applied. Place and secure to substrate according to manufacturer's current written instructions.

1. While the membrane is still tacky, begin installation at a corner. Install horizontally against the waterproofing membrane with the polypropylene geotextile mat side facing out-ward.

2. Install panels from top of footing extending to finish grade level. If there is overlapping off the membrane once you have reached the grade line, a utility knife or similar tool can be used to cut the rolls to the correct height.

3. For good adherence, apply uniform pressure throughout the surface area, not just the edges and corners.

4. When two edges come together from two separate pieces, overlap the dimples to create a continuous coverage of the wall.

5. Secure the board to the wall with concrete fasteners.

6. If the board overlaps the membrane once you have reached the grade line, a utility knife or similar tool can be used to cut the boards to the correct height.

B. Backfill and Drainage

1. #57 Gravel or equivalent must go no less than 2’ high at the base of the foundation and 1’ in depth away from the foundation walls.

2. Adequate interior and exterior foundation drainage at the base of the foundation walls, across any floors or adjacent flower beds must be properly installed and functioning properly.

3. Backfilling should begin no sooner than 24 hours after the installation of the board, but must be backfilled within 15 days.

C. 6” Geo-Drain or 12” Geo-Drain DrainTile Vertical Collection System Installation

1. Unroll material along foundation base; adhere to partially cured waterproofing material; use adhesive acceptable to waterproofing material manufacturer for cured waterproofing or other sheet waterproofing not requiring curing.

2. Install preformed corner fittings at foundation interior and exterior corners.

3. Install outlet fittings where indicated; connect to corrugated drainage pipe if present at time of modular system installation; leave ready for connection to corrugated drainage pipe if not present.

3.05 CLEAN UP

A. Dispose of scrap in dumpster.

END OF SECTION

CONSULTING WEST

ENGINEERS

Casitas Municipal Water District (CMWD)
Electrical Upgrades for Rincon
Pump Plant

ELECTRICAL
SPECIFICATION
BOOKLET

PREPARED BY,

Consulting West Engineers
31340 Via Colinas, Suite 102
Westlake Village, CA 91362
(818) 889-3383

January 20, 2019

INDEX TO SPECIFICATIONS

DIVISION 26 - ELECTRICAL

SECTION 26 01 00
GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

1.1a This Section includes the following:

1. CONSTRUCTION COORDINATION (Very important!) (See Section 1.2).

2. CONSTRUCTION TIME LINE (See Section 1.3).

3. Submittal requirements, including but not limited to the following:

3.1 Supporting devices for electrical components.

3.2 Concrete equipment bases.

3.3 Electrical identification.

3.4 Cutting and patching for electrical construction.

3.5 Touchup painting.

1.1b Related Work:

1. Temporary Services:

a. Include all costs for temporary service, temporary 5KV-MC cables, temporary routing of service or any other requirements of a temporary nature associated with the objective to ensure that the pumps remain operational during construction.

2. Concrete Work:

a. Provide cast-in-place concrete as shown on drawings, unless otherwise noted.

b. Provide metal shapes and templates used to form concrete, and provide anchor bolts required to be cast in concrete, for support of electrical equipment.

3. Painting:

a. Electrical equipment shall be furnished with factory applied primer and finish coats, unless otherwise specified.

b. If factory finish on equipment furnished by Contractor is damaged in shipment or during construction, equipment shall be refinished to satisfaction of CMWD at no extra cost to CMWD.

c. Furnish one can of touch up paint for each type/color of factory final finish coat.

1.1c Definitions:

1. Intent of drawings and specifications is to define 100% complete and operable systems that are furnished, installed, tested, adjusted, and ready for operation.

2. Complete and operable systems shall include all required hardware, fittings, boxes, pedestals, mounting provisions and miscellaneous equipment.

3. Except as otherwise defined in greater detail, the terms "provide", "furnish" and "install" as used in Division 26 contract documents shall have the following meanings:

   "Provide" or "provided" shall mean, "furnish and install".

   "Furnish" or "furnished" does not include installation.

   "Install" or "installed" does not include furnishing.

4. Include incidental details not usually shown or specified, but necessary for proper installation and operation.

5. Check, verify, and coordinate work with drawings and specifications prepared for other trades. Include modifications, relocations, or adjustments necessary to complete work or to avoid interference with other trades.

6. Information given herein and on drawings is as exact as could be secured but is not guaranteed. Do not scale drawings for exact dimensions.

1.2 CONSTRUCTION COORDINATION

It is critically important to minimize downtime of this pump plant to periods of no longer than 24 hours during winter months and no longer than 6 hours during spring, summer, and fall seasons, with adequate follow-on time to refill the served reservoirs. The construction drawings delineate a recommended construction sequence that provides for an orderly transition to the new switchgear replacement work. The contractor is welcome to propose alternate approaches. The objective is to ensure that the pumps remain operational during the entire project.

1.3 CONSTRUCTION TIME LINE

Due to the critical need to complete this project during the winter season (when water demand is lower), the contractor shall include in his proposal a specific time line showing critical steps and completions dates for each phase of construction. Contractor's time-line shall specifically include the following milestones:

1. Coordinate work with contractor building the new electrical room.
2. **Existing system shall remain operational and undisturbed during these stages**. Contractor to provide overhead protection to the existing switchgear and motor control center by building A temporary roof with plywood sheathing supported on 6x2 posts.
3. Proceed with the required installation of the underground conduits, the slab box for Pad mount S.C.E. Transformer and the new switchgear.
4. Completion of all conduit and slab box inspection in coordination with S.C.Edison Co. .
5. Install new Service Switchgear as shown on plans.
6. Complete the installation of Low Voltage (120/208V) panels including conduit and wire extensions as shown on drawings.
7. SCE to power up Switchgear in coordination with contractor.
8. SCE to remove old service conductors.
9. Start up and Testing of new Switchgear, MCC and motors.
10. Complete all remaining work and site activity.
11. Submit all required documentation (as-built dwgs, manuals, etc.)

Contractor shall make provisions to provide all necessary labor and materials necessary to complete all the activities listed above. Time line shall clearly indicate date and duration of all anticipated power-down periods where no pumps will be operable. (CMWD recognizes that some of these steps may require SCE involvement, and that the contractor cannot be held responsible for delays caused by the local power utility or by unanticipated CMWD events.)

1.4 SUBMITTALS

A. Shop Drawings (Product Data):

1. The term "Shop Drawings" is generally used throughout this specification, and refers to detailed product information and installation details as dictated by context. Manufacturer-provided product drawings are acceptable, provided all optional items and generalized dimensions are clearly marked to indicate precise dimensions and included options. Items shown on submittal documents that are not included must be crossed out or deleted from submittal documents.

2. Contractor shall submit shop drawings for equipment and systems as requested in the respective specification sections. Submittals which were not requested may not be reviewed.

3. Mark general catalog sheets and drawings to indicate specific items submitted.

4. Include proper identification of equipment by name and/or number, as indicated in specification and shown on plans.

5. When manufacturer's reference numbers are different from those specified, provide correct cross reference number for each item. Submittal shall be clearly marked and noted accordingly.

6. When equipment and items specified include accessories, parts and additional items under one designation, submittal shall be complete and include all required components.

7. Submittal based on other than the item specified in Electrical Distribution System sections shall include coordination study showing complete system coordination.

8. Where submittal cover products containing non-metallic materials, include "Material Safety Data Sheet" (MSDS) from manufacturer stating physical and chemical properties of components and precautionary considerations required.

9. Submit shop drawings or product data as soon as practicable after signing contracts. Submittal must be approved before installation of materials and equipment.

10. Submittals which are not complete, not permanent, or not properly checked by Contractor will be returned without review.

B. Coordination Drawings::

1. "Coordination Drawings" shall be prepared by Contractor to coordinate work among various trades and to facilitate installation. These types of drawings typically include dimensioned conduit and electrical raceway layouts.

C. Certificates and Inspections:

1. Obtain inspections required by this specifications and deliver certificates approving installations to CMWD unless otherwise directed.

D. Operation and Maintenance Manuals:

1. Upon completion of work and before final acceptance of system, submit to CMWD for approval, three copies of operation and maintenance manuals in loose-leaf binders. If one copy is larger than two inches thick or consists of multiple volumes, submit only one set initially for review. After securing approval, submit all three copies to CMWD.

2. Manuals shall be organized by specification section number and shall have table of contents and tabs for each piece of equipment or systems.

3. Manuals shall include the following:

a. Manufacturer's operating and maintenance instructions and parts lists of all items or equipment. Where manufacturer's data includes several types or models, applicable type or model shall be designated.

b. Wiring diagrams for all systems. Diagrams of a general nature are not acceptable. Diagrams must show exact internal wiring, and any optional items or components that are not included must be deleted from the diagrams.

c. Additional information, diagrams or explanations as designated under respective equipment or systems specification section.

d. Factory and field-test records.

4. TRAINING: Manufacturer shall instruct CMWD's Representative regarding operation and maintenance of equipment. Instruction shall include complete operating cycle on all apparatus.

5. O&M manuals and instructions to CMWD are of prime importance and shall be provided prior to request for final payment.

E. Record Documents:

1. Prepare complete set of record drawings by revising electronic copies of original contract documents as prepared and furnished by CMWD. Where reproducible drawings cannot be satisfactorily revised for record purposes, prepare appropriate new drawings using title block furnished by CMWD.

1.5 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Rules and regulations of Federal, State and local authorities and utility companies, in force at time of execution of contract shall become part of this specification.

B. Reference Standards:

1. Agencies or publications referenced herein refer to the following:

ANSI	American National Standards Institute
ICEA	Insulated Cable Engineers Association
IEEE	Institute of Electrical & Electronics Engineers
NEC	National Electrical Code (by NFPA)
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NIST	National Institute of Standards & Technology
UL	Underwriters Laboratories, Inc.

Uniform Building Code, latest edition
NECA Standards for Construction
California Administrative Codes and Title 24
California State and Local Fire Marshall

1.6 WARRANTY

A. Guarantee all equipment, materials, and workmanship to be free from defect for twelve (12) months after startup date and complete delivery to CMWD.

B. Repair, replace or alter systems or parts of systems found defective at no extra cost to CMWD.

C. In any case, wherein fulfilling requirements of any guarantee, if Contractor disturbs any work guaranteed under another contract, restore such disturbed work to condition satisfactory to CMWD and guarantee such restored work to same extent as it was guaranteed under such other contract.

PART 2 - PRODUCTS

Products shall be as indicated on drawings and specification.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Access:

1. Provide raceways, pull boxes, and accessories so as to permit access for maintenance.

2. Install equipment with ample space allowed for removal, repair or changes to equipment. Provide ready accessibility to equipment and wiring without moving other equipment, which is to be installed, or which is already in place.

B. Equipment Supports:

1. Provide supporting steel not indicated on drawings as required for installation of equipment and materials including angles, unistrut channels, beams, hangers, etc.

2. Provide concrete & masonry anchors, used for attachment to concrete. Anchors shall be steel shell with plug type. Plastic, rawhide or anchors utilizing lead are not allowed.

C. Support Protection:

1. In existing, electrical areas requiring normal maintenance access by CMWD, provide equipment guards as necessary to protect personnel from injury.

2. Provide minimum 1/2" thick Armstrong Armaflex insulation or similar product applied with Armstrong 520 adhesive on lower edges of equipment, including conduit, pull boxes, and electrical supporting devices suspended less than 7 ft above floors.

3. Threaded rod or bolts shall not extend beyond supporting element and shall be protected as described above.

D. Cutting and Patching:

1. Perform cutting, drilling and patching required for complete installation of conduit systems. When installation requires openings and access through existing construction and is not provided by General Contractor, it shall be provided under this Section. Patch and restore all work cut or damaged to original condition. This includes openings remaining from removal or relocation of existing system components. All openings and penetrations must be rodent-proof when complete.

2. Provide all materials required for patching unless otherwise noted.

3. Do not pierce beams or columns without permission of CMWD and then only as directed. for Openings required through walls or floors, hole shall be core drilled to avoid unnecessary damage and structural weakening.

4. Replace, repair, and refinish surfaces to condition existing prior to commencement of work. This may include areas beyond construction limits.

E. Wall Openings:

1. Sleeves shall be Schedule 40 carbon steel pipe with integral water stop Similar to type "WS" wall sleeves by Thunderline Corporation. Seal annular space between sleeves and pipe with "Link-Seal" modular wall and casing seals by Thunderline Corporation, or sealing system by another manufacturer approved as equal by CMWD. Sealing system shall utilize Type 316 stainless steel bolts, washers and nuts.

2. For core drilled holes, size and location shall be reviewed and approved by CMWD prior to execution.

3. Seal concrete wall openings with water proof caulk and rodent proof sealants.

F. Rodent Proof Installation: All building openings, including new conduits, and busway, shall be sealed with rodent proof materials to prevent rodents from gaining access to Electrical Switchgear.

G. Housekeeping and Cleanup:

1. Periodically as work progresses and/or as directed by CMWD, remove waste materials and leave area of work broom clean. Upon completion of work, remove tools, scaffolding, broken and waste materials, etc. from site.

2. Food items shall be removed from site daily to minimize attraction of raccoons and rodents to construction areas.

H. Testing:

1. Refer to Section 267000 – Acceptance testing.

2. Prior to energizing of switchgear, conduct appropriate tests to verify integrity of insulation and grounding. Hi-pot test new conductors before connecting to existing switchgear. Do NOT apply meg-ohm or other high voltage tests to existing pump motors when checking switchgear, unless specifically directed to do so by CMWD personnel.

3. Verify proper operation of main circuit breaker of 1,200 Amps and all ground-fault interrupting devices prior to energizing switchgear.

4. Notify engineer and CMWD inspectors at least 48 hours in advance of each test, and schedule so that testing may be witnessed by all parties.

5. Provide all equipment required for testing, including meters and power sources.

6. This Contractor is responsible for certifying in writing, the results of all testing of systems and equipment in this contract. Include description of the portion of system that has been tested for each entry. Record date, time, test criteria, and include signature, name and title of person certifying the test.

7. When equipment or systems fail to meet minimum test requirements, replace or repair defective work or materials as necessary and repeat inspection and test. Make repairs with new materials.

8. Maintain complete records at job site of testing that has been certified.

9. At completion of project, include in O&M manuals copies of test approval records and certifications.

10. Upon completion of work, submit to CMWD copies of test approval records and certifications.

I. Start-Up:

1. Manufacturer of Switchgear shall provide start-up services with a qualified medium voltage engineer.

2. Switchgear shall be started, tested, adjusted and turned over to CMWD ready for operation.

J. Identification:

1. Submit identification text to CMWD for approval. CMWD reserves the right to modify identifications prior to shop drawing approval.

2. After painting is completed, identify equipment as indicated. Locate identification as conspicuously as possible except where such would distract from finished area.

3. Group conductors as to phases and arrange in a neat manner in pull boxes and cabinets. Group, bind together with nylon ties and identify conductors. Phase identification shall be consistent throughout system.

4. Furnish typewritten charts with identification and location of access panels serving equipment and incorporate in O&M manuals.

K. Cleaning:

1. After installation is complete, Contractor shall clean all systems.

2. Clean debris from panel enclosures, junction boxes and pull boxes and arrange wire neatly with surplus length cut off prior to installation of covers.

3. Thoroughly clean equipment of stains, paint spots, dirt and dust. Remove temporary labels not used for instruction or operation.

END OF SECTION

SECTION 26 07 00
ELECTRICAL CONNECTIONS

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Extent of electrical connections for applicable equipment is indicated on drawings and schedules. A specific sequence is indicated on the drawings, and should be followed as closely as possible to minimize water supply disruptions during construction activity. Electric connections are hereby defined to include, but not necessarily limited to, connections for providing electrical power to existing equipment.

B. Furnish all labor and material required to complete power connections to all existing electric equipment, including 2.4KV Motors, Motor Starters and Service Switchgear.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Available Manufacturers: Subject to compliance with requirements, manufactures offering products which may be incorporated in the work include, but are not limited to, the following:

3-M Corp.
AMP Products Corp.
Appleton Electric Co.
Burndy Corp.
Ideal Industries, Inc.
T and B/Thomas and Betts Corp.

2.02 MATERIALS AND COMPONENTS:

A. General: For each electrical connection indicated, provide complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, electrical solder, electrical soldering flux, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other items and accessories as needed to complete splices and terminations of types indicated.

B. Metal Conduit and Fittings: Provide rigid metal conduit and fittings, grades, sizes and weights indicated for each type service. Where types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements; comply with NEC requirements for raceways. Provide products complying with Electrical Work basic materials and methods section “Raceways”, and in accordance with the raceway material required for the project.

C. Wire, Cable, and Connectors: Provide wires, cables, and connectors complying with Electrical Work basic materials and methods section “Wires and Cables”.

D. Wire: Unless otherwise indicated, provide wires/conductors for electrical connections which match wires/conductors of wiring supplying power.

E. Connectors and Terminals: Provide electrical connectors and terminals as recommended by connector and terminal manufacturer for intended applications.

F. Electrical Connection Accessories: Provide electrical insulating tape, heat-shrinkable insulating tubing and boots, solder, electrical soldering flux, wire nuts and cable ties as recommended for use by accessories manufacturers for type services indicated.

PART 3 - EXECUTION

3.01 INSTALLATION OF ELECTRICAL CONNECTIONS:

A. Install electrical connections as indicated; in accordance with connector manufacturer's written instructions and with recognized industry practices, and complying with requirements of NEC and NECA's " Standard of Installation" to ensure that products fulfill requirements.

B. Connect electrical power supply conductors to equipment conductors in accordance with equipment manufacturer's written instructions and wiring diagram. Wherever possible, mate and match conductors of electrical connections for proper interface between electrical power supplies and installed equipment.

C. Coordinate installation of electrical connections for equipment with equipment installation work.

D. Cover splices with electrical insulation equivalent to, or of higher rating, than insulation on conductors being spliced.

E. Prepare cables and wires by cutting and stripping covering armor, jacket, and insulation properly to ensure uniform and neat appearance where cables and wires are terminated.

F. Trim cables and wires as short as practicable and arrange routing to facilitate inspection, testing and maintenance.

G. Tighten wire-binding connector screws firmly.

H. Refer to section 26 01 00 for identification of electrical power supply conductor terminations with markers approved as to types, colors, letters and market sizes. Affix markers at each point of termination, as close as possible to each point of connection.

END OF SECTION

SECTION 26 11 00
CONDUITS & FITTINGS

PART 1- GENERAL

1.1 SUMMARY

A. Section Includes:

1. Conduits, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Work:

1. Underground conduits for S.C.Edison Service Conductors. Contractor shall follow requirements of S.C.Edison.

1.2 PROTECTION

A. Furnish information to CMWD as to size and location of built-in openings required. Do not cut, remove or pierce exterior walls, fire rated walls, ceilings or steelwork without prior permission and instruction.

B. Coordinate layout and installation of raceways and boxes with other construction elements to insure adequate headroom, working clearance, and access.

1.3 SUBMITTAL

A. Procedure: In accordance with this Section.

B. Shop Drawings:

1. Submit shop drawings for:

a. Conduits.

b. Couplings & Fittings.

c. Conduit bodies.

d. Boxes.

e. Conduit seals.

2. Provide list of conduit types indicating where each type will be used.

1.4 QUALITY ASSURANCE

A. Each conduit shall bear manufacturer's trademark and UL label.

PART 2- PRODUCTS

2.1 CONDUIT AND FITTINGS

A. Rigid Steel Conduit:

1. Heavy wall tubing with hot dipped galvanized coating and shall conform to ANSI C-80.1.

2. Provide threaded connectors and couplings.

3. Connections shall be made with double locknuts and bushings. Bushings to be steel with internal insulator except conduits 2" and below may have high impact thermoset phenolic insulated bushings.

4. All conduit bushings, fittings and terminations shall be UL listed as grounding type fittings, or shall be supplemented by a UL approved grounding type device.

B. EMT Conduit:

1. Thin wall tubing with hot dipped galvanized coating

2. Couplings and connectors shall be threaded steel watertight gland compression type.

3. Steel set screw couplings are permitted for 1 inch or smaller EMT concealed conduit not in slab
4. All connectors shall have insulated throat

Rigid Nonmetallic Conduit:

1. Heavy wall rigid, type 40, listed for underground encased, underground direct and above ground applications.

C. PVC Jacketed Conduit:

1. Rigid steel conduit and fittings with an extruded polyvinyl chloride jacket. The jacket shall have high tensile strength, shall be highly resistant to corrosion and shall not oxidize or deteriorate or shrink when exposed to sunlight and weather. The jacket shall be flame retardant and shall not support combustion. The interior of the conduit shall have a urethane coating.

2.2 CONDUIT BODIES

A. Conduit bodies 3" or larger shall be Crouse-Hinds, Type LBD.

B. Conduit bodies smaller than 2" shall be Crouse-Hinds, Type Form 8.

2.3 BOXES

A. Galvanized steel or FD cast type outlet boxes to accommodate device indicated by symbol, in conformance with code requirements, number and size of conductors and splices and consistent with type of construction. Bell boxes are not allowed.

B. Surface mounted boxes shall have the appropriate cover, raised device covers on 4" square and 4-11/16" boxes, etc. Boxes in block shall have device covers that are square drawn or square cut. Boxes in tile shall have tile covers. Use round drawn device covers on boxes in lath and plaster walls or dry wall only.

C. FD cast type boxes shall be utilized with rigid steel conduit.

D. The front edge of the device boxes must be set flush with the finished wall surfaces except on walls of non-combustible materials where the boxes may have maximum set back of 1/4".

E. Outside exterior wall boxes or wet location boxes shall be gasketed type cast boxes with matching cover. Boxes shall have hubs threaded for rigid conduit and neoprene gasketed covers.

F. Junction or Pull Boxes and Covers:

1. Code gauge steel with galvanized or sheradized finish with covers secured by galvanized machine screws. Boxes shall be large enough so that code required minimum cable bending radii can be rolled and constructed. Knock out punches shall be used for required holes.

2.4 SUPPORT

A. Conduit supports for horizontal and vertical multiple runs:

1. Hot dipped galvanized structural steel and unistrut channel systems with appropriate components. Horizontal runs to be supported with appropriate unistrut and vertical runs anchored to support structure. Provide 25% future conduit space on each channel construction.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide for proper application, installation and location of, supports and anchor bolts for satisfactory raceway system. Where any component of the raceway system is damaged, replace it or provide new raceway system at no cost to district. CMWD.

B. Complete raceway installation before starting conductor installation.

1. Use temporary closures to prevent foreign matter from entering raceways.

2. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bend is not visible above the finished slab.

3. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

C. Separation of system low voltage signal cabling from power wiring: Maintain a min. of 6”

D. Run conduits to permit drainage, and to avoid materials and equipment of other trades. Maintain minimum clearance of six inches from water pipes.

E. Feeder conduits, exposed conduit grouped and parallel supported on structural wall. Exposed conduits shall be offset at boxes. Make bends in parallel. Bank runs from same centerline to make bends parallel. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.

F. Running threads are not allowed for any type of conduits.

G. Center conduit on structural walls clear of reinforcing steel, except where crossing same, and spaced on centers equal or exceeding three times the conduit diameter.

H. Conduit larger than 3/4" shall not be installed in topping slabs without approval. Minimize conduit in topping slabs. Locate to avoid conflict with equipment, door bucks, partitions and other equipment bolted to floor.

I. Ream conduit smooth at ends, restore galvanized finish, cap upon installation, rigidly attach to structural parts of building and securely fasten to outlet boxes, panel cabinets, junction boxes, pull boxes, splicing chambers, safety switches and other components of the raceway system.

J. Join raceways with fittings designed and approved for the purpose and make joints tight.

1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

2. Use insulating bushings to protect conductors.

K. Terminations

1. Tighten set screws of threadless fittings with suitable tools.
2. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box.
3. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipples so no threads are exposed. Verify that conduits are securely seated and thighten into threaded hub of conduits.
4. Threadless connectors and couplings are not allowed.

L. Independently support or attach raceway system to structural supports in accordance with good industry practice. Suspended ceiling systems shall not be considered as structural parts of the construction for conduit support. Conduit, conduit systems or boxes shall not be supported or secured by wire, but shall be supported by devices manufactured specifically for this purpose. Plastic tie-wrap is not permitted.

M. Conduits supported on channel systems shall be secured on each channel with appropriate clamps.

N. Conduit installed in metal stud walls must be secured to prevent rattling.

O. Devices in exterior or load-bearing walls may be fed by horizontal conduit runs. Horizontal bends in conduit around corners is not allowed. Other devices shall be fed vertically from above.

P. Provide spare capped conduits for flush-mounted panelboards consisting of three 3/4" conduits to the ceiling space above, and three 3/4" conduits to the ceiling space below floor slab.

Q. Provide empty raceways 2-1/2" and over with No.10 galvanized fishwire and nylon cord in smaller sizes.

S. Provide conduit expansion and deflection fittings in all conduit at building separation/seismic joints complete with bonding jumpers. Conduit shall be rigid steel heavy wall. Alternate flexible connection made up of full size 24" length of flexible metal conduit and couplings may be used where EMT runs across expansion joints in ceiling spaces. Conduits on roof exposed to weather shall have watertight fittings.

T. Conduit attached to building surfaces which may be damp shall be spaced out to avoid rust and/or corrosion using fittings approved for use.

U. Provide conduit seals where conduits pass from interior to exterior of the building, in moist areas in accordance with NEC, where conduits enter room which at any time is low or high temperature room and where conduits enter a room which at any time is subject to internal air pressures above or below normal.

V. Provide minimum of 5 ft of rigid metal conduit on duct lines entering or leaving buildings.

W. Three 90º bends are maximum allowed in any conduit run.

X. Seal conduits entering or passing through areas which are "hazardous areas" as defined by NEC and/or NFPA using Crouse Hinds Series EYS seal fittings and Crouse Hinds "Chico A" sealing compound, following manufacturer's recommended installation methods.

AA. Install conduits located in hazardous areas in accordance with NEC.

AB. Set outlet boxes parallel to construction and independently attached to same. Adjust flush type boxes to set level with finished surface. Back to back and through-the-wall boxes are not acceptable. Ganged sectional type boxes are not acceptable. Do not install back to back boxes in the same wall stud space.

AC. Boxes in concrete shall be of type to allow placing of conduit without displacing reinforcing bars, and shall be type approved for concrete use. Boxes installed in poured concrete shall be packed with approved material to prevent concrete entering box. Do not use paper for such packing.

AD. Lighting fixtures outlet boxes shall be equipped with proper fittings to support and attach light fixtures.

AE. Box Support: Mount boxes straight. In stud walls provide horizontal bracing at top or bottom of box for three or more gang device boxes. For up to two gang device boxes, provide stud support one side, with short piece of stud of support on opposite side. In masonry walls boxes shall be solidly mortared in. Tie wire supported boxes are not acceptable.

AF. For one and two gang box support, Steel City "H" bracket supports shall be accepted alternate.

AG. Provide multi-ganged boxes where two or more devices are in same location, except where otherwise noted. Provide partitions in multi-ganged boxes where different types of devices are installed, or devices installed operate at different voltages.

AH. With prior approval by CMWD, raceway runs may be field changed to obtain better installation.

AI. Conduit clamps, mounting hardware, supports, hangers, etc., shall be made of stainless steel when located on roof, in "wet" or wash-down areas.

3.2 APPLICATION

A. PVC Jacketed Conduit:

1. Use rigid PVC jacketed conduit for all outdoor, exposed conduit.

B. EMT Conduit:

1. EMT conduit shall be permitted in exposed areas of equipment room.

C. Nonmetallic Rigid Conduit:

1. Nonmetallic rigid conduit shall be permitted for:

a. Direct burial, concrete encased.

b. Direct burial, in sand fill on bottom and top.

2. All elbows and stub-ups both vertical and horizontal, shall be PVC coated (inside and outside) rigid steel in areas where direct contact with earth occurs.

END OF SECTION

SECTION 26 11 20
EXCAVATION AND BACKFILL FOR UNDERGROUND ELECTRICAL CONDUITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Methods and materials for trench excavation and backfill for electrical conduits.

B. Related Document:

1. Refer to Geotechnical Report available from CMWD.

1.2 REFERENCES

A. The Work under this section is subject to requirements of the Contract Documents including the GENERAL CONDITIONS and GENERAL REQUIREMENTS.

1.3 SUBMITTALS

A. Procedure: In accordance with this Section.

B. List of materials to be used for backfill.

PART 2 - PRODUCTS

2.1 FILL MATERIAL

A. Type 1 Fill:

1. Material from excavation separated from materials which do not compact by tamping and rolling. No stones larger than 3" and no building, organic, corrosive or frozen materials and no lumps larger than 6".

B. Type 2 Fill:

1. Sand or gravel materials with none larger than 2" and of that portion passing the #4 sieve less the 5% to pass #200 sieve.

C. Type 3 Fill:

1. Gravel of rounded to subangular shape, screened, which will pass 0.75" sieve and retained on #4 sieve.

D. Type 4 Fill:

1. Pit run rock or gravel with maximum stone size of 1".

E. Type 5 Fill:

1. Pea gravel, screened, which will pass 0.375" sieve and retained on #4 sieve.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify location of existing utilities prior to excavation for new conduits.

3.2 EXCAVATION

A. Provide excavation for underground work, including bank of conduits encased in concrete.

B. Excavate trench to 24" wider than concrete bank dimension and minimum of 3" below bottom of conduit.

C. Include necessary work such as rock excavation, sheet piling; shoring; underpinning; pumping; bailing and transportation.

D. Blasting will not be allowed on this project without written permission of CMWD.

E. Dispose of excess excavation material on site in location designated by Construction Manager.

3.3 ROCK EXCAVATION

A. Use mechanical methods to remove rock in trenches for conduit. Excavate trench to 24" wider than the conduit diameter and minimum of 3" below bottom of conduit.

B. Include rock excavation in the Bid.

3.4 INSTALLATION

A. Keep underground conduit to proper line and grade and sealed to prevent entrance of animals or foreign matter.

B. Provide bracing and sheet piling as necessary to support trenches. Remove water to fully protect workmen and adjacent structures to permit proper installation of conduit. Comply with local regulations, applicable provisions of OSHA regulations on trenching, or with provisions of "Manual of Accident Prevention in Construction" published by Associated General Contractors of America. Under no circumstances lay conduit in water. Keep trench free from water until conduit joint material has hardened and concrete encasement is in place. Presence of ground water in soil or necessity of sheet piling or bracing trenches shall not constitute condition for which any increase may be made in Contract price, except when sheet piling is left in place, on written order of CMWD, Contract price shall be adjusted.

C. Cut off sheet piling left in place not less than 2 ft below new-finished grade. Do not remove sheet piling until trench is substantially backfilled.

D. Install lines passing under foundations with minimum of 1-1/2" clearance to concrete and insure there is no disturbance of bearing soil.

3.5 BACKFILL

A. Backfill around conduit bank by hand to depth of 12" above top of conduit with Type 2 fill in 6" layers. Compact backfill thoroughly with compactor of suitable weight or with approved mechanical tamper. No flooding or jetting with water will be allowed.

B. Place backfill from 12" above conduit bank to elevation of subgrade in layers not exceeding 8" in depth with Type 2 fill. Compact backfill material to 95% modified proctor.

C. When excavation occurs on public property or areas beyond the property line, excavation, pipe laying, backfilling, grading and surfacing shall conform as herein specified, except additional requirements for public utility or other authorities shall be complied with when in order. Check with each utility and incorporate cost of any additional requirements in base bid.

3.6 FINISHING

A. On completion of trenching and backfilling operations, restore grades to original elevation or to new subgrade elevation. When trenching is through existing areas or beyond constructions limits, replace surfaces to existing conditions.

B. Install lines passing under foundations with minimum of 1-1/2" clearance to concrete and insure there is no disturbance of bearing soil.

C. Edison incoming feeders shall be protected from damage and finished in accordance with SCE requirements.

END OF SECTION

SECTION 26 12 00
LOW VOLT CONDUCTORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Power and control circuit conductors.
2. Overhead busway (new and existing)

B. Related Work:

1. Acceptable wire and insulation for various systems shall be as indicated in the appropriate section of this specification.

1.2 REFERENCES

A. The Work under this section is subject to requirements of the Contract Documents including the Section 26 01 00 GENERAL ELECTRICAL REQUIREMENTS.

1.3 SYSTEM DESCRIPTION

A. Design Criteria:

1. All conductors shall be copper.

2. All wire and cable connections and terminations shall be made with compression type connectors using solid barrel type connectors at terminals and installed with a hydraulic compression tool similar to Anderson or Burndy. Busway connections shall be made with manufacturer-approved kits and hardware.

3. Conductor and conduit sizes in these contract documents are based on copper wire, and only copper wire shall be used.

1.4 SUBMITTALS

A. Shop drawings shall be submitted for all equipment under this Section.

1.5 QUALITY ASSURANCE

B. Conductors shall conform to applicable IACS, ASTM and ICEA standards.

1.6 SEQUENCING-SCHEDULING

A. Do not pull wire in until the conduit system is complete and weather tight.

PART 2 - PRODUCTS

2.1 FABRICATION AND MATERIALS

A. Cable and wire to be of new manufacture not to exceed 12 months prior to date of contract award.

B. Existing overhead busway shall be inspected and may be reused where suitable and practical. Replacement or extension shall be of similar gauge and material, rated for 600 Volts and amperage as shown on drawings.

C. Conductors for use at 600 volts or below shall be 600 volt rated. Provide stranded conductors. Solid conductors are not acceptable.

D. Motor controls branch wiring:

1. Provide type XHHW insulation. All control wiring to be stranded copper.

E. Wiring in fluorescent fixture channels:

1. Provide type THWN insulation.

F. Feeder Circuit Wiring:

1. Use only type XHHW insulation rated for wet location.

2. Use only copper 75ºC rated cable, or 90ºC copper cable sized at 75ºC copper rating for connection to 100% rated devices.

G. Branch Circuit Wiring:

1. Use Type THWN or XHHW insulation rated.

H. Other wiring (communications, low voltage sensors, etc.)

1. Use type and gauge as indicated on drawings. Where a question exists regarding suitability of a specific cable or conductor, contact Engineer or submit for approval.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Color code power wiring as follows:

1. 120/208 volt, 3 phase, 4 wire: phase A-black, phase B-red, phase C-blue, neutral-white; ground conductor-green.

B. Pull wire and cables into conduits and raceways in such manner that insulation will not be damaged or undue strain placed on conductors. Lubricants shall be UL listed.

C. Branch circuit wires in panels shall be neatly arranged with all surplus wire cut off and wires tied with non-metallic ties. Metallic ties not permitted.

D. Conductors shall be attached to terminal screw or lug per UL listing.

E. Joints, taps and splices sizes No. 10 and smaller:

1. Ideal-Nut Connectors or Scotchlok Spring connectors.

F. Joints, taps and splices sizes No. 8 and larger:

1. Tinned copper compression connectors that have been installed with a hydraulic compression tool.

G. Joints, taps and splices sizes larger than No. 1:

1. Tape with electrical insulation putty to build up insulation level equivalent to cable insulation and cover with not less than two half lapped layers of plastic electrical tape.

H. Plastic snap-on splice insulators are not permitted.

I. Conductors in vertical raceways shall be supported per NEC 300-19 using O.Z. type "S" cable supports for 600 volt conductors.

J. Wire and cable boxes and reels shall bear the date of manufacture. The date of manufacture shall not precede contract date by more than one year.

K. Minimum conductor sizes shall be as follows:

1. No. 12 - Branch circuits of any kind.

2. No. 10 - Security lighting and all exterior light circuits.

L. Limit homeruns to 8 current carrying conductors.

M. Circuits of different panels shall not be installed in the same conduit.

N. Provide a minimum #10 sized neutral conductor for all shared neutral branch circuits.

O. Branch circuit shall not pass through a different panelboard.

P. Branch Wiring:

120/208 volt circuits over 100 ft in length:
Increase one size for each 100 ft of length.
Increase conduit size as required.

END OF SECTION

SECTION 26 12 20
MEDIUM VOLTAGE WIRES AND CABLES

PART 1 GENERAL

1.01 SCOPE OF SPECIFICATION

A. 5kV Shielded Power Cable, Single Conductor, Type MV-105.

1.02 REFERENCES

A. Insulated Cable Engineers Association, Inc. (ICEA) - ICEA S-68-516 – EPR Insulated Wire and Cable

B. Association of Edison Illuminating Companies (AEIC) - AEIC CS6 – EPR Insulated Shielded Cable

C. Institute of Electrical and Electronics Engineers, Inc. (IEEE) - IEEE 404 – Cable Joints

D. Underwriters Laboratories (UL) - UL 1072 – Medium Voltage Power Cables

E. National Fire Protection Association (NFPA) - NFPA 70 – National Electric Code

F. Materials and insulation shall meet or exceed the above referenced standards.

1.03 SUBMITTALS

A. Submit data sheet on cable construction, shielding, insulation material, thickness of insulation and jacket, cable stranding, and voltage rating.

B. Submit certified test reports for: 1. Sample test on insulation: Physical properties, solvent extraction, heat distortion, and accelerated water absorption. 2. Insulation resistance, power factor corona level, AC dielectric

C. Certified Factory Test Report including the results of the test plus cable identification, factory order number, cable length and all cable specifications. No cable shall be installed until Owner's representative has accepted related test report.

D. Provide recommended DC voltage for field-testing of cable.

1. Provide minimum three copies of field test reports indicating test results relative to compliance with performance requirements.

E. Manufacturer's cable pulling calculations for each cable installation. The calculations shall include jam ratio, tension, and sidewall pressure analysis.

1.04 QUALITY ASSURANCE

A. Qualifications of Cable Splicers

1. Submit a certification for the approval of Owner's Representative containing the names and the qualifications of persons who are to perform the splicing and termination of medium voltage cables approved for installation.

2. The certification shall indicate that persons who shall perform actual splicing and terminations have been adequately trained in the proper techniques and have had at least five years experience in the "cable splicer" classification.

B. Provide cable of recent manufacture, no more than 12 months old, and in continuous lengths with no splices, as noted on the purchase order release. Seal ends of cable to prevent moisture penetration into the conductor strands.

PART 2 PRODUCTS

2.01 GENERAL

A. UL listed, type MV-105 shielded single conductors, with ozone and discharge resistant dielectric.

B. Suitable for use in wet locations; or outdoor, including direct sunlight

C. Suitable for routing in conduit, underground duct systems.

D. Rated 105 degrees C for normal operation, 140 degrees C for emergency overload operation, and 250 degrees C for short circuit conditions. Emergency overload operation may occur for periods up to 1,500 hours cumulative during the life of the cable.

2.02 MANUFACTURERS

A. Okonite

B. Pirelli

C. Or approved equal

2.03 5KV POWER CABLE

A. Basic Construction

1. Stranded, bare copper conductor

2. Triple extrusion

a) Semiconducting thermosetting compound strand shield

b) Ethylene-propylene rubber insulation

c) Extruded semiconducting thermosetting compound insulation shield

B. Copper tape shield

C. Overall PVC jacket

D. Conductor

1. Uncoated soft copper wire, compact stranded per ASTM B-496

2. Comply with the electrical resistance requirements of ICEA S-68-516

E. Conductor Shield

1. Extruded layer of semi-conducting thermosetting compound compatible with the overlaying insulation and meeting resistivity requirements of AEIC-CS6

2. The shield shall be clean-stripping from the conductor, and inseparably bonded to the overlaying insulation.

3. The minimum thickness of the extruded conductor shield shall be as shown in Table 1. Measure and control the thickness of the shield to meet or exceed all physical and electrical tests prescribed by AEIC specifications.

TABLE 1

CONDUCTOR SHIELD THICKNESS

Conductor Size AWG/Kcmil	Minimum Point (mils)	Minimum Average (mils)
1 - 4/0	12	15
250 - 500	16	20

F. Insulation

1. Provide insulation of a flexible thermosetting dielectric based on an ethylene propylene elastomer. Heat, moisture, ozone, and corona resistant. Color shall contrast from the conductor and insulation shields.

2. Provide 133 percent insulation unless otherwise indicated on drawings. Minimum average insulation thickness not less than as scheduled in Table 2. The minimum thickness at any cross-section of the insulation shall not be less than 90 percent of the specified minimum average thickness.

3. Perform the extrusion operation by using a triple-extrusion process that permits the measurement and accurate control of the wall thickness of each layer of compound, and prevent intersurface contamination.

TABLE 2
INSULATION THICKNESS AND WITHSTAND VOLTAGES

Rated Voltage Phase to Phase (kV)	Conductor Size	Minimum Average Insulation Thickness (mils)		5 minute ac Withstand (kV)		15 minute dc Withstand (kV)	
Insulation Level		100%	133%	100%	133%	100%	133%
5	#2 AWG to 1000 kcmil	175	220	35	44	70	80

G. Insulation Shield

1. Apply an extruded semi-conducting thermosetting insulation shield over the insulation.

   a) Extruded semiconducting thermosetting compound compatible with the underlaying insulation. Comply with the resistivity requirements of AEIC CS6.

   b) Clean stripping. Peel strength of between 6 and 24 pounds from the insulation for a 1/2-inch width when tested per AEIC CS-6. The extruded shield shall be in intimate contact with the outer surface of the insulation and shall be free-stripping, leaving no conducting particles or other residue on the insulation surface.

   c) Identify the insulation shield by continuously printing, with contrasting colored ink on the outer surface, "Semi-conducting - Remove When Splicing or Terminating."

   d) The average thickness of the extruded shield shall be in accordance with AEIC-CS6, Table C3. The minimum and maximum point thickness of the extruded shield shall be in accordance with the values shown in Table 3.

TABLE 3
INSULATION SHIELD THICKNESS

Calculated Minimum Diameter (d) Over Insulation (inches)	Insulation shield thickness (mils)	
	Min. point	Max point
d < 1.0	30	70
1.0 < d < 1.5	40	85
1.5 < d < 2.0	55	100
d > 2.0	55	115

H. Metallic Shield

1. Apply a helical 5-mil uncoated annealed copper shielding tape, directly over the extruded insulation shield, with a minimum 12-1/2 percent overlap. Comply with the requirements of Part 4 of ICEA S-68-516.

I. Jacket

1. Overall jacket: Black polyvinylchloride (PVC)

2. PVC jacket thickness as scheduled in Table 4. The minimum thickness at any point shall not be less than 80 percent of the specified minimum average thickness.

TABLE 4 PVC JACKET THICKNESS

Cable Core Diameter (inches)	Minimum Average Jacket Thickness (mils)
0 - 0.425	45
0.426 - 0.700	60
0.701 - 1.500	80
1.501 - 2.500	110
2.501 & larger	140

J. Identification

1. Print the following identifying legend, items 1 through 12, on the jacket with contrasting ink, or emboss into the jacket. Repeat at maximum two-foot intervals (unmarked surfaces not exceeding six inches).

a) Cable Manufacturer

b) Plant Number or Letter

c) Conductor Size (AWG) (kcmil)

d) Cu

e) Insulation Type (EPR)

f) Shielded

g) Voltage (kV)

h) Insulation Level in percent

i) Insulation Thickness (MILS)

j) UL

k) MV-105

l) Year of Manufacture

PART 3 EXECUTION

3.01 TESTS

A. Factory Test: A complete test shall be done on each length of cable at the factory in accordance with ICEA S-68-516, and UL-1072. In addition a corona test shall be done per AEIC CS6-87, Section E.

B. Field Test

1. Visual and mechanical inspections of physical damage, shield grounding cable support, cable bend, and termination.

2. Third-party Contractor shall perform tests per Acceptance Testing specification, or if not defined therein a D.C. High Potential Test shall be performed in accordance with NETA Acceptance Testing Specification.

3.02 INSTALLATION

A. The cable shall be drawn into the conduit using basket grips on swivel connections. Lubricate the cables before pulling in accordance with cable pulling calculations. All cable ends shall be sealed when being pulled into the ducts.

B. All cables shall be tagged with 2-inch diameter anodized tags with 5/32-inch high white letters on black background, showing the size of the cable, what the cable feeds, and the date it was first energized. The tags shall be attached to the cables with wire ties and shall be located in every pullbox, junction box, etc., and at every splice and termination. The cables shall also be phase marked "A", "B", and "C".

C. Cable lugs shall be coordinated with the associated equipment connection and shall be manufactured by Burndy or Thomas and Betts, made from plated copper, 2-hole minimum. Lugs shall be compression type, installed with the manufacturer's pressure type indent tool, using properly sized rounding type dies.

D. Splices shall have insulation shield carried across the splice. Splices and terminations shall have insulation shield ground grounded at each splice location.

E. Stress relief terminations shall be made on all cable splices and terminations, and shall be made in accordance with the printed recommendations of the cable manufacturer.

F. The conductor shields shall be grounded at each termination of the cable run, and on both sides of all splices, using a stranded, #6 bare copper wire to the nearest ground system. Conductor shield continuity must be maintained at all splices. The ground wire shall be protected from mechanical injury by enclosing it in a metal protective covering or by placing it where it will not be subject to damage.

G. Single conductor cables in racks in vaults, shall have the three conductors of each circuit bound together with plastic cable ties at each points not over three feet apart.

H. The cables shall be installed within one year of manufacture.

END OF SPECIFICATION

SECTION 26 12 40
MEDIUM VOLTAGE CABLE TERMINATIONS, SPLICES, & ACCESSORIES

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Medium voltage cable terminations.
B. Medium voltage cable splices.
C. Medium voltage end sealing caps.
D. Medium voltage connections.

1.02 RELATED SECTIONS

A. Section 26 12 20- Medium Voltage Cable

1.03 REFERENCES

A. ANSI/IEEE C2- National Electrical Safety Code.
B. ANSI/NFPA 70- National Electrical Code.
C. IEEE 48- Test Procedures and Requirements for High- Voltage Alternating- Current Cable Terminations.
D. IEEE 404- Standards for Cable Joints for use with extruded Dielectric Cable Rated 5,000 through 46,000 Volts, and Cable Joints for use with Laminated Dielectric Cable Rated 2,500 through 500,000 volts.
E. ANSI C 119.2- Separable Insulated Connectors for Power Distribution Systems above 600V.
F. NEMA WC3- Rubber- Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
G. NEMA WC5- Thermoplastic- Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
H. NEMA WC 7- Cross-Linked-Thermosetting-Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
I. NEMA WC 8- Ethylene-Propylene-Rubber-Insulated wire and Cable for the Transmission and Distribution of Electrical Energy.

1.04 SUBMITTALS

A. Submit under provisions of this Section
B. Product Data: Provide for cable terminations and Splices.
C. Test Reports: Indicate results of cable test with terminations and splices installed in tabular form and in plots of current versus voltage for incremental voltage steps, and current versus time at 30 second intervals at maximum voltage.
D. Test Reports: Terminations. Manufacturer shall provide a test report demonstrating design-proof testing per IEEE 48 and capability of passing IEEE 404 test sequence. Manufacturer shall provide a test report demonstrating accelerated and real-time testing of weathering resistance including track and U.V. resistance as well as termination stability with time, temperature, and stress variation.
E. Test Reports: Splices. Manufacturer shall provide a test report demonstrating design-proof testing according to IEEE 404, and water submersion testing according to ANSI C119.2.
F. Manufacturer's Instructions: Manufacturer shall provide illustrated step-by-step instructions describing installation on cable construction specified in Section 16121.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 15 years documented experience.
B. Installer: Company specializing in installing Products specified in this Section with minimum three years documented experience.

1.06 FIELD SAMPLES

A. Provide under provisions of Section
B. Provide field sample of one each of each type of termination and splice used.

1.07 EXTRA MATERIAL

A. Provide 10% extra spare terminations and splices of each type.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, product, and handle Products to site under provisions of this Section
B. Accept cable and accessories on site in manufacturer's packaging. Inspect for damage.
C. Store and protect in accordance with manufacturer's instructions.
D. Protect from weather. Provide adequate ventilation to prevent condensation.

1.09 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.
B. Verify routing, termination and splice location of cable bank prior to rough-in.

PART 2 - PRODUCTS

2.01 CABLE TERMINATIONS:

A. Manufacturer: Tyco Electronics, Model Raychem HVT.
B. Description: IEEE 48; Class 1, heat shrinkable cable terminations in kit form, capable of properly terminating cables specified in Section 16122.
C. Termination for single-conductor cables shall consist of heat-shrinkable radiation crosslinked high dielectric constant linear stress relief material and heat-shrinkable radiation crosslinked non-tracking outer insulation. Terminations shall contain a high relative permittivity electric stress relief mastic for insulation shield cutback treatment and a heat activated sealant for environmental sealing.
D. In addition to the components describe above, three-conductor kits shall contain heat shrinkable components to seal the cable jacket, phase conductors, ground wire and rejacket phase and ground conductors.
E. Kits shall be factory engineered and shall accommodate any common form of cable shielding or construction without the need for special adaptors. Kits shall accommodate a wide range of cable sizes and be completely independent of cable manufacturers' tolerances. Kits shall accommodate commercially available standard connectors.

2.02 CABLE SPLICES

A. Manufacturer: Tyco Electronics, Model Raychem HVS

B. Description: IEEE 404, heat shrinkable cable splices in kit form, capable of properly splicing cables specified in Section 16122.

C. Splice kits shall contain all necessary components to reinstate primary cable insulation, metallic shielding and grounding systems and overall jacket to the equivalent of the cable itself. Splices shall be of a uniform cross-section and shall consist of heat-shrinkable radiation crosslinked insulation. The outer insulating layer shall be bonded to a conducting layer for shielding. The splice shall be rejacketed with a heavy-wall, heat-shrinkable sealant lined sleeve to provide a waterproof hot melt adhesive seal. Splices shall contain heat-shrinkable radiation cross-linked high dielectic constant linear stress relief material. Splices shall contain a high relative permittivity electric stress relief mastic for insulation shield cutback treatment and heat activated sealant for environmental sealing.

D. Kits shall be factory engineered and shall accommodate any common form of cable shielding or construction without the need for special adaptors. Kits shall accommodate a wide range of cable sizes and be completely independent of cable manufacturers' tolerance. Kits shall allow splicing cables with different types of insulation, conductor sizes, and shielding construction. Kits shall accommodate commercially available standard connectors.

2.03 CABLE END SEALING CAPS

A. Manufacturer: Tyco Electrics, Model Raychem ESC

B. Description: Heat-shrinkable crosslinked polymeric end sealing caps capable of sealing cables specified in Section 16122.

C. End caps shall be precoated with a heat activated sealant and shall be able to accommodate a wide range of cable sizes and be completely independent of cable manufactures' tolerances.

2.04 MEDIUM VOLTAGE SWITCHGEAR CONNECTION

A. Manufacturer: Tyco Electronics, Model Raychem MCK

B. Description: Heat-shrinkable kits capable of property connecting cables specified in section 16121 to switchgear bus.

C. Connections kits shall consist of two layers of heat-shrinkable radiation crosslinked insulation and heat activated sealant for environmental sealing. Kits shall be factory engineered and shall accommodate a wide range of cable sizes and be completely independent of cable manufactures' tolerances.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify installation conditions.

3.02 INSTALLATION

A. Install cable terminations and splices in accordance with manufacturer's instructions.

B. Avoid abrasion and other damage to cables during installation.

3.03 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of this Section

B. Inspect exposed cable sections for physical damage.

C. Inspect cable for proper connections as shown on Drawings.

D. Inspect shield grounding, cable support, terminations, and splices for proper installation.

E. Perform DC high potential test of each conductor in accordance with NEMA standards.

F. Connect untested conductors in circuit to ground during test.

G. Apply test voltage in at least eight equal increments to maximum test voltage.

H. Record leaking current at each increment, allowing for charging current decay.

I. Hold maximum test voltage for ten minutes.

END OF SECTION

SECTION 26 24 10
5KV MEDIUM VOLTAGE METAL-CLAD SWITCHGEAR

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Medium voltage (5 kV) freestanding close-coupled metal-clad switchgear with vacuum circuit breakers.

1.02 REFERENCES
A. ANSI/IEEE C37.20.2 - Standard for Metal-Clad Switchgear.
B. ANSI/IEEE C37.04 and .06 - Standard ratings and preferred ratings for Indoor AC Medium-Voltage Circuit Breakers used in Metal-Clad Switchgear.
C. ANSI/IEEE C37.11 - Requirements for electrical control for AC High-Voltage Circuit Breakers rated on a symmetrical current basis or a total current basis.
D. ANSI/IEEE C37.09 - Standard Design and Production Testing.
E. ANSI Z55.1 - Gray Finishes for Industrial Apparatus and Equipment.
F. ANSI/IEEE C57.13 - Requirements for Instrument Transformers.
G. NEMA SG4 - Alternating Current High Voltage Circuit Breakers.
H. NEMA SG5 - Power Switchgear Assemblies.

1.03 SUBMITTALS
A. Submit shop drawings indicating outline dimensions, enclosure construction, shipping splits, lifting and supporting points, electrical single line diagram, control schematics, equipment electrical ratings and electrical bill of materials.

1.04 OPERATION AND MAINTENANCE DATA
A. Include circuit breaker recommended spare parts list.

1.05 QUALITY ASSURANCE
A. Manufacturer: Company specializing in medium voltage metal-clad switchgear with at least twenty years documented experience. The manufacturer of the switchgear must be the same as the manufacturer of the circuit breaker.

1.06 DELIVERY, STORAGE, AND HANDLING
By special arrangement and coordination with the owner: Casitas Municipal Water District

1.07 EXTRA MATERIALS/ACCESSORIES
A. Submit one racking handle with equipment. Charging handle furnished on each breaker mechanism.
B. Provide one set of spare control fuses for each set installed.
C. For all switchgear with circuit breaker, provide circuit breaker lifting device - portable, floor-supported with a roller base.
D. Provide one test cabinet.
E. Provide one test jumper cable.
F. Provide one key interlock to prevent insertion of the breaker in the connected position during lockout.
G. Provide a 5^{th} wheel for the breaker.
H. Provide one Infrared Viewing Window.
I. Provide surge arresters.
J. Provide one 75kVA transformer and 208/120V associated panelboard with the required branch breakers.
K. Provide an insulation breaker section with 1200A breaker.
L. Provide a generator breaker section with auto throw over and VTS.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The metal-clad switchgear shall be manufactured by Square D (Schneider Electric).

2.02 METAL-CLAD SWITCHGEAR ASSEMBLY

A. The metal-clad switchgear shall consist of a MASTERCLAD^{TM} indoor enclosure containing circuit breakers and the necessary accessory components all factory assembled (except for necessary shipping splits) and operationally checked. The assembly shall be a self-supporting and floor mounted on a level concrete pad. The integrated switchgear assembly shall withstand the effects of closing, carrying and interrupting currents up to the assigned maximum short circuit rating.
B. System Voltage: 2.4 kV nominal, three-phase ungrounded Delta, 60 Hz.
C. Maximum Design Voltage: 4.76 kV.
D. Impulse Withstand (Basic Impulse Level): 60 kV.
E. Power Frequency Withstand: 19 kV, 1 minute test.
F. Main Bus Ampacity: 1200 amps, continuous.
G. Momentary Current Ratings: Equal to the circuit breaker close and latch rating.

2.03 COMPONENTS

A. Stationary Structure
   1. The switchgear shall consist of 7 sections including 3 breaker (plus CPT/VT) sections and 4 others sections assembled to form a rigid self-supporting completely enclosed structure providing steel barriers between sections.
   2. The sections are divided by metal barriers into the following separate compartments:
      Circuit breaker, instrument, main bus, auxiliary device and cable.
   3. The base of the switchgear structure shall be provided with a 1/2" minimum raise, as well as any available additional assistance from the manufacturer, in order to facilitate an easier means of transportation. This is a special requirement to be utilized by the rigging company to be hired by contractor.

   In addition, a transition section shall be provided for connecting the load bus to the existing Allen Bradley MV MCC. The manufacturer will need to take measurements from the site and ensure that the bus transition to feed the existing equipment meets the installation requirements.
B. Circuit Breaker Compartments
   1. Each circuit breaker compartment shall be designed to house a horizontal drawout metal-clad vacuum circuit breaker. The stationary primary disconnecting contacts are to be silver-plated copper and mounted within porcelain support bushings. The movable contacts and springs shall be mounted on the circuit breaker element for ease of inspection/maintenance.
   2. Entrance to the stationary primary disconnecting contacts shall be automatically covered by metal shutters when the circuit breaker is withdrawn from the connected position to the test or disconnected position or removed from the circuit breaker compartment. Extend a ground bus into the circuit breaker compartment to automatically ground the breaker frame with high-current spring type grounding contacts located on the breaker chassis when in the test and connected positions. Guide rails for positioning the circuit breaker and all other necessary hardware are to be an integral part of the circuit breaker compartment. Blocking devices shall interlock breaker frame sizes to prevent installation of a lower ampere rating or interrupting capacity element into a compartment designed for one of a higher rating. It shall be possible with indoor or outdoor walk-in switchgear to install a circuit breaker into a bottom compartment without use of a transport truck or lift device.
C. Cable Compartment/Ground Bus
   1. Cable terminators shall be furnished as shown on plans. The ground bus shall extend through this

compartment for the full length of the switchgear.

D. Main Bus Compartment
   1. The main bus is to be rated 1200 amps and be fully insulated for its entire length with an epoxy coating by the fluidized bed process. The conductors are to be silver-plated copper and be of a bolted [not welded] design. Access to this compartment is gained from the front or rear of the structure by removing a steel barrier. Provide standard provisions for future extension, as applicable.

E. Doors and Panels
   1. Relays, meters, control switches, etc., shall be mounted on a formed front-hinged panel for each circuit breaker compartment.

F. Circuit Breakers:
   1. The circuit breakers shall be rated 2400 nominal volts, 4760 maximum volts, 60 Hz, with a continuous current rating of 1200 amps and a maximum symmetrical interrupting rating of 40kA/250mVA - 4.76 kV system. Furnish Type VR circuit breakers with one vacuum interrupter per phase. Breakers of same type and rating shall be completely interchangeable. The circuit breaker shall be operated by means of a stored energy mechanism which is normally charged by a universal motor but can also be charged by the manual handle supplied on each VR breaker for manual emergency closing or testing. The closing speed of the moving contacts is to be independent of both the control voltage and the operator. Provide a full front shield on the breaker. Secondary control circuits shall be connected automatically with a self-aligning, self-engaging plug and receptacle arrangement when the circuit breaker is racked into the connected position. Provision shall be made for secondary control plug to be manually connected in test position. A minimum of 4 auxiliary contacts (2a 2b), shall be provided for external use. Provisions shall be made for 10 additional cell-mounted auxiliary contacts both MOC and TOC type for external use. The racking mechanism to move the breaker between positions shall be operable with the front door closed and position indication shall be visible with door closed.
   2. An interlocking system shall be provided to prevent racking a closed circuit breaker to or from any position. An additional interlock shall automatically discharge the stored-energy operating mechanism springs upon removal of the breaker out of the compartment.
   3. The circuit breaker control voltage shall be: 120, volts ac - provide one capacitor trip unit for each circuit breaker when ac control power is required.

G. Instrument Transformers
   1. Current transformers: Each breaker compartment shall have provision for front-accessible mounting of up to three multi ration high accuracty current transformers. The current transformer assembly shall be insulated for the full voltage rating of the switchgear. The current transformers wiring shall be Type SIS #12 AWG. Relaying and metering accuracy shall conform to ANSI Standards.
   2. Voltage transformers are drawout mounted with primary current-limiting fuses and shall have ratio as indicated. The transformers shall have mechanical rating equal to the momentary rating of the circuit breakers and shall have metering accuracy per ANSI Standards.

H. Control Wiring
   1. The switchgear shall be wired with type SIS #14 AWG, except where larger size wire is specified. The switchgear shall be provided with terminal blocks for outgoing control connections. Wire markers shall be provided for each end of all control wires.

I. Protective Relays: Provide SEPAM S84 Relay for each circuit breaker in circuit.

J. With each circuit breaker in circuit, provide an Allen Bradley PM5000/1425DM Power Monitor.

2.04 FABRICATION

A. Construction: Each equipment bay shall be a separately constructed cubicle assembled to form a rigid freestanding unit. Minimum sheet metal thickness shall be 11 gauge steel on all exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. The rear covers shall be removable to assist installation and maintenance of bus and cables. Each individual unit shall be braced to prevent distortion.

B. Dimensions: Standard dimensions per indoor section are: 36 in W x 95 in H x 92/100 in D except for the Utility and Transition sections.

C. The metal-clad switchgear shall be fully assembled, inspected and tested at the factory prior to shipment. Large line-ups shall be split to permit normal shipping and handling as well as for ease of rejoining at the job site.

2.05 FACTORY FINISHING

A. All steel parts, except galvanized (if used), shall be cleaned and an iron phosphate pre-treatment applied prior to paint application.

B. Paint color shall be ANSI-61 [light grey]; TGIC polyester powder, applied electrostatically through air. Following paint application, parts shall be baked to produce a hard durable finish. The average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking and peeling.

C. Adequacy of paint finish to inhibit the buildup of rust on ferrous metal materials shall be tested and evaluated per paragraphs 5.2.8.1-7 of ANSI C37.20.2-1987. Salt spray withstand tests in accordance with ASTM #D-1654 and #B-117 shall be performed on a periodic basis to provide conformance with the corrosion resistance standard of at least 600 hours minimum.

PART 3 EXECUTION

3.01 WITNESS TESTING

The owner/engineer will witness the factory tests. Provide two weeks notice so that the owner/engineer is able to make travel arrangements.

3.02 INSTALLATION

1. Contractor shall hire the services of a specialized rigging company for the pickup, transport, and installation of the switchgear.
2. Install in accordance with manufacturer's instructions, applicable requirements of the NEC and in accordance with recognized industry practices.
3. Install cables, as provided by the switchgear manufacturer, to connect the primary surge arresters. Bending of high-voltage cables should be avoided or minimized. All necessary bends should meet at least the minimum radius specified by the cable manufacturer.

3.03 FIELD QUALITY CONTROL

Field inspection and testing.
Visually inspect for physical damage.
Perform start-up tests in accordance with manufacturer's instruction manual.
Verify key interlock operation.
Perform low frequency withstand (Hi-Pot) tests according to ANSI/IEEE C37.20.2, paragraph 5.5.
Test CPT/CT/PT/Protection Relay and ground resistance.

3.04 TRAINING

Provide one day of classroom training at the owner location and include videotaping of the training.

3.05 EXTENDED WARRANTY

Provide one year additional warranty in addition to the manufacturer's standard warranty.

3.06 PREVENTIVE MAINTENACE

Include the Schneider Electric SIBS ASP 5 YR PLUS plan that includes two preventive maintenance and three IR scans of the equipment.

END OF SECTION

SECTION 26 29 40
SEISMIC ANCHORAGE AND RESTRAINT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Seismic anchorage and restraint of electrical systems including switchgear, conduits, and bus duct.

B. Related Work:

1. Reference other sections of this specification to coordinate installation requirements with respect to seismic restraints.

1.2 STANDARDS

A. Seismic anchorage and restraints shall be installed in accordance with codes and standards as enforced by authorities having jurisdiction in California for earthquake zone 4.0. Earthquake load shall be 2.5 times UBC essential rating. Importance factor shall be 1.5. Authorities shall include CMWD's insurance company.

B. Where applicable, building standards supersede those of other evaluation or listing agencies referenced in specification.

1.3 SUBMITTALS

A. Procedure: In accordance with this Section.

1. Provide complete calculations, drawings and details.

2. Submittal shall be sealed by the contractor's seismic engineer.

3. Submittal shall be coordinated with building structural engineer.

4. Submit for approval, seismic restraint calculations, drawings and details to authorities having jurisdiction as required by those authorities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and devices shall be in accordance with applicable codes and standards and shall be appropriate for intended use.

B. Anchors and attachments to building structure shall be as approved by building structural engineer.

C. Seismic restraints used in conjunction with vibration isolators may consist of loose cables, telescoping pipes or box sections, angles or sections, flat plates used as limit stops or snubbers, or other types of housing used either integral with or separate from vibration isolators to accomplish necessary seismic restraint.

2.2 EQUIPMENT

A. Equipment available with seismic rating including motor control center, shall be provided with rating applicable to seismic zone of project location.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Secure stationary equipment, raceways and equipment supports to structure, concrete slab, or special supports to provide protection against earthquakes and to restrain lateral or vertical movement. Where vibration isolators are used, seismic restraints shall be designed to limit lateral or vertical movement during earthquake without short circuiting vibration isolation system.

B. Coordinate seismic restraints with structural engineer and incorporate structural engineer's requirements.

C. Seismic restraint methods and materials shall be supplementary to support devices specified in other sections of this specification and together shall serve as equipment support criteria.

D. Installation of devices shall be in accordance with seismic design engineer's drawings and details and in accordance with seismic guidelines.

E. Coordinate installation of devices with other contractors and incorporate their requirements.

F. Refer to drawings and details for seismic restraint system concepts. Verify, revise and refine details in accordance with requirements of this specification.

G. Modify raceway and equipment locations as required for seismic restraint system.

H. Seismic restraint systems shall not interfere with installation of other building systems and access space as indicated on drawings.

END OF SECTION

SECTION 26 40 00

PANEL BOARDS

1. GENERAL

1.1. Summary

1.1.1. Scope of Specification

A. Provide and install panelboards as shown on the Drawings and as specified.

1.2. Applicable Standards

1.2.1. FS W-C-375 – "Circuit Breakers, Molded Case, Branch Circuit and Service"

1.2.2. FS-W-P-115 – "Power Distribution Panel"

1.2.3. NEMA AB 1 – "Molded Case Circuit Breakers"

1.2.4. NEMA PB 1 – "Panelboards"

1.2.5. NEMA PB 1.1 – "Instructions for safe installation, Operation and Maintenance of Panelboards Rated 600 Volts"

1.2.6. NEMA PB 1.2 – "Application Guide for Ground-fault protective devices for equipment"

1.2.7. UL 67 – "Panelboards"

1.2.8. NFPA 70 – "National Electric Code, Article 384 – Panelboards"

1.3. Submittals

1.3.1. Shop Drawings

A. Include a front elevations, indicate cabinet dimensions, make, location and capacity of circuit breakers, integrated short circuit ampere rating, size of gutters, type of mounting, finish, and catalog number of locks and construction details, and catalog of all circuit breakers.

2. PRODUCTS

2.1. General

2.1.1. Provide panelboard cabinets surface-mounted as noted on the Drawings, with bolt-on circuit breakers, with hinged lockable door, typewritten index card holders under plastic cover, copper bushing, and main lugs or main protective device as indicated on the drawings. Panels shall have concealed hinge, latch and flush locks, keyed to operate from one key, and permanent type plastic or metal numbers on adjacent trim removable only from back of trim, to identify the branch circuit breakers.

2.1.2. Lighting, power panelboards shall be three phase, four wire, 208/120V, as indicated on the Drawings. All panelboards shall be equipped with a ground bus. Panelboards shall be UL listed for non-linear loads and therefore possess a neutral bus capable of carrying 200% of the phase bus current.

2.1.3. All boxes shall be formed of galvanized steel, chemically cleaned, and all breaks in galvanizing shall be painted with metallic aluminum paint. All trims and doors shall be chemically cleaned. Front door and trim shall be finished with ANSI 61 gray paint.

2.1.4. Provide factory finish on the exposed trim of all flush mounted panels.

2.1.5. Protective devices, main, branch or sub-feed shall be bolt-on type circuit breakers as shown on the drawings and panel schedules. Circuit breakers in panelboards shall be rated to interrupt the fault current available at panelboards, as shown on the drawings on otherwise indicated.

2.1.6. Equip each circuit feeding electrical discharge lamp with NEC lock-off device, unless lamps are within sight of panelboard, or have local switch. Non-switched emergency light circuits, fire alarm, security system and control circuits shall include "lock-on" devices.

2.1.7. Minimum interrupting rating shall be 10KAIC.

2.1.8. The main circuit breaker shall be installed vertically on the top or the bottom of panel. Installing the main at branch circuit location is not acceptable.

2.1.9. Where a contactor, relay or time switch is indicated to be included with or adjacent to a panelboard, it shall be in a separate box and mounted under a separate hinged lockable door. Where a panelboard or box has more than one door, a barrier and divider bar shall be installed between doors. Relays, time switches and control devices may be grouped under one door, but not with contactor.

2.1.10. Panelboards shall be UL labeled per UL Standard 67.

2.1.11. Panelboards shall be manufactured by Eaton-Cutler-Hammer or Square ‘D’.

2.2. Panelboard Cabinets

2.2.1. Panelboard cabinets shall be code gauge galvanized steel or blue steel; and fronts, doors, and trims shall be code gauge furniture steel. Cabinets shall have at least 6" high gutters at top and bottom where feeder cable pass through the cabinet vertically. Cabinets shall have top and bottom gutters sized as required by the inspection department having jurisdiction but never less than " where more than one feeder enters the top or bottom of the cabinets. Side gutters shall not be less than 4" wide.

2.2.2. Doors shall be cut true, accurately fit opening and shall finish smooth across the joints. Rabbets concealed except for barrels and pins. Hinge flanges shall be welded to the door and trim. Each door shall be equipped with flush type lock, spring latching, All panelboard locks shall be keyed to operate from one key.

2.2.3. Where contactors, time switches, and the control devices are specified or indicated to be installed within panelboard cabinets, a separate compartment and door shall be provided at the top of the cabinet for such devices. The door shall be sized as required to permit removal of the contactor and other devices intact. Gutters shall be provided to the sides and top of the compartment.

2.2.4. Panelboard Schedule: The contractor shall prepare a neatly typewritten schedule with the number or name of the room or area and the machine served by each panel board circuit. The room numbers or

name used shall be determined at the site and shall not necessarily be those used on the drawings. The schedule shall also indicate the panel designation, voltage and phase, the building and distribution panel or switchboard from which fed. The schedule shall be mounted in a frame under transparent plastic 1/32" thick on the inside of each panelboard cabinet door.

3. EXECUTION

3.1. Installation

3.1.1. Fronts shall be flush type unless otherwise indicated and shall be fastened to the cabinets with 1/4"-20 nickel plated oval headed machine screws and cup washers. Sufficient screws shall be installed to prevent buckling or warping of the panel front. Flush type fronts shall be aligned plumb and square and cabinet shall be drilled and tapped for cover screw sat the site to accomplish this if necessary. Install nameplates at the front of each panelboard.

3.1.2. All surfaces of surface mounting cabinets and fronts shall be given one coat of metal primer and a finish coat of baked on gray enamel.

3.1.3. Surface mounted panelboard shall be rigidly supported in place independent of the conduit with (2) row unistrut.

3.1.4. Obtain building room numbering system from CMWD and include these room numbers in final typewritten panelboard directories.

End of Specification

SECTION 16450
GROUNDING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide a complete and adequate grounding system as here required to meet the minimum resistance to ground of 5ohms herein specified.

1.2 SYSTEM REQUIREMENT

A. Grounding shall be as approved by the State of California, Occupational Safety and Health Administration ("CAL-OSHA").

B. Provide extensions and reconnections to new grounding ring encircling the Building in direct contact with the earth and consisting of a bare copper conductor #250 MCM of 75ft. connected to (4) new ground rods.

C. Electrical continuity to ground metal raceways and enclosures, isolated from the equipment ground by use of non-metallic conduit or fittings, shall be provided by a green insulated grounding conductor of approved sized with in each raceway connected to the isolated metallic raceways or enclosures at each end.

D. Ground conductors shall be terminated at the ground bus of the switchboard and the neutral bus, equipment enclosure, and “grounding ring” shall be bonded together.

1.3 REFERENCES

A. ANSI/NEPA 70 – National Electrical Code.

Materials and/or installation shall be meet or exceed the above-referenced standards.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Ground conductors shall be bare copper, 250 MCM, stranded, installed in one continuous length.

B. Splices shall be by means of exothermic welding process.

C. Ground Rods shall be 3/4”dia with a minimum depth of 10Ft.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All feeder runs and branch circuit wiring in non-metallic conduit shall carry a green THWN insulated NEC sized ground conductor per circuit correctly connected for electrical ground continuity.

B. All primary feeder conduits to panelboard shall contain an equipment ground conductor with 600 volt insulation.

C. Flexible conduit shall not be used as a ground path. Include NEC sized green conductor in all flex conduit.

D Provide NEC approved bonding devices, fittings or jumpers at expansion fitting, isolation sections or wherever continuity of ground is broken.

E. Connections above grade shall be made with bolted solderless connectors and those below grade shall be made by a fusion-welding process, a compression ground grid connector of a type, which uses a hydraulic compression tool to provide the correct circumferential pressure, may be used. Tools and dies shall be as recommended by the manufacturer. An embossing die code or other standard method shall provide visible indication that a connector has been adequately compressed on the ground wire.

F. Weld grounding conductors to underground grounding ring.

G. Install grounding and bonding conductors with sufficient slack to prevent breaking due to settlement and movement of conductors at attached points.

H Resistance to ground for all systems shall be measured by the "direct" method:

Perform the 2 point method test per IEEE No. 81, Section 9.03 to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral and derived neutral points. Ground resistance shall be 5 ohms or less between any system ground point and the two reference ground rods, which shall be located at least 20 FT. away from each other and any other enclosure or underground conduit.

I. Apply corrosion-resistant finish to field connections, buried splice grounding and bonding products, and places where factory applied protective coating has been destroyed, which are subjected to corrosive action.

J. Resistance to ground for electrical systems shall not exceed 5 ohms measurement and additional grounding rods and bare copper conductors shall be provided to attain this value or lower.

3.2 RECORDS

A. A certified record of ground-resistance test on ground ring, and other grounding electrodes shall be prepared and submitted for approval to CMWD upon completion of this part of the work.

B. The record shall include the number of splices, bondings, and their depth at each location to meet the required resistance to ground measurements specified. A statement shall be included describing the conditions of the soil at the time of measurement.

3.3 AS-BUILT DRAWINGS

A. As-built drawings shall indicate the location of ground ring and all connections to the grounding system.

END OF SECTION

SECTION 26 70 00
ACCEPTANCE TESTING

1. GENERAL

1.1. Summary

1.1.1. Scope of Specification

A. A third party agency is required to perform this section of work. This section provides the guidelines for inspection, testing and verification of electrical equipment, cables, circuit breakers, and related apparatus of the electrical distribution system. This specification does not release the contractor from any further testing required for safe commissioning of the equipment. All inspections, tests and verifications shall be documented, dated and signed off by the individual who does the actual work.

1. Electrical contractor shall perform infrared testing on all power connections after start-up. Infrared testing shall include but shall not be limited to the following: Switchgear bus connection, distribution panels, cable terminations.
2. Electrical contractor shall redo any loose connections found during testing. All findings and corrective actions shall be given to CMWD in binder form (video tape if applicable). Infrared images to be included in a binder and turned over to CMWD.
3. Contractor will pay all costs of testing including costs of correcting failures and of replacing or repairing any damage to associated work or surrounding areas resulting therefrom.

B. The Contractor shall be responsible for the following general equipment tests:
1. 2.4KV busway and cable testing.
2. Low voltage cable testing for L-L and L-G faults.
3. Grounding Systems.
4. Overload settings for protective relays of switchgear.
5. Coordination of the trip settings for main 1,200Amp-2.4KV circuit breaker.
6. Insulation resistance.

C. Test reports shall include:
1. Description of equipment tested.
2. Description of test.
3. Test results.
4. Conclusions and recommendations.
5. Appendix, including appropriate test forms.
6. List of test equipment used and calibration date.

1.2. Quality Assurance

1.2.1. Requirements of Regulatory Agencies

A. Codes and Ordinances: All work shall meet the requirements of the codes as listed in General Conditions as applicable.

B. Materials shall bear the Underwriters' Laboratories, Inc. (UL) label.

C. Qualifications of Testing Agency
   1. The testing firm shall meet the Federal Occupational Safety and Health Administration (OSHA) criteria for accreditation of testing laboratories, Title 29, part 1907.
   2. Proof of the above qualifications shall be submitted.
   3. All instruments used to evaluate electrical performance shall meet National Electrical Testing Association (NETA) specifications for Test Instruments.
   4. The testing firm shall meet all requirements for accreditation for this type of work. Membership in NETA will constitute proof of meeting those requirements.

1.3. Applicable Standards

1.3.1. National Electric Testing Association Standards for acceptance testing of Electrical Distribution Apparatus, Publication 1.001 and IEEE Publication No. 141 are part of this section unless modified herein.

2. PRODUCTS

Not applicable.

3. EXECUTION

3.1. Preparatory Work

3.1.1. Prior to the testing of any specific piece of equipment, the contractor shall remove all shipping hardware and inspect for broken or missing parts and proper connections in accordance with the manufacturer's instructions.

3.2. General

3.2.1. The Contractor shall notify CMWD's representative of scheduled dates of electrical equipment installation completion. Equipment testing shall be coordinated at this time with contractor, CMWD's representative Engineer and appropriate manufacturer.

3.2.2. Tests of 2.4KV switchgear circuit breakers shall be supervised by CMWD’s Representative. CMWD's representative shall be given a one week notice of all scheduled tests.

3.3. Switchgear Main Circuit Breaker, Tie Breaker and Generator Breaker

3.3.1. General: Before performing any inspection tests, confirm that the incoming power is locked and tagged "off" and will remain "off" to the switchgear being tested. For safety, ground all three incoming cables to ground using a shorting strap. If power is "on" to the incoming main, lock the main in the off position.

3.3.2. Obtain from the switchgear manufacturer, the recommended testing procedure for the main breaker. Perform as indicated in the written procedure.

3.3.3. Using the solid state tester designed for testing the breaker trip devices, test the breaker for proper trip operation. Visually inspect to see if the CT ratio is correct for the breaker rating and manually operate breaker to assure that the breaker is not binding. Perform high current testing at minimum of 300% of breaker rating.

3.3.4. With power off to the switchgear, inspect the breaker trip devices and settings provided.

3.3.5. The breaker, after being completely tested, shall be tagged showing test completion. The tag shall show company's name performing test, tester's name and date of test.

3.4. Grounding

3.4.1. Perform a visual and mechanical inspection to insure that all connections (both compression and exothermal) have been properly made.

A. Perform three point fall of potential tests on main grounding electrode per IEEE No. 81 Section 9.04. Notify Engineer if exceeds 5 ohm.

B. Perform 2 point method test as per IEEE No. 81, Section 9.03 to determine ground resistance between the main ground system and all major electrical equipment frames, system neutral and/or derived neutral points.

C. Conduct resistance to ground tests. Submit to the CMWD representative a report showing the results of these measurements. If the resistance exceed values specified elsewhere, perform all corrective measures at no additional cost to CMWD.

3.5. 2.4KV Cable and Busway

3.5.1. Conditions Required to Start Testing:

A. All cables and busway installed and terminated.

B. All conduit fittings in place.

3.5.2. Visual and Mechanical Inspection:

A. Inspect exposed section for physical damage.

B. Verify system is connected in accordance with the single-line diagram.

C. Check color-coding with applicable engineer’s specifications and NEC standards.

D. Check visible cable bends against ICEA or manufacturer’s minimum allowable bending radius.

E. Inspect jacket and insulation condition.

F. Inspect for proper phase identification and arrangement.

3.5.3 Electrical Tests

A. Perform insulation resistance test on each conductor with respect to ground and adjacent conductors. Applied potential to be 2500 volts dc for one (1) minute. Minimum insulation resistance values shall be not less than onethousand megohms.

B. Perform continuity test to insure proper cable connection.

3.6. Operational Test:

A. Upon completion of the work and adjustment of all equipment, conduct an operating test for approval at such time as the CMWD representative directs. Conduct the test in the presence of the CMWD representative. Demonstrate all systems and equipment to operate in accordance with all requirements of the Contract documents and to be free from all electrical and mechanical defects. Provide all systems free from short circuits and grounds and show an insulation resistance between phase conductors and ground not less than the requirements of the governing electric Code. Test all circuits for proper neutral connection.

END OF SECTION

SECTION 26 70 10
ARC FLASH HAZARD ANALYSIS/SHORT-CIRCUIT/COORDINATION STUDY

PART 1 GENERAL

1.01 SCOPE

A. The Switchgear Manufacturer, Square D Company shall furnish short-circuit and protective device coordination studies.

B. The Arc Flash Hazard Analysis Study shall be performed per the requirements set forth in the current version of NFPA 70E -*Standard for Electrical Safety in the Workplace*. The arc flash hazard analysis shall be in accordance to IEEE Standard 1584 – 2002, the IEEE *Guide for Performing Arc-Flash Calculations.*

C. The scope of the studies shall include new distribution equipment supplied by Square D Company under this contract as well as the recommended settings of the three motor protection relays of the existing equipment.

1.02 RELATED SECTIONS

A. Drawings and general provisions of the Contract.

1.03 REFERENCES

A. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

1. IEEE 141 – Recommended Practice for Electric Power Distribution and Coordination of Industrial and Commercial Power Systems
2. IEEE 242 – Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems
3. IEEE 399 – Recommended Practice for Industrial and Commercial Power System Analysis
4. IEEE 241 – Recommended Practice for Electric Power Systems in Commercial Buildings
5. IEEE 1015 – Recommended Practice for Applying Low-Voltage Circuit Breakers Used in Industrial and Commercial Power Systems.
6. IEEE 1584 -Guide for Performing Arc-Flash Hazard Calculations

B. American National Standards Institute (ANSI):

1. ANSI C57.12.00 – Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers
2. ANSI C37.13 – Standard for Low Voltage AC Power Circuit Breakers Used in Enclosures
3. ANSI C37.010 – Standard Application Guide for AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis
4. ANSI C 37.41 – Standard Design Tests for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches and Accessories.

C. The National Fire Protection Association (NFPA)

1. NFPA 70 -National Electrical Code, latest edition
2. NFPA 70E – Standard for Electrical Safety in the Workplace

1.04 SUBMITTALS FOR REVIEW/APPROVAL

A. The studies shall be submitted to the design engineer prior to receiving final approval of the distribution equipment shop drawings and/or prior to release of equipment drawings for manufacturing. If formal completion of the study may cause delays in equipment shipments, approval from the Engineer may be obtained for a preliminary submittal of data to ensure that the selection of device ratings and characteristics will be satisfactory to properly select the distribution equipment. The formal study will be provided to verify preliminary findings.

1.05 SUBMITTALS FOR CONSTRUCTION

A. The results of the short-circuit, protective device coordination and arc flash hazard analysis studies shall be summarized in a final report. A minimum of five (5) bound copies of the complete final report shall be submitted. Electronic PDF copies of the report shall be provided upon request.

B. The report shall include the following sections:

1. Executive Summary including Introduction, Scope of Work and Results/Recommendations.
2. Short-Circuit Methodology Analysis Results and Recommendations
3. Short-Circuit Device Evaluation Table
4. Protective Device Coordination Methodology Analysis Results and Recommendations
5. Protective Device Settings Table
6. Time-Current Coordination Graphs and Recommendations
7. Arc Flash Hazard Methodology Analysis Results and Recommendations including the details of the incident energy and flash protection boundary calculations, along with Arc Flash boundary distances, working distances, Incident Energy levels and Personal Protection Equipment levels.
8. Arc Flash Labeling section showing types of labels to be provided. Section will contain descriptive information as well as typical label images.
9. One-line system diagram that shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location, device numbers used in the time-current coordination analysis, and other information pertinent to the computer analysis.

1.06 QUALIFICATIONS

A. The short-circuit, protective device coordination and arc flash hazard analysis studies shall be conducted under the responsible charge and approval of a Registered Professional Electrical Engineer skilled in performing and interpreting the power system studies.

B. The Registered Professional Electrical Engineer shall be an employee of the equipment manufacturer or an approved engineering firm.

C. The Registered Professional Electrical Engineer shall have a minimum of five (5) years of experience in performing power system studies.

D. The approved engineering firm shall demonstrate experience with Arc Flash Hazard Analysis by submitting names of at least ten actual arc flash hazard analyses it has performed in the past year.

E. The engineering firm shall have a minimum of twenty-five (25) years experience in performing power system studies.

1.07 COMPUTER ANALYSIS SOFTWARE

A. The studies shall be performed using SKM Systems Analysis Power*Tools for Windows (PTW) software program.

PART 2 PRODUCT

2.01 STUDIES

A. The contractor shall furnish an Arc Flash Hazard Analysis Study per NFPA 70E -Standard for Electrical Safety in the Workplace, reference Article 130.3 and Annex D. This study shall also include short-circuit and protective device coordination studies. All studies to be prepared by Square D Engineering Services.

2.02 DATA

A. Client shall furnish all data as required for the power system studies. The Engineer performing the short-circuit, protective device coordination and arc flash hazard analysis studies shall furnish the Client with a listing of required data immediately after award of the contract. The Client shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings and/or prior to the release of the equipment for manufacturing.

B. Data Source may include present and future motors and generators.

C. Load data utilized may include existing and proposed loads obtained from Contract Documents provided by Client.

D. If applicable, include fault contribution of existing motors in the study. The Client shall obtain required existing equipment data, to satisfy the study requirements.

2.03 SHORT-CIRCUIT ANALYSIS

A. Transformer design impedances shall be used when test impedances are not available.

B. Study shall provide the following:

1. Calculation methods and assumptions
2. Selected base per unit quantities
3. One-line diagram of the system being evaluated that clearly identifies individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis
4. The study shall include input circuit data including electric utility system characteristics, source impedance data, conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.
5. Tabulations of calculated quantities including short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings and notes regarding adequacy or inadequacy of the equipment rating.
6. Results, conclusions, and recommendations. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.

C. For solidly-grounded systems, provide a bolted line-to-ground fault current study for applicable buses as determined by the engineer performing the study.

D. Protective Device Evaluation:

1. Evaluate equipment and protective devices and compare to short circuit ratings
2. Adequacy of switchgear, motor control centers, and panelboard bus bars to withstand short-circuit stresses
3. Square D shall notify Owner in writing, of any circuit protective devices improperly rated for the calculated available fault current.

2.04 PROTECTIVE DEVICE TIME-CURRENT COORDINATION ANALYSIS

A. Protective device coordination time-current curves (TCC) shall be displayed on log-log scale graphs.

B. Include on each TCC graph, a complete title with descriptive device names.

C. Terminate device characteristic curves at a point reflecting maximum symmetrical or asymmetrical fault current to which the device is exposed.

D. Identify the device associated with each curve by manufacturer type, function, and, if applicable, tap, time delay, and instantaneous settings recommended.

E. Plot the following characteristics on the TCC graphs, where applicable:

1. Electric utility's overcurrent protective device
2. Medium voltage equipment overcurrent relays
3. Medium and low voltage fuses including manufacturer's minimum melt, total clearing, tolerance, and damage bands

4. Low voltage equipment circuit breaker trip devices, including manufacturer's tolerance bands
5. Transformer full-load current, magnetizing inrush current, and ANSI through-fault protection curves
6. Medium voltage conductor damage curves
7. Ground fault protective devices, as applicable
8. Pertinent motor starting characteristics and motor damage points, where applicable
9. Pertinent generator short-circuit decrement curve and generator damage point
10. The largest feeder circuit breaker in each motor control center and applicable panelboard.

F. Provide adequate time margins between device characteristics such that selective operation is provided, while providing proper protection.

G. Provide the following:

1. A One-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.
2. A sufficient number of log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
3. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, and device identification numbers to aid in locating the devices on the log-log plots and the system one-line diagram.
4. The study shall include a separate, tabular printout containing the recommended settings of all adjustable overcurrent protective devices, the equipment designation where the device is located, and the device number corresponding to the device on the system one-line diagram
5. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.
6. Square D shall notify Owner in writing of any significant deficiencies in protection and/or coordination. Provide recommendations for improvements.

2.05 ARC FLASH HAZARD ANALYSIS

A. The arc flash hazard analysis shall be performed according to the IEEE 1584 equations that are presented in NFPA70E-2009, Annex D. The arc flash hazard analysis shall be performed in conjunction with the short-circuit analysis (Section 2.03) and the protective device time-current coordination analysis (Section 2.04)

B. The flash protection boundary and the incident energy shall be calculated at significant locations in the electrical distribution system (switchboards, switchgear, motor-control centers, panelboards, busway and splitters) where work could be performed on energized parts.

C. Circuits 240V or less fed by single transformer rated less than 125 kVA may be omitted from the computer model and will be assumed to have a hazard risk category 0 per NFPA

70E.

D. Working distances shall be based on IEEE 1584. The calculated arc flash protection boundary shall be determined using those working distances.

E. When appropriate, the short circuit calculations and the clearing times of the phase overcurrent devices will be retrieved from the short-circuit and coordination study model. Ground overcurrent relays should not be taken into consideration when determining the clearing time when performing incident energy calculations

F. The short-circuit calculations and the corresponding incident energy calculations for multiple system scenarios must be compared and the greatest incident energy must be uniquely reported for each equipment location in a single table. Calculations must be performed to represent the maximum and minimum contributions of fault current magnitude for normal and emergency operating conditions. The minimum calculation will assume that the utility contribution is at a minimum. Conversely, the maximum calculation will assume a maximum contribution from the utility. Calculations shall take into consideration the parallel operation of synchronous generators with the electric utility, where applicable as well as any stand-by generator applications.

   The Arc-Flash Hazard Analysis shall be performed utilizing mutually agreed upon facility operational conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.

G. The incident energy calculations must consider the accumulation of energy over time when performing arc flash calculations on buses with multiple sources. Iterative calculations must take into account the changing current contributions, as the sources are interrupted or decremented with time. Fault contribution from motors should be decremented as follows:

   1. Fault contribution from induction motors should not be considered beyond 5 cycles.

H. For each piece of ANSI rated equipment with an enclosed main device, two calculations shall be made. A calculation shall be made for the main cubicle, sides, or rear; and shall be based on a device located upstream of the equipment to clear the arcing fault. A second calculation shall be made for the front cubicles and shall be based on the equipment's main device to clear the arcing fault. For all other non-ANSI rated equipment, only one calculation shall be required and it shall be based on a device located upstream of the equipment to clear the arcing fault.

I. When performing incident energy calculations on the line side of a main breaker (as required per above), the line side and load side contributions must be included in the fault calculation.

J. Mis-coordination should be checked amongst all devices within the branch containing the immediate protective device upstream of the calculation location and the calculation should utilize the fastest device to compute the incident energy for the corresponding location.

K. Arc Flash calculations shall be based on actual overcurrent protective device clearing time. A maximum clearing time of 2 seconds will be used based on IEEE 1584-2002 section B.1.2. Where it is not physically possible to move outside of the flash protection boundary in less than 2 seconds during an arc flash event, a maximum clearing time based on the specific location shall be utilized.

L. Provide the following:

1. Results of the Arc-Flash Hazard Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing fault current levels, flash protection boundary distances, working distances, personal-protective equipment classes and AFIE (Arc Flash Incident Energy) levels.
2. The Arc-Flash Hazard Analysis shall report incident energy values based on recommended device settings for equipment within the scope of the study.
3. The Arc-Flash Hazard Analysis may include recommendations to reduce AFIE levels and enhance worker safety.

PART 3 EXECUTION

3.01 ARC FLASH LABELS

A. Square D Engineering Services shall provide a 4.0 in. x 4.0 in. Brady thermal transfer type label of high adhesion polyester for each work location analyzed.

B. The labels shall be designed according to the following standards:

1. UL969 – Standard for Marking and Labeling Systems
2. ANSI Z535.4 – Product Safety Signs and Labels
3. NFPA 70 (National Electric Code) – Article 110.16

C. The label shall include the following information:

1. System Voltage
2. Flash protection boundary
3. Personal Protective Equipment category
4. Arc Flash Incident energy value (cal/cm^2)
5. Limited, restricted, and prohibited Approach Boundaries
6. Study report number and issue date

D. Labels shall be printed by a thermal transfer type printer, with no field markings.

E. Arc flash labels shall be provided for equipment as identified in the study and the respective equipment access areas per the following:

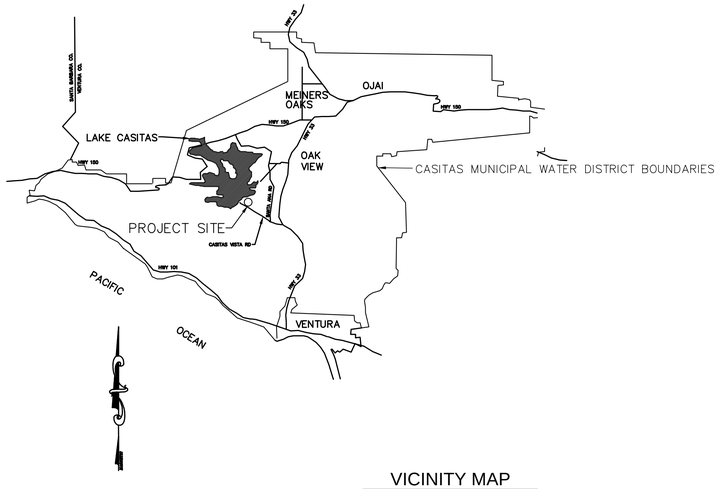
1. Floor Standing Equipment - Labels shall be provided on the front of each individual section. Equipment requiring rear and/or side access shall have labels provided on each individual section access area. Equipment line-ups containing sections with multiple incident energy and flash protection boundaries shall be labeled as identified in the Arc Flash Analysis table.

2. Wall Mounted Equipment – Labels shall be provided on the front cover or a nearby adjacent surface, depending upon equipment configuration.
3. General Use Safety labels shall be installed on equipment in coordination with the Arc Flash labels. The General Use Safety labels shall warn of general electrical hazards associated with shock, arc flash, and explosions, and instruct workers to turn off power prior to work.

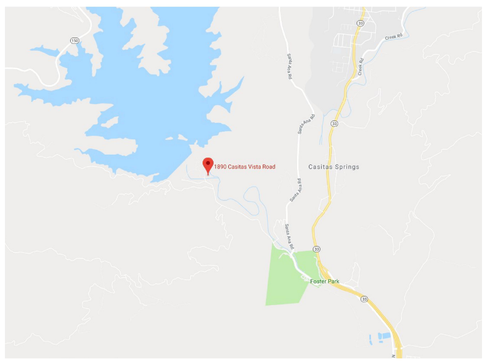
Label Installation by the owner/contractor

END OF SECTION

RINCON PUMP PLANT ELECTRICAL UPGRADE



VICINITY MAP
NOT TO SCALE



LOCATION MAP
2,000' 0' 2,000'
1 in. = 2,000 ft.

DIAL TOLL FREE
811
AT LEAST TWO DAYS
BEFORE YOU DIG

811
Know what's **below.**
Call before you dig.
UNDERGROUND SERVICE ALERT (USA) OF SOUTHERN CALIFORNIA

SHEET INDEX		
SHEET NO.	DRAWING NO.	DESCRIPTION
1	T-0	PROJECT TITLE SHEET
2	A0.0	COVER SHEET
3	A1.0	FLOOR PLANS AND SCHEDULES
4	A2.0	ELEVATIONS, SECTIONS, AND DETAILS
5	AD1	MANUFACTURER DETAILS
6	AD2	MANUFACTURER DETAILS
7	AD3	MANUFACTURER DETAILS
8	S1	GENERAL NOTES AND DETAILS
9	S2	FOUNDATION PLAN
10	S3	ROOF FRAMING PLAN
11	SD1	FOUNDATION AND CONCRETE BLOCK DETAILS
12	SD2	ROOF FRAMING DETAILS
13	E-0	ELECTRICAL TITLE SHEET
14	E-1	ELECTRICAL SITE PLAN
15	E-2	NEW ELECTRICAL SERVICE PLAN
16	E-3	SINGLE LINE DIAGRAM AND SWITCHGEAR ELEVATION
17	E-4	SWITCHGEAR MANUFACTURER-SINGLE LINE DIAGRAM
18	E-5	SWITCHGEAR MANUFACTURER-SPECIFICATIONS
19	E-6	120/208V-SINGLE LINE, LOAD AND FIXTURE SCHEDULE
20	E-7	NEW ELECTRICAL FLOOR PLAN
21	M-1	MECHANICAL FLOOR PLAN

PLAN LEGEND

- EXISTING MINOR CONTOUR LINE
- EXISTING MAJOR CONTOUR LINE
- PROPERTY BOUNDARY
- EXISTING SEWER MAIN (S)
- EXISTING GAS MAIN (G)
- EXISTING WATER MAIN (W)
- EXISTING OVERHEAD WIRE (OHW)
- FLOWLINE
- CURB
- PROPOSED WATER MAIN (W)
- PROPOSED WATER LATERAL
- EXISTING POWER POLE
- EXISTING LIGHT STANDARD
- EXISTING WATER METER (W)
- EXISTING GAS VALVE (GV)
- EXISTING FIRE HYDRANT
- EXISTING WATER METER (WV)
- EXISTING PIPE CAP
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE (W)
- PROPOSED PIPE CAP

ABBREVIATIONS

Δ	CURVE ANGLE
Ø	NOMINAL DIAMETER
ABAN.	ABANDON
C	CLASS
C.I.	CAST IRON
CMWD	CASITAS MUNICIPAL WATER DISTRICT
CNC	CONCRETE
CO.	COUNTY
D.I.	DUCTILE IRON
DR	DIMENSION RATIO
DWY	DRIVEWAY
E	EASTING
EA	EACH
ELEV	ELEVATION
FG	FINISH GRADE
FLG	FLANGE
FOC	FACE OF CURB
FT.	FOOT (FEET)
H	HORIZONTAL
HDPE	HIGH DENSITY POLYETHYLENE
ICV	IRRIGATION CONTROL VALVE
IN.	INCH(ES)
INV	INVERT
L	LENGTH
LF	LINEAR FEET
LSTD	LIGHT STANDARD
MAX.	MAXIMUM
MBX	MAIL BOX
MIN.	MINIMUM
MJ	MECHANICAL JOINT
N	NORTHING
N'LY	NORTHERLY
NAD83	NORTH AMERICAN DATUM OF 1983
NAVD88	NORTH AMERICAN VERTICAL DATUM OF 1988
NO.	NUMBER
O.D.	OUTER DIAMETER
O.F.C.I.	OWNER-FURNISHED/CONTRACTOR-INSTALLED
PO	PUSH ON
PVC	POLYVINYL CHLORIDE
R	RADIUS
SD	STANDARD
S'LY	SOUTHERLY
SN	SIGN
S	SEWER
SMH	SEWER MANHOLE
SSPWC	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION
STA	STATION(ING)
SWS	STOP SIGN WHITE STRIPE
VCP	VITRIFIED CLAY PIPE
W	WATER
W'LY	WESTERLY

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

DESIGNED: XX
DRAWN: XX
CHECKED: XX
QA/QC: XX
CONSTRUCTABILITY: XX

CONSULTING WEST ENGINEERS
31304 VIA COLINAS, SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818/889-3383 FAX 818/889-4927

PROJECT ENGINEER:
R.C.E. EXP.

DATE

ROD O. VASQUEZ — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

PROJECT TITLE SHEET

PROJECT NUMBER
17-397

DRAWING NUMBER
T-0

SHEET NUMBER
1 OF **21**

RINCON PUMP PLANT ELECTRICAL UPGRADE

CASITAS MUNICIPAL WATER DISTRICT

1890 CASITAS VISTA ROAD,
VENTURA, CA. 93001

SYMBOL LEGEND

XX — CONSTRUCTION TYPE	X — WINDOW TAG
# — REVISION NUMBER	KN — KEYNOTE
XX — GRID BUBBLE	ELEVATION — ELEVATION DATUM TAG
FINISH — FINISH TAG	XX / AX.X — DETAIL TAG
XXX — DOOR TAG	AX.X — MATCH LINE
NAME / XXX — ROOM TAG	XX — PLAN DETAIL TAG
XX — BUILDING SECTION TAG	XX — WALL SECTION TAG
XX / AX.X — EXTERIOR ELEVATION TAG	XX / AX.X — INTERIOR ELEVATION TAG
XX / AX.X — EQUIPMENT TAG	

ABBREVIATIONS

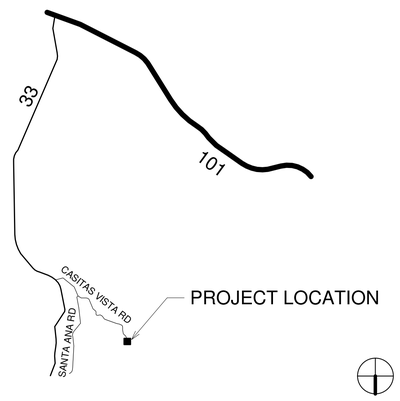
A	ANHEALED
AC	AIR CONDITIONING
ACT	ACOUSTIC CEILING TILE
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ASPH	ASPHALT
CJ	CONTROL JOINT
CLING	CEILING
CMU	CONCRETE MASONAY UNIT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CPT	CARPET
CT	CERAMIC TILE
CL	CENTERLINE
DBL	DOUBLE
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
EA	EACH
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATION
EQ	EQUAL
EXIST	EXISTING
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FF	FINSIH FLOOR
FRP	FIBERGLASS REINFORCED PLASTIC
GALV	GALANIZED
GYP BD	GYPSUM BOARD
HC	HANDICAP
HDW	HARDWARE
HM	HOLLOW METAL
HT	HEIGHT
HVAC	HEATING, VENTALATION, AIR
INSUL	INSULATION
MAX	MAXIMUM
MECH	MACHANICAL

MFR	MANUFACTURER
MIN	MINIMUM
MO	MASONRY OPENING
MR	MOISTURE RESISTANT
MTL	METAL
NA	NOT APPICABLE
NIC	NOT IN CONTRACT
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OPP	OPPOSITE
PF	PRE-FABRICATED
PSF	POUNDS PER SQUARE FOOT
PT	PRESSURE TREATED
PTD	PAINTED
QT	QUARRY TILE
R	RADIUS
REBAR	REINFORCING BAR
REF	REFERENCE
REQ'D	REQUIRED
RO	ROUGH OPENING
SB	SPLASHBLOCK
SIM	SIMILAR
SPEC	SPECIFICATION
SS	STAINLESS STEEL
STOR	STORAGE
SUSP	SUSPENDED
T	TEMPERDED
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
WD	WOOD
WP	WATERPROOF
WWF	WELDED WIRE FABRIC
T.O.S	TOP OF STRUCTURE

GENERAL NOTES

1. CASITAS MUNICIPAL WATER DISTRICT WILL BE SERVING AS THE JURISDICTION HAVING AUTHORITY AND WILL REVIEW THE CONSTRUCTION DOCUMENTS FOR GENERAL CONFORMANCE WITH APPLICABLE CODES.
2. ALL WORK AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH ALL CODES HAVING JURISDICTION.
4. ALL WORK SHALL BE OF THE HIGHEST QUALITY FOLLOWING THE CONTRACT DOCUMENTS, MANUFACTURES SPECIFICATIONS AND RECOMMENDATIONS, AND THE BEST ACCEPTED TRADE PRACTICES AND STANDARDS.
5. DETAILS SHOWN ARE INTENDED TO BE INDICATIVE OF THE PROFILES AND TYPES OF DETAILING REQUIRED FOR THE WORK. DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO THOSE DETAILED.
6. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS AND PAY FOR ALL FEES, CHARGES AND PERMITS REQUIRED AS WELL AS FOR HAULING, RIGGING AND TRANSPORTATION CHARGES.
7. THE CONTRACT DOCUMENTS SHALL NOT BE CONSTRUED AS A CONTRACTUAL AGREEMENT OF ANY KIND BETWEEN THE ARCHITECT AND CONTRACTOR, SUBCONTRACTORS OR BETWEEN ANY PERSONS OR ENTITIES OTHER THAN THE OWNER AND CONTRACTOR.
8. EXECUTION OF THE CONTRACT BY THE CONTRACTOR IS A REPRESENTATION THAT THE CONTRACTOR HAS VISITED THE SITE AND HAS BECOME FAMILIAR WITH THE LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS BEFORE COMMENCING WORK AND SHALL NOTIFY THE ARCHITECT AND/OR ENGINEER IF A CONDITION EXISTS WHICH PREVENTS THE CONTRACTOR FROM ACCOMPLISHING THE INTENT OF THE DRAWINGS.
9. THE TERM "WORK" MEANS THE CONSTRUCTION AND SERVICES REQUIRED BY THE CONTRACT DOCUMENTS, WHETHER COMPLETED OR PARTIALLY COMPLETED, AND INCLUDES ALL OTHER LABOR, MATERIALS, EQUIPMENT AND SERVICES PROVIDED OR TO PROVIDED BY THE CONTRACTOR TO FULFILL THE CONTRACTOR'S OBLIGATIONS. THE WORK MAY CONSTITUTE THE WHOLE OR PART OF THE PROJECT.
10. CONTRACTOR SHALL KEEP ACCURATE RECORDS OF ALL WORK WHICH DIFFERS FROM THE CONTRACT DOCUMENTS SO THAT ACCURATE RECORD DRAWINGS CAN BE KEPT AND PROVIDED BY THE CONTRACTOR TO THE OWNER AT THE CLOSE OF THE PROJECT.
11. THE CONTRACTOR SHALL VISIT THE SITE AND BE KNOWLEDGEABLE OF CONDITIONS THEREOF. FAILURE TO EXAMINE THE SITE AND DETERMINE EXISTING CONDITIONS OR NATURE OF NEW CONSTRUCTION, OR NATURE OF EXTENT OF WORK TO BE PERFORMED BY OTHER TRADES WILL NOT BE CONSIDERED A BASIS FOR APPROVING CHANGE ORDERS.
12. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS ON SITE, AND SHALL NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES, OMISSIONS AND/OR CONFLICTS BEFORE PROCEEDING WITH THE WORK.
13. THE CONTRACTOR SHALL INVESTIGATE, VERIFY AND BE RESPONSIBLE FOR ALL REQUIREMENTS OF THE PROJECT AND SHALL NOTIFY THE ARCHITECT OF ANY CONDITIONS CONTRARY TO THE CONSTRUCTION DOCUMENTS THAT REQUIRE MODIFICATIONS BEFORE PROCEEDING WITH THE WORK.
14. THE CONTRACTOR SHALL PROTECT ALL EXISTING SITE ELEMENTS AND ADJACENT SPACES FROM DAMAGE DUE TO THE CONSTRUCTION OPERATIONS, AND REPAIR OR REPLACE ANY ELEMENTS DAMAGED DURING THE PROJECT.
15. THE CONTRACTOR MUST PROVIDE PUBLIC PROTECTION IN ACCORDANCE WITH CBC 3306.1 FOR THE WORK ON ANY BUILDING OR STRUCTURE ADJACENT TO THE PUBLIC WAY.
16. GENERAL CONTRACTOR TO PROVIDE BUILDING MAINTENANCE AND OPERATIONS MANUAL AND DIGITAL FILES PER CAL GREEN SECTION 4.4.10, SEE 2016 CALIFORNIA GREEN BUILDING STANDARD CODES.

VICINITY MAP



STANDARD NOTES OF CONSTRUCTION

THE FOLLOWING STANDARD NOTES AND PRESCRIPTIVE CONSTRUCTION REQUIREMENTS ARE NOT INTENDED TO REPLACE ANY MORE RESTRICTIVE MINIMUM LIFE-SAFETY OR STRUCTURAL CODE REQUIREMENTS OR CONDITIONS. THESE NOTES ARE NOT INTENDED TO CREATE A CONFLICT BETWEEN THE DESIGN AND MINIMUM CODE REQUIREMENTS. WHERE A CONFLICT EXISTS BETWEEN THESE NOTES AND THE PLANS, THESE NOTES TAKE PRECEDENCE ONLY FOR MINIMUM CODE COMPLYING CONSTRUCTION PURPOSES.

SECTION 01: GENERAL NOTES

1. THESE DRAWINGS ARE INTENDED TO SHOW GENERAL ARRANGEMENT, DESIGN & EXTENT OF WORK & ARE PARTLY DIAGRAMMATIC. THEY ARE NOT INTENDED TO BE SCALED.
2. SEPARATE PERMITS WILL BE REQUIRED FOR PLUMBING, MECHANICAL, AND ELECTRICAL WORK AS APPLICABLE.
3. PRIOR TO COMMENCEMENT OF ANY WORK WITHIN THE PUBLIC RIGHT-OF-WAY OR WITHIN A CITY EASEMENT, THE APPLICANT SHALL APPLY FOR AND OBTAIN AN ENCROACHMENT PERMIT FROM THE CITY ENGINEERING DIVISION. PUBLIC WORKS INSPECTORS REQUIRE 48-HOURS NOTICE FOR INSPECTION.
4. PROTECTION OF PEDESTRIAN ACCESS IS REQUIRED DURING CONSTRUCTION IN ACCORDANCE WITH CBC SECTION 3303.3
5. COMPLIANCE WITH ADA REQUIREMENTS IS THE RESPONSIBILITY OF THE OWNER/ARCHITECT/CONTRACTOR.
6. A SEPARATE PERMIT SHALL BE OBTAINED FOR INSTALLATION OF SOLAR PANELS. THE SOLAR PANELSYSTEM SHALL BE A DEFERRED SUBMITTAL.
7. A SEPARATE PERMIT SHALL BE OBTAINED FOR INSTALLATION OF AUTOMATIC FIRE SPRINKLER SYSTEM.
8. A SEPARATE PERMIT SHALL BE OBTAINED FOR INSTALLATION OF AUTOMATIC FIRE ALARM SYSTEM.

SECTION 02: FIRE NOTES

1. PORTABLE FIRE EXTINGUISHERS SHALL BE PROVIDED FOR THIS STRUCTURE. FIRE EXTINGUISHERS TO BE CLASS SPECIFIC FOR ELECTRICAL PURPOSES.
2. THE STRUCTURE SHALL BE IN COMPLIANCE WITH THE APPLICABLE SECTIONS OF THE CALIFORNIA FIRE CODE AND CALIFORNIA CODE OF REGULATIONS, TITLE 19.
3. ENVELOPE CEILINGS MUST COMPLY WITH THE CALIFORNIA BUILDING CODE.

SECTION 03: CALGREEN STANDARDS: [2016 CALGREEN CODE]

1. ALL APPLICABLE COMMERCIAL MANDATORY AND SELECTED VOLUNTARY MEASURES AS INDICTED IN THE PROJECT DOCUMENTS SHALL BE COMPLETED, DOCUMENTED AND FIELD VERIFIED PER THE APPROVED PLANS.

SECTION 04: CALIFORNIA ENERGY CODE

1. ALL APPLICABLE "INSTALLATION CERTIFICATES" (CF-6R) FORMS AND "CERTIFICATE OF FIELD VERIFICATIONS AND DIAGNOSTIC TESTING" (CF-4R) FORMS SHALL BE COMPLETED AND POSTED AT THE PROJECT SITE TO BE VERIFIED BY THE BUILDING INSPECTOR. HERS INSPECTIONS SHALL BE REQUIRED.

SECTION 05: SITE DEVELOPMENT

1. SITE DEVELOPMENT AND GRADING SHALL BE DESIGNED TO PROVIDE ACCESS TO ALL ENTRANCES AND EXTERIOR GROUND FLOOR EXITS, AND ACCESS TO NORMAL PATHS OF TRAVEL, AND WHERE NECESSARY TO PROVIDE ACCESS, SHALL INCORPORATE PEDESTRIAN RAMPS, CURB RAMPS, ETC.
2. WALK AND SIDEWALK SURFACES SHALL BE SLIP-RESISTANT AS FOLLOWS:
   A. SURFACES WITH A SLOPE OF LESS THAN 6% GRADIENT SHALL BE AT LEAST AS SLIP-RESISTANT AS THAT DESCRIBED AS A MEDIUM SALTED FINISH.
   B. SURFACES WITH A SLOPE OF 6% GRADIENT SHALL BE SLIP-RESISTANT.
3. WALKS, SIDEWALKS AND PEDESTRIAN WAYS SHALL BE FREE OF GRATINGS WHENEVER POSSIBLE.
4. GRATINGS LOCATED IN THE SURFACE OF ANY WALK, SIDEWALK AND/OR PEDESTRIAN WAY:
   A. GRID OPENINGS SHALL BE NO GREATER THAN 1/2 INCH WIDE IN ONE DIRECTION.
   B. IF GRATINGS HAVE ELONGATED OPENINGS THEY SHALL BE PLACED SO THAT THE LONG DIMENSION IS PERPENDICULAR TO THE DOMINANT DIRECTION OF TRAVEL.

SECTION 011: SAFETY GLAZING (CBC SECTION 2406)

1. PERMANENTLY IDENTIFIED SAFETY GLAZING SHALL BE PROVIDED IN THE FOLLOWING LOCATIONS:
   A. GLAZING IN ALL DOORS.

SECTION 21: ROOF-CEILING CONSTRUCTION:

1. WALL AND CEILING MATERIALS SHALL NOT EXCEED THE FLAME SPREAD CLASSIFICATION IN CALIFORNIA BUILDING CODE CHAPTER 8.
2. ROOF DRAINAGE: IN AREAS WHERE EXPANSIVE OR COLLAPSIBLE SOILS ARE KNOWN TO EXIST, A CONTROLLED METHOD OF WATER DISPOSAL FROM ROOFS SHALL BE PROVIDED THAT WILL COLLECT AND DISCHARGE ROOF DRAINAGE TO THE GROUND SURFACE AT A POINT AT LEAST 5 FEET FROM THE FOUNDATION.

SECTION 24: ROOF ASSEMBLIES:

1. WEATHER PROTECTION:
   A. FLASHING SHALL BE INSTALLED IN A MANNER TO PREVENT MOISTURE ENTERING THE WALL AND ROOF.
   B. WHERE FLASHING IS OF METAL, THE METAL SHALL BE CORROSION RESISTANT WITH A THICKNESS OF NOT LESS THAN 0.019 INCH (NO. 26 GALVANIZED SHEET).
2. PERFORMANCE REQUIREMENTS:
   A. CLASS A ROOF COVERINGS SHALL BE LISTED (UL 790 OR ASTM E 108) AND IDENTIFIED AND VERIFIED IN THE FIELD PRIOR TO INSTALLATION.
3. ALL ROOF MATERIALS SHALL BE INSTALLED PER THE MANUFACTURE'S INSTALLATION INSTRUCTIONS.

BUILDING SUMMARY

APPLICABLE CODES

THIS PROJECT TO COMPLY WITH THE FOLLOWING CODES:
TITLE 24
2016 CALIFORNIA BUILDING CODE (CBC)
2016 CALIFORNIA MECHANICAL CODE (CMC)
2016 CALIFORNIA ELECTRICAL CODE (CEC)
2016 CALIFORNIA GREEN BUILDING STANDARDS CODE
2016 CALIFORNIA FIRE CODE
2016 CALIFORNIA ENERGY CODE

BUILDING STATISTICS

YEAR BUILT:	CIRCA 1957
EXISTING BUILDING AREA:	681 SF
PROPOSED BUILDING AREA EXPANSION:	681 SF
TOTAL NEW BULIDING AREA:	1362 SF
EXISTING BUILDING HEIGHT:	13 FT (PER ARCHIVE AS-BUILTS)
PROPOSED BUILDING HEIGHT:	13 FT (TO MATCH EXISTING HT)

BUILDING INFORMATION

OCCUPANCY GROUP:
U, ELECTRICAL ROOM

CONSTRUCTION TYPE:
TYPE V-A (ALL MATERIALS)
NON-RATED CONSTRUCTION
CLASS A ROOF

FIRE SPRINKLERS:
NO EXISTING SYSTEM
NO PROPOSED SYSTEM
NOT REQUIRED PER CBC SECTION 903

ALLOWABLE BUILDING AREA PER CBC TABLE 506.2:
9,000 SF BUILDING AREA PER STORY

ALLOWABLE BUILDING HEIGHT PER CBC TABLE 504.3 + 504.4:
50 FT HEIGHT LIMIT / 2 STORIES

PROPOSED BUILDING AREA:
1,362 SF

PROPOSED BUILDING HEIGHT:
15 FT MAX. / 1 STORY

PROJECT TEAM

CLIENT:
CONSULTING WEST ENGINEERS
31340 VIA COLINAS @102
WESTLAKE VILLAGE, CA 91362
TEL: (818) 889-3383
CONTACT: TYLER COWLES
EMAIL: tyler@consulting west.com

ARCHITECT:
MAINSTREET ARCHITECTS + PLANNERS, INC.
422 E. MAIN STREET
VENTURA, CA 93001
TEL: (805) 652-2115
CONTACT: JUAN UEHARA
EMAIL: juan@mainstreetarchitects.com

STRUCTURAL ENGINEER:
VINCI & ASSOCIATES
175 E. WILBUR RD, STE: 103
THOUSAND OAKS, CA 91360
TEL: (805) 496-2100
CONTACT: JAMES VINCI
EMAIL: jim@vincise.com

PROJECT DESCRIPTION

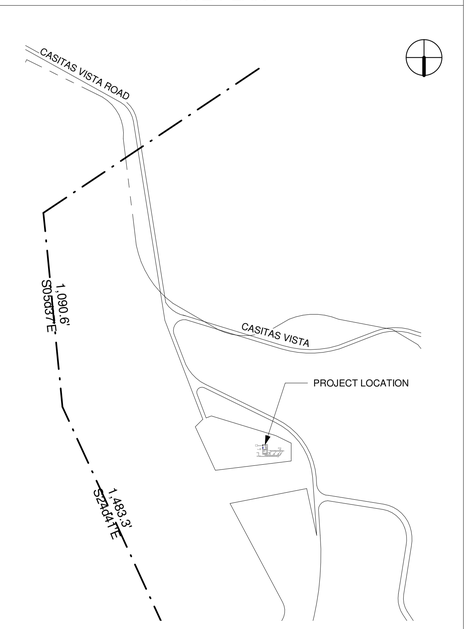
EXPANSION OF EXISTING RINCON PUMP STATION TO DOUBLE IN SIZE. PARTIAL DEMOLITION OF EXISTING SOUTH ELEVATION TO CREATE ONE LARGE OPENING. DEMOLITION OF EXISTING ROOFING. NEW CMU WALLS, CONCRETE SLAB, TO MATCH EXISTING AS WITHIN A REASONABLE DEGREE. PROVIDE NEW ROOFING AND ROOF STRUCTURE

CONSTRUCTION SEQUENCE

NOTE:
CONTRACTOR TO REVIEW CONSTRUCTION SEQUENCE AND DETERMINE FINAL CONSTRUCTION SEQUENCE AFTER REVIEWING CONSTRUCTION DOCUMENTS, REVIWEING FIELD CONDITIONS, AND CLIENT COORDINATION.

1. PREPARE ASPHALT FOR REMOVAL PER NEW STRUCTURAL FOUNDATION LAYOUT AND NEW ELECTRICAL WORK.
2. PREPARE ASHPAHT FOR REMOVAL TO INSTALL FOUNDATION DRAIN PIPE AROUND EXISTING AND NEW BULIDING FOOTINGS. EXTENT OF DISCHARGE TO BE COORDINATED WITH CLIENT. PLEASE COORDINATE PRIOR TO BEGINNING WORK.
3. EXCAVATE SITE AND PREPARE SOIL FOR NEW CONSTRUCTION, INCLUDING ELECTRICAL WORK. STRUCTURAL ENGINEER OR THIRD PARTY INSPECTION TO BE PERFORMED AFTER COMPLETION OF FORMWORK AND PRIOR TO POUR.
4. COORDINATE AND PREPARE FOR INSTALLATION OF NEW CONCRETE WORK.
5. AFTER SLAB AND FOOTINGS HAVE CURED PER SPECIFICATIONS, WORK ON VERTICAL CONSTRUCTION MAY COMMENCE.
6. UPON COMPLETION OF VERTICAL CONSTRUCTION, PROTECT EXISTING ELECTRICAL EQUIPMENT BEFORE COMMENCEMENT OF DEMOLITION. EQUIPMENT TO BE FULLY FUNCTIONAL DURING DEMOLITION AND CONSTRUCTION, INCLUDING BEING PROPERLY VENTILATED.
7. DEMOLITION WORK TO COMMENCE. PROPERLY SECURE AND REINFORCE ANY AREAS DETERMINED TO REQUIRE SUCH MEASURES.
8. COMPLETE REMAINDER OF CONSTRUCTION WORK, INCLUDING NEW ROOF STRUCTURE AND ROOFING.
9. UPON COMPLETION OF STRUCTURAL AND ARCHITECTURAL WORK, INSTALL NEW ELECTRICAL EQUIPMENT PER ELECTRICAL CONSTRUCTION SEQUENCE.

SITE PLAN



REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS MUNICIPAL WATER DISTRICT

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

CONSULTING WEST ENGINEERS
MECHANICAL & ELECTRICAL
31340 VIA COLINAS, SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818.889.3383 FAX 818.889.4927

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION
REGISTERED ARCHITECT DEBORAH T. GUTHRIE REN. 10-31-19 STATE OF CALIFORNIA

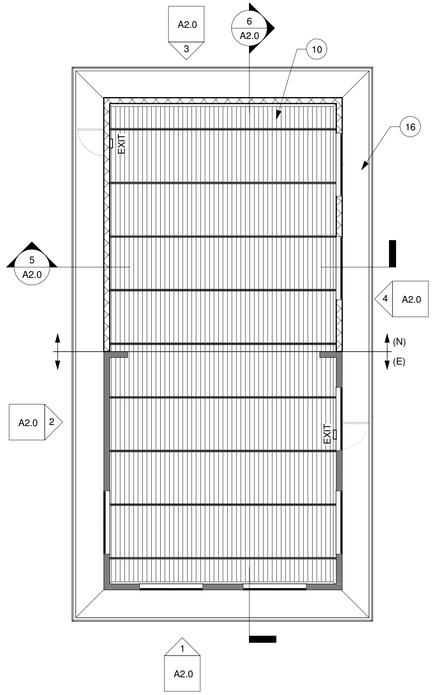
0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE: As indicated

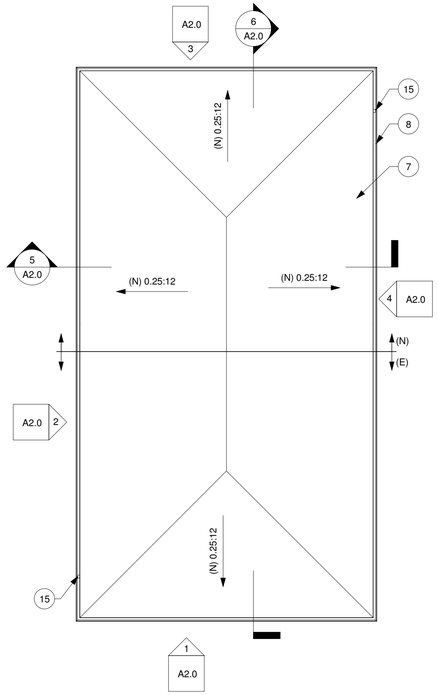
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

COVER SHEET

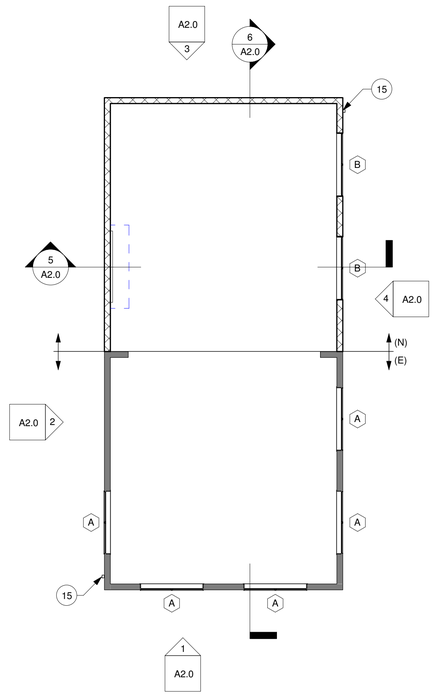
PROJECT NUMBER 17-397
DRAWING NUMBER A0.0
SHEET NUMBER 2 OF 21



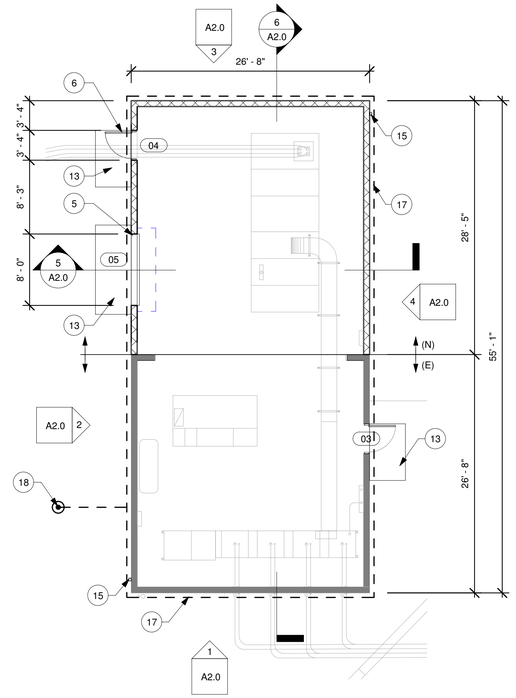
4 REFLECTED CEILING PLAN
1/8" = 1'-0"



3 ROOF PLAN
1/8" = 1'-0"



2 CLERESTORY
1/8" = 1'-0"



1 GROUND FLOOR
1/8" = 1'-0"

NEW CONDITION

EXISTING CONDITION

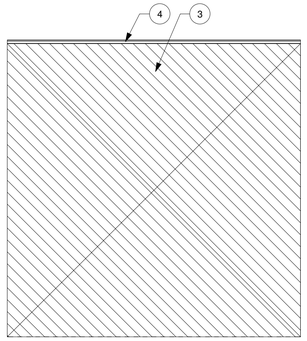
NOTE:
EQUIPMENT TO BE PROTECTED IN PLACE DURING DEMOLITION AND CONSTRUCTION

DOOR SCHEDULE

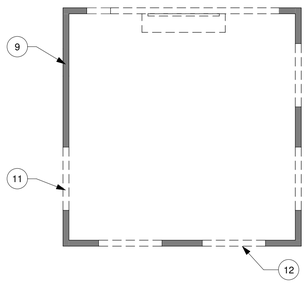
NO.	WIDTH	HEIGHT	FRAME	FINISH	FAMILY	COMMENTS
01	3' - 0"	7' - 0"	MTL	MTL	Door-Passage-Single-One_Lite	DEMOLISH
02	8' - 0"	10' - 0"	MTL	MTL	Door-Overhead-Rolling	DEMOLISH
03	3' - 0"	7' - 0"	MTL	MTL	Door-Passage-Single-One_Lite	EXISTING, PANIC HARDWARE
04	3' - 0"	7' - 0"	MTL	MTL	Door-Passage-Single-One_Lite	NEW, PANIC HARDWARE, INSULATED
05	8' - 0"	10' - 0"	MTL	MTL	Door-Overhead-Rolling	NEW, INSULATED - PROVIDE SHOP DRAWINGS

OPENING SCHEDULE

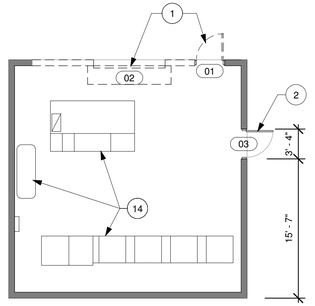
MARK	WIDTH	HEIGHT	SILL HEIGHT	COMMENTS
A	7' - 1"	2' - 9"	9' - 3"	EXISTING WINDOWS TO BE REPLACED WITH ALUMINUM FRAME, DUAL PANE WINDOW
B	7' - 1"	2' - 9"	9' - 3"	ALUMINUM FRAME, DUAL PANE WINDOW



7 EXISTING ROOF
1/8" = 1'-0"



DEMOLITION
6 CLERESTORY
1/8" = 1'-0"



5 DEMOLITION PLAN
1/8" = 1'-0"

GENERAL NOTES

1. THESE DRAWINGS ARE INTENDED TO SHOW GENERAL ARRANGEMENT, DESIGN AND EXTENT OF WORK AND ARE PARTLY DIAGRAMMATIC. THEY ARE NOT INTENDED TO BE SCALED, DIMENSIONS SHALL GOVERN.
2. PROTECTION OF PEDESTRIANS IS REQUIRED DURING CONSTRUCTION.
3. CONTRACTOR SHALL VERIFY ALL MATERIAL AND EQUIPMENT SIZES, MEANS OF INSTALLATION IN EXISTING SPACES, ROUTING, CONNECTION TO EXISTING CONDITIONS AND PROVIDE AN ALLOWANCE IN THE BID FOR ANY FIELD ADJUSTMENTS, ADDITIONAL COMPONENTS, REMOVAL OF EXISTING MATERIALS, ETC, WHICH MAY BE NECESSARY TO ENSURE FULL AND PROPER INSTALLATION.
4. CONTRACTOR SHALL THOROUGHLY CLEAN ALL AREAS AFFECTED BY CONSTRUCTION WORK.
5. PROTECT IN PLACE EXISTING BUILDING WALLS AND PATH OF TRAVEL - REPAIR AND REPLACE WHEN NECESSARY TO MATCH EXISTING.
6. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS BEFORE CONSTRUCTION AND NOTIFY ARCHITECT OF ANY VARIANCES.
7. EXISTING CONCRETE SIDEWALK, PATCH AND REPAIR ANY DAMAGE DONE DURING CONSTRUCTION TO MATCH EXISTING.
8. NO PARKING TO BE IMPACTED BY THIS WORK.

MATERIAL NOTES

1. (E) DOOR TO BE REMOVED
2. (E) DOOR TO REMAIN
3. (E) ROOFING AND ROOF STRUCTURE TO BE REMOVED
4. (E) GUTTER TO BE REMOVED
5. (N) INSULATED OVERHEAD ROLLING DOOR
6. (N) INSULATED ENTRY DOOR w/GLAZING
7. (N) SINGLE-PLY ROOFING o/RIGID INSULATION o/VAPOR BARRIER
8. (N) METAL GUTTER ALL AROUND ROOF PERIMETER, PAINTED
9. (E) ELECTRICAL SERVICE, REMOVE AND INFILL W/ CMU. PROTECT IN PLACE UNTIL INSTALLATION OF NEW ELECTRICAL SERVICE.
10. (N) EXPOSED METAL ROOF DECK, PAINTED
11. (E) EXHAUST HOOD TO BE REMOVED
12. (E) LOUVER TO BE REMOVED
13. (N) CONCRETE STOOP AT 2" BELOW FINISH FLOOR OF BUILDING, SLOPE AWAY FROM BUILDING 1/4" PER FOOT
14. PROVIDE TEMPORARY PROTECTION FOR ALL EXISTING EQUIPMENT THAT MUST REMAIN IN PLACE AND MUST BE FULLY OPERATIONAL THROUGHOUT ALL PHASES OF DEMOLITION & CONSTRUCTION
15. (N) DOWNSPOUT W/ BUILT-IN FILTRATION SYSTEM
16. (N) FIBER CEMENT PANEL SOFFIT
17. (N) PERFORATED FOUNDATION DRAIN PIPE
18. TERMINATION OF PERFORATED DRAIN PIPE TO BE COORDINATED PER OWNER INSTRUCTIONS

WALL LEGEND

- EXISTING 8" CMU WALL TO BE DEMOLISHED
- EXISTING 8" CMU WALL TO REMAIN
- NEW 8" CMU WALL TO MATCH EXISTING

REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

CONSULTING WEST ENGINEERS
MECHANICAL ELECTRICAL
31340 VIA COLINAS, SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818/889-5383 FAX 818/889-6527

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION
REGISTERED ARCHITECT DEBORAH T. GUTHRIE C 29629 REN. 10-31-19 STATE OF CALIFORNIA

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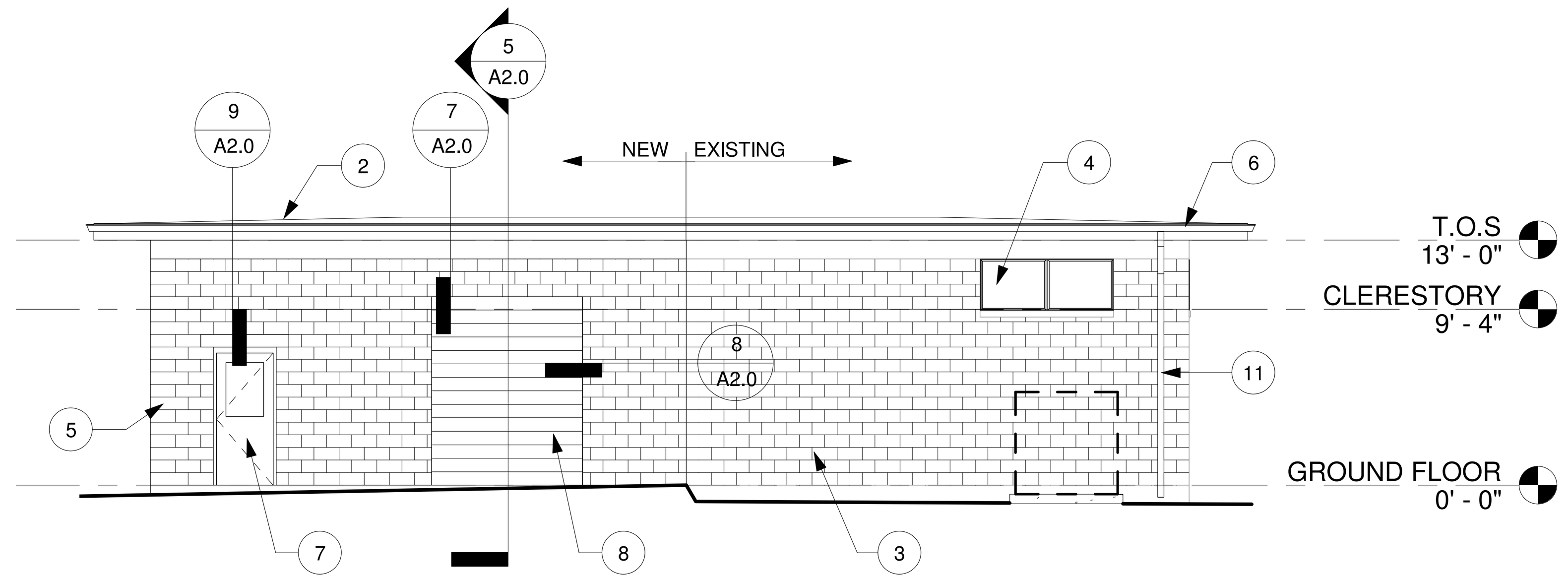
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE: As indicated

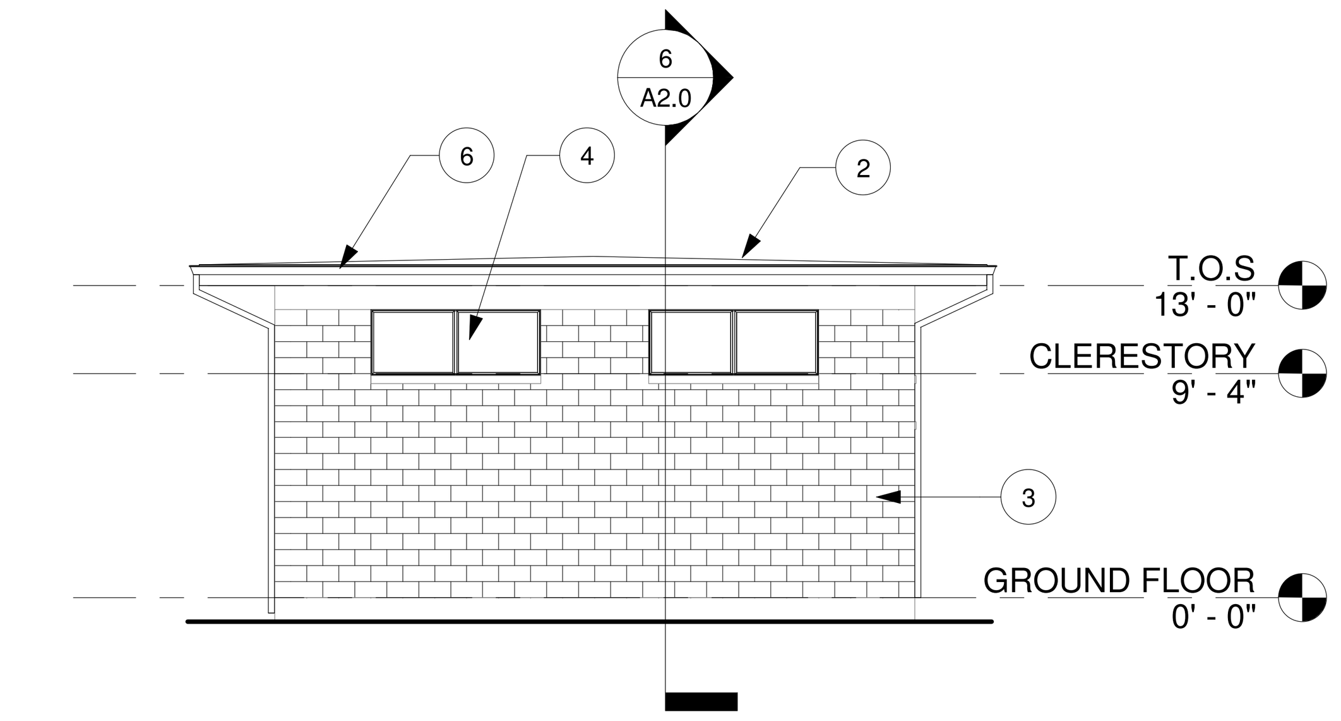
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

FLOOR PLANS AND SCHEDULES

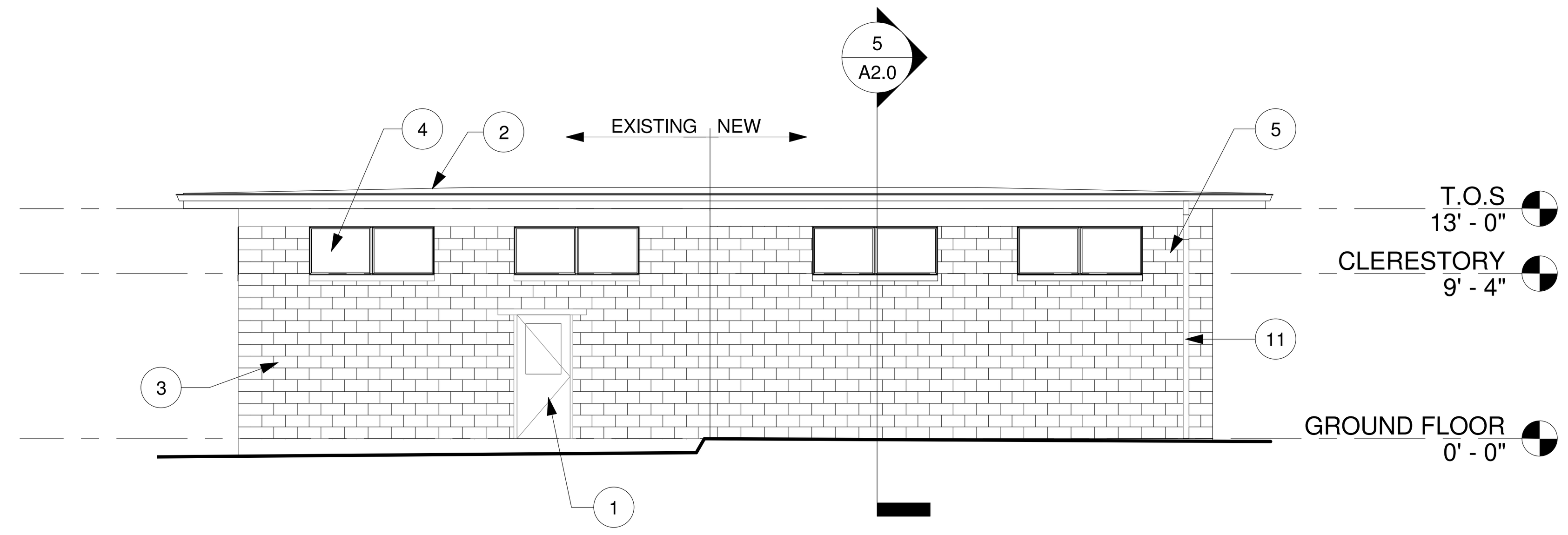
PROJECT NUMBER 17-397
DRAWING NUMBER A1.0
SHEET NUMBER 3 OF 21



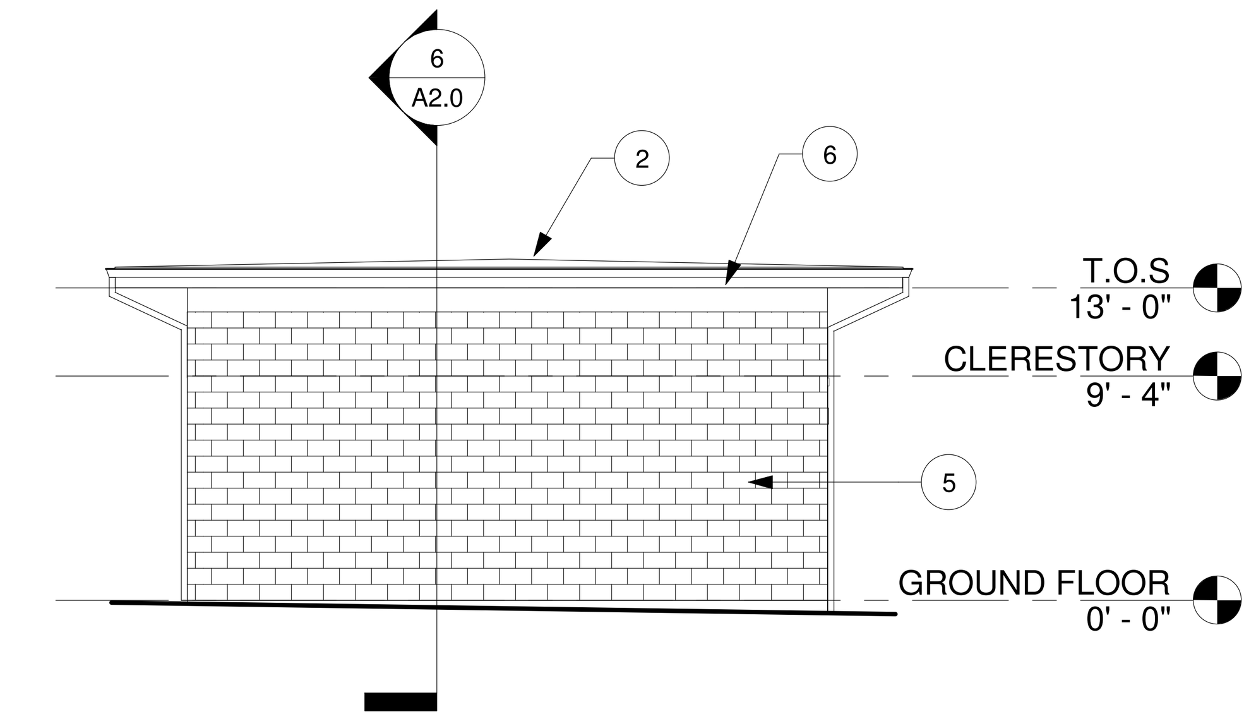
2 EAST ELEVATION
1/8" = 1'-0"



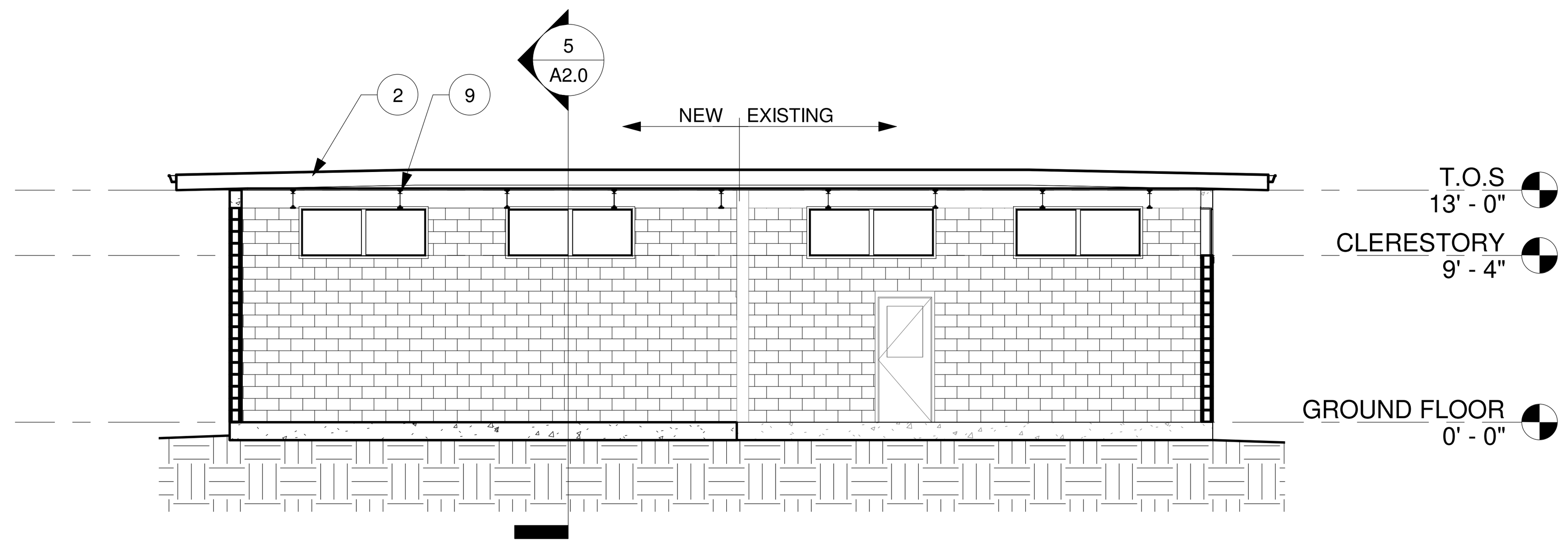
1 NORTH ELEVATION
1/8" = 1'-0"



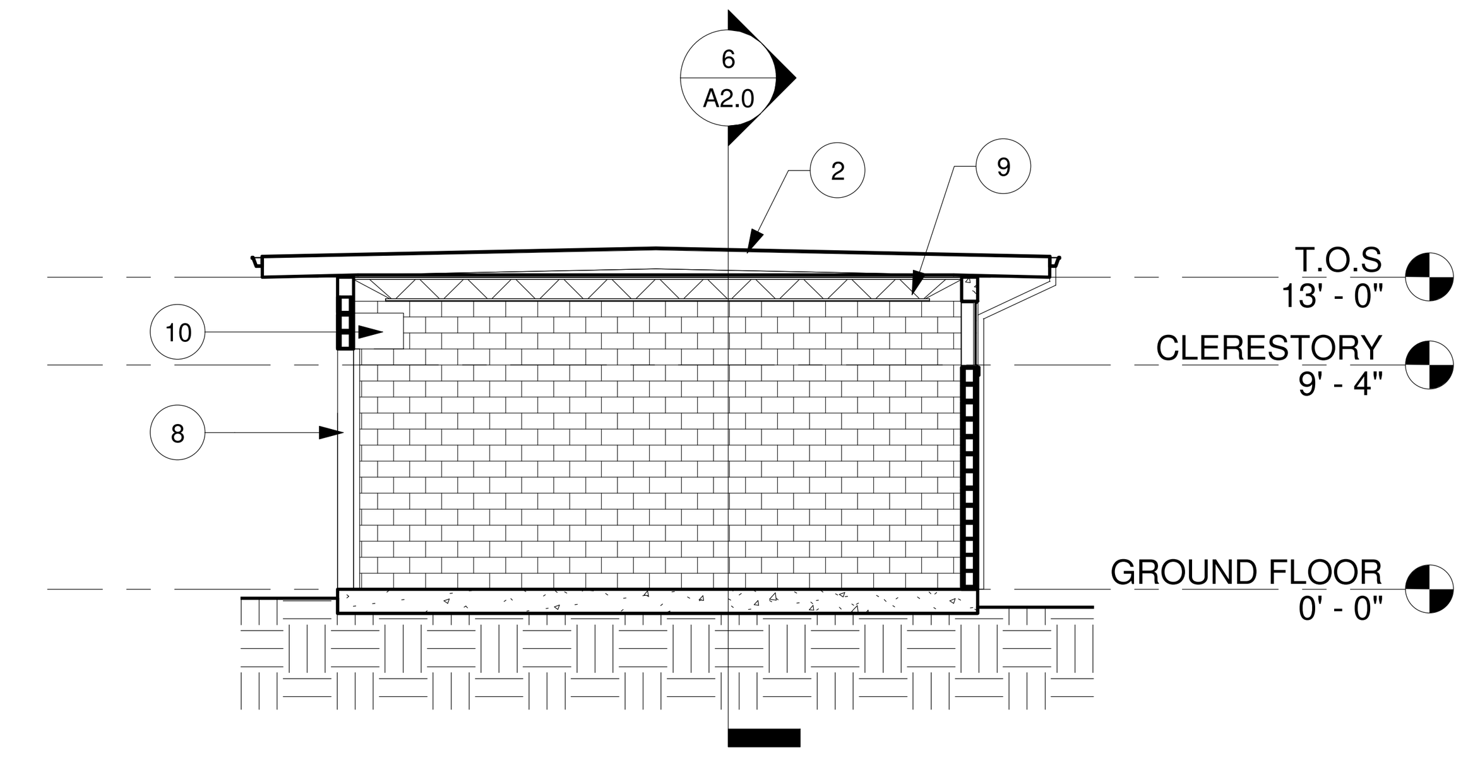
4 WEST ELEVATION
1/8" = 1'-0"



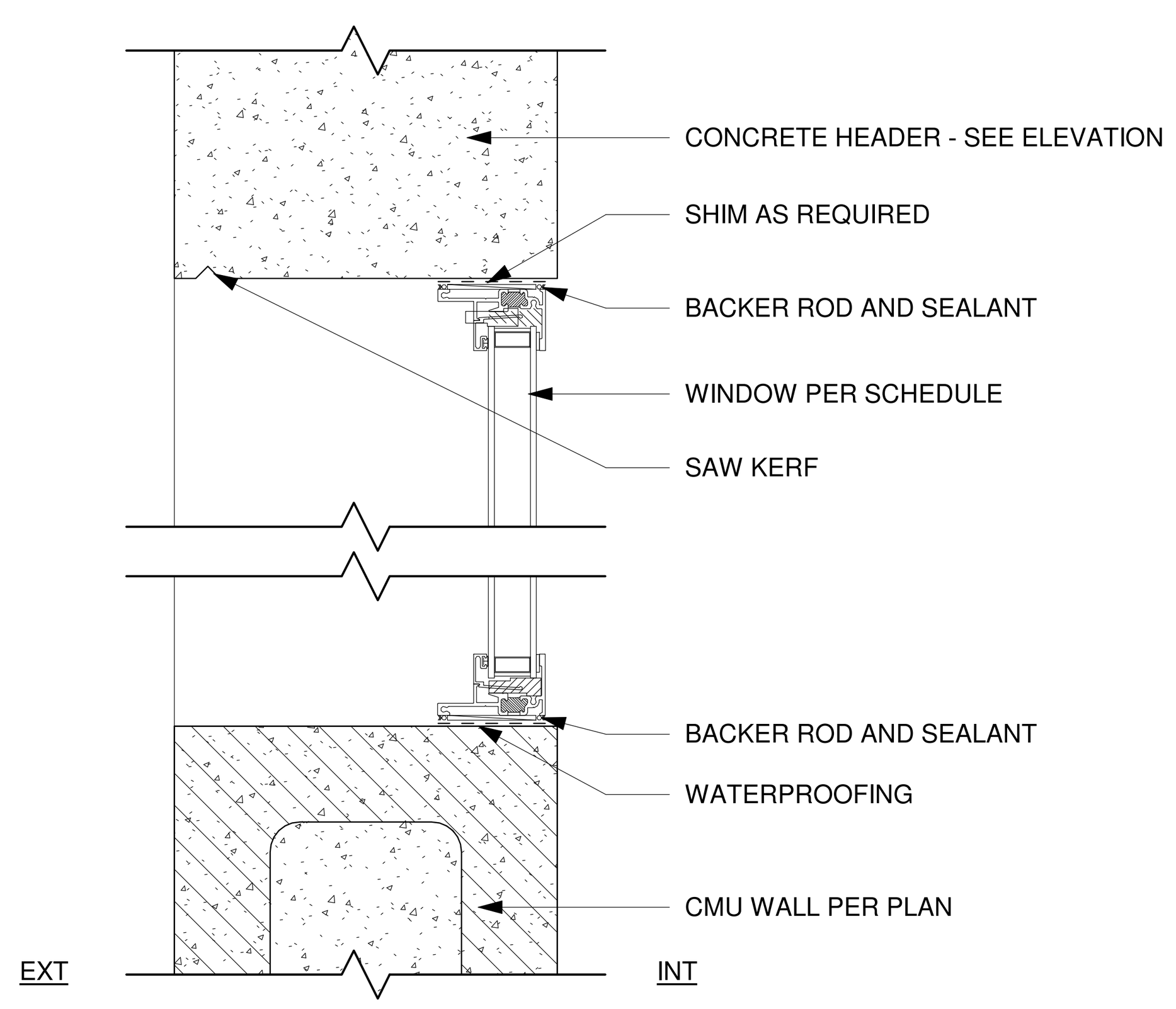
3 SOUTH ELEVATION
1/8" = 1'-0"



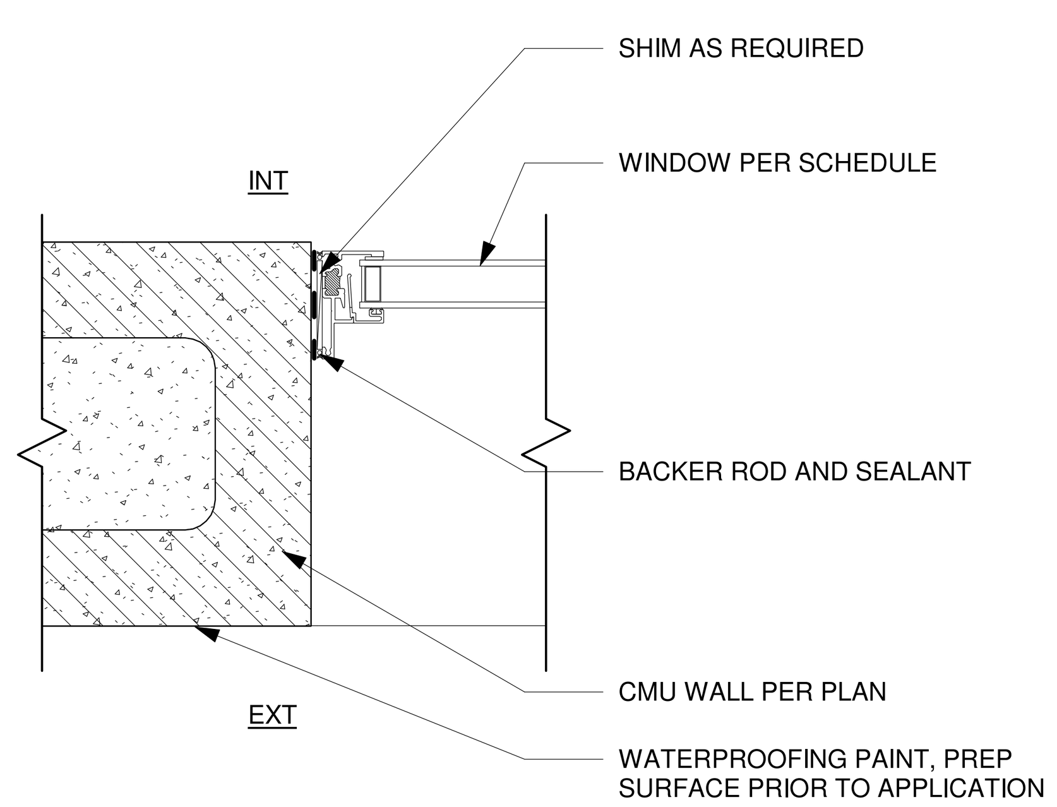
6 SECTION 1
1/8" = 1'-0"



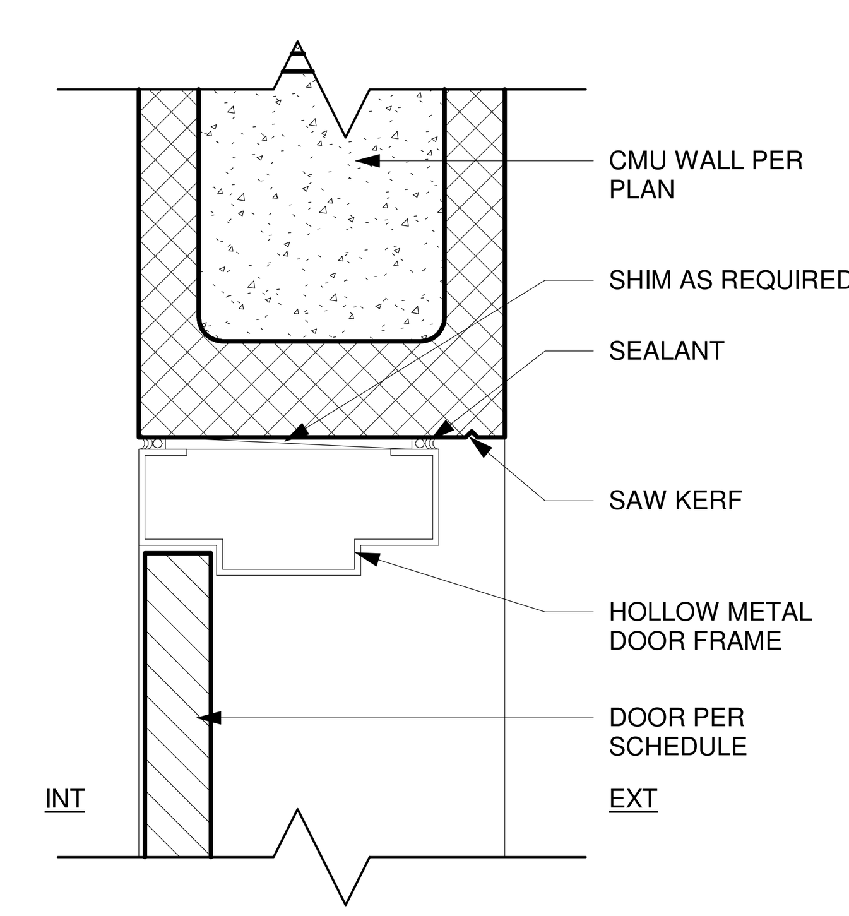
5 SECTION 2
1/8" = 1'-0"



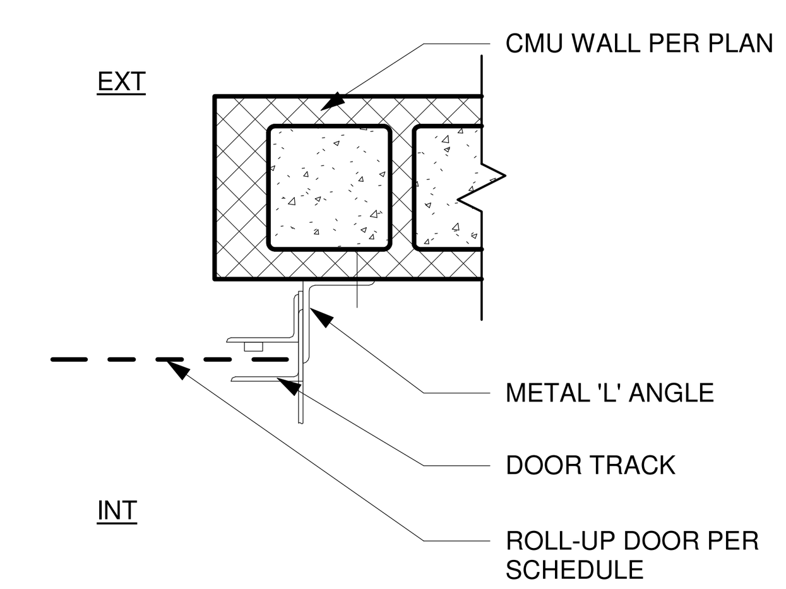
11 WINDOW HEAD-SILL
3" = 1'-0"



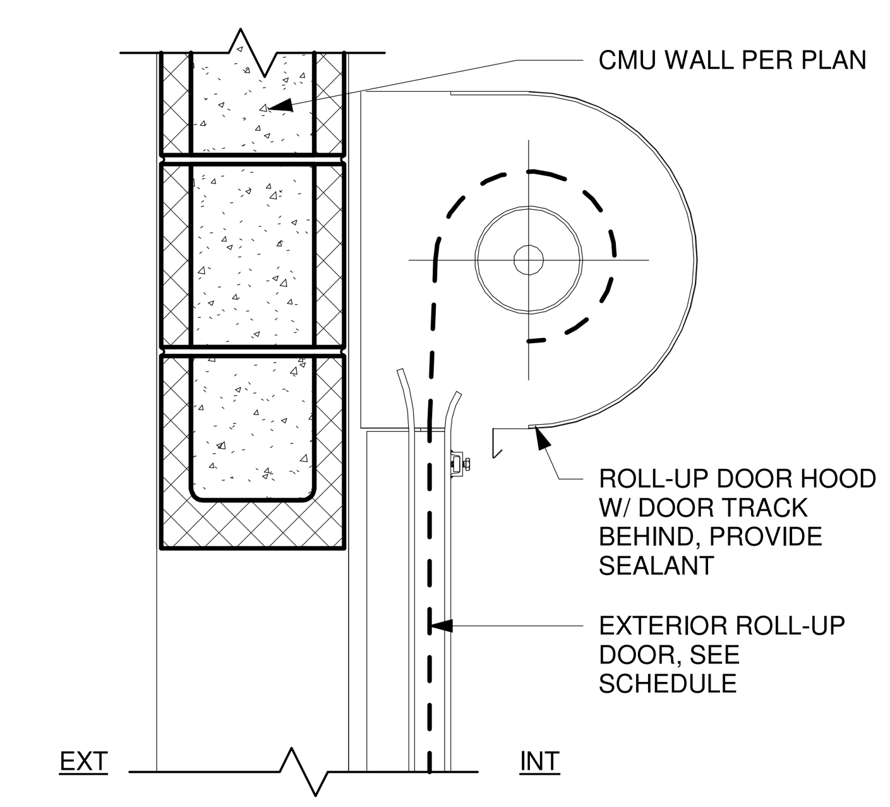
10 WINDOW JAMB
3" = 1'-0"



9 DOOR HEADER
3" = 1'-0"



8 ROLL UP DOOR JAMB
1 1/2" = 1'-0"



7 ROLL-UP DOOR HEAD
1 1/2" = 1'-0"

GENERAL NOTES

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6. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS BEFORE CONSTRUCTION AND NOTIFY ARCHITECT OF ANY VARIANCES.
7. EXISTING CONCRETE SIDEWALK, PATCH AND REPAIR ANY DAMAGE DONE DURING CONSTRUCTION TO MATCH EXISTING.
8. NO PARKING TO BE IMPACTED BY THIS WORK.

MATERIAL NOTES

1. (E) DOOR TO REMAIN
2. (N) SINGLE-PLY ROOFING o/RIGID INSULATION o/VAPOR BARRIER
3. (E) CMU WALL TO REMAIN, REMOVE (E) PAINT, PATCH, AND REPAIR TO ACCEPT NEW PAINT
4. (N) ALUMINUM FRAMED WINDOW PER SCHEDULE
5. (N) CMU WALL TO MATCH EXISTING, PAINTED
6. (N) METAL GUTTER, PAINTED
7. (N) INSULATED ENTRY DOOR w/GLAZING
8. (N) INSULATED OVERHEAD ROLLING DOOR
9. (N) STEEL ROOF DECK AND TRUSSES PER STRCUTURAL
10. (N) OVERHEAD ROLLING DOOR HEAD. SEE DETAIL 7/A2.0
11. (N) DOWNSPOUT W/ BUILT-IN FILTRATION SYSTEM

REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

CONSULTING WEST
MECHANICAL & ELECTRICAL ENGINEERS

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION

REGISTERED ARCHITECT DEBORAH T. GUTHRIE C24288 REN. 10-31-19 STATE OF CALIFORNIA

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THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
As indicated

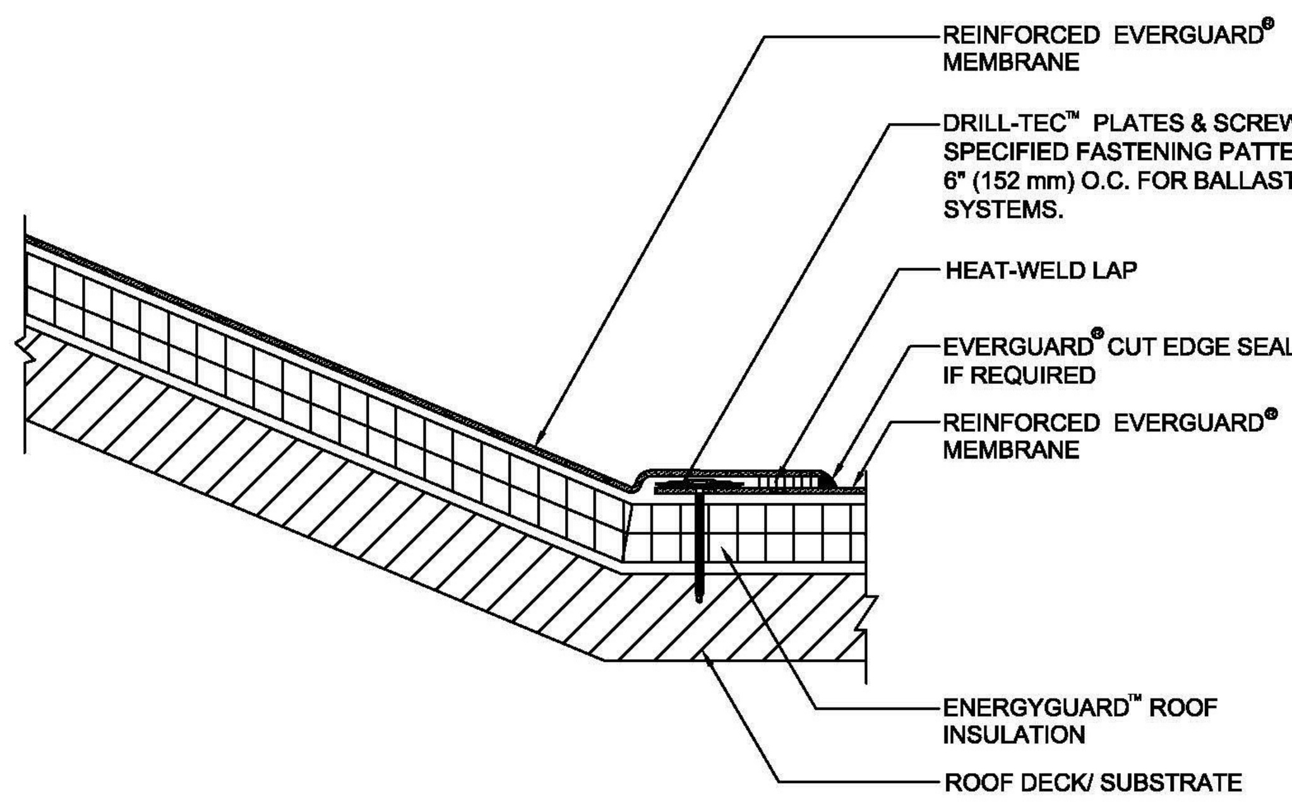
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

ELEVATIONS, SECTIONS, AND DETAILS

PROJECT NUMBER
17-397

DRAWING NUMBER
A2.0

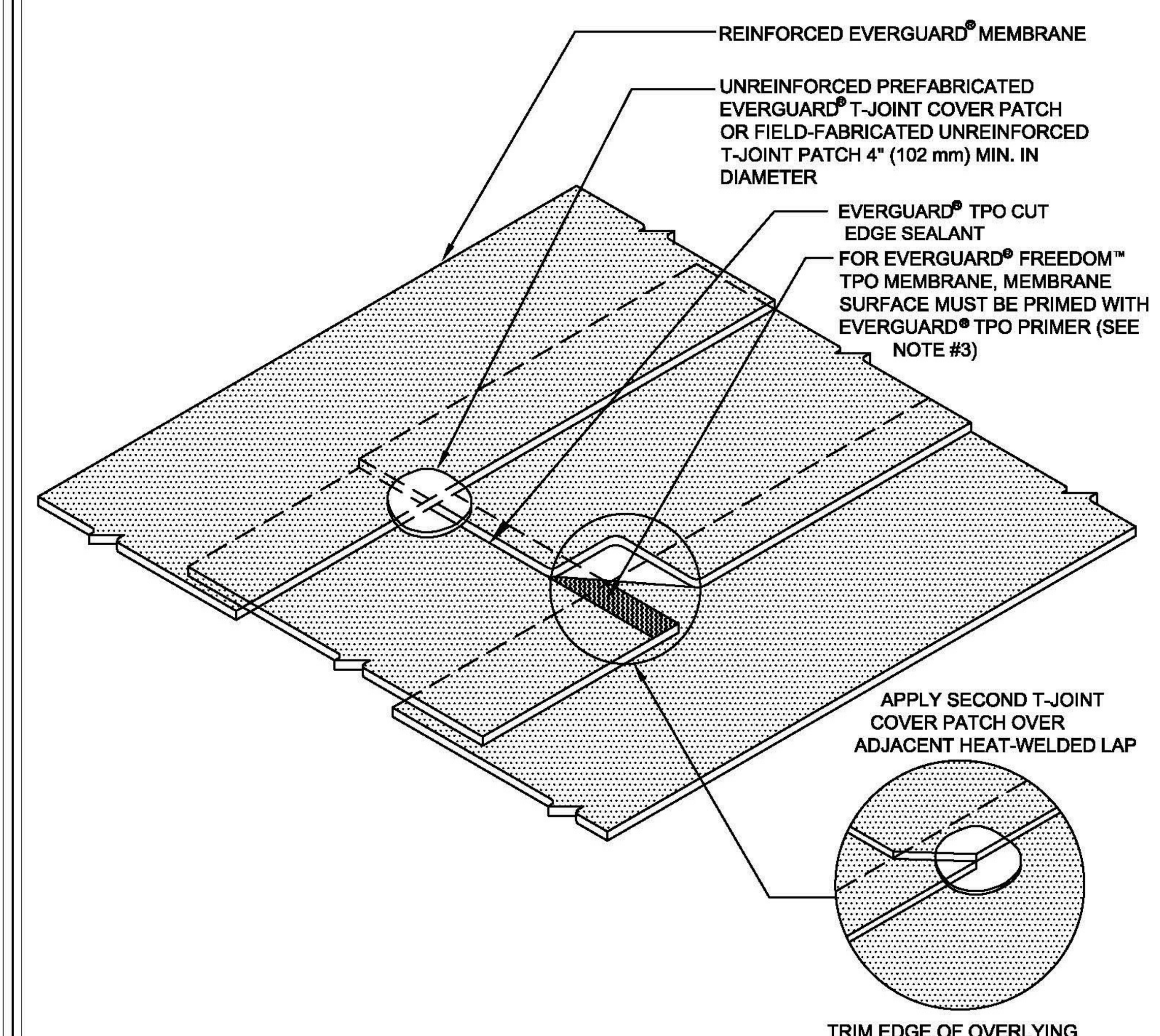
SHEET NUMBER
4 OF 21



NOTE:

1. ANYTHING 1:12 OR GREATER NEEDS TO BE FASTENED AT ANGLE CHANGE.
2. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

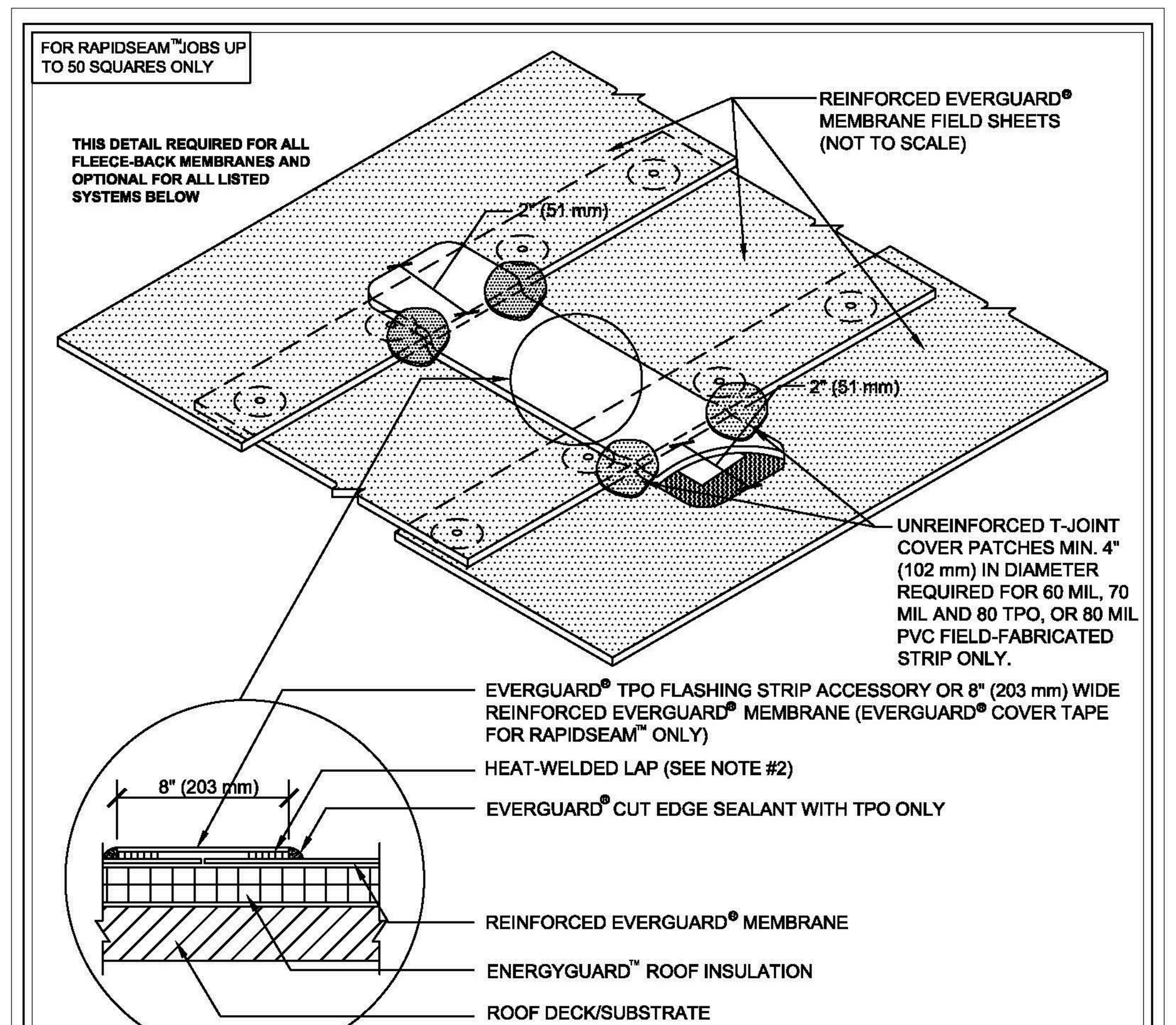
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 112	CHANGE OF DECK PLANE DETAIL	THIS DETAIL APPLIES TO: Adhered Systems, RhinoBond Systems, Mechanically Attached Systems
	SCALE N.T.S.		REVISION DATE 6-1-16



NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.
2. T-JOINT IS TO BE USED FOR 60, 70 & 80 MIL TPO AND 80 MIL PVC ONLY.
3. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

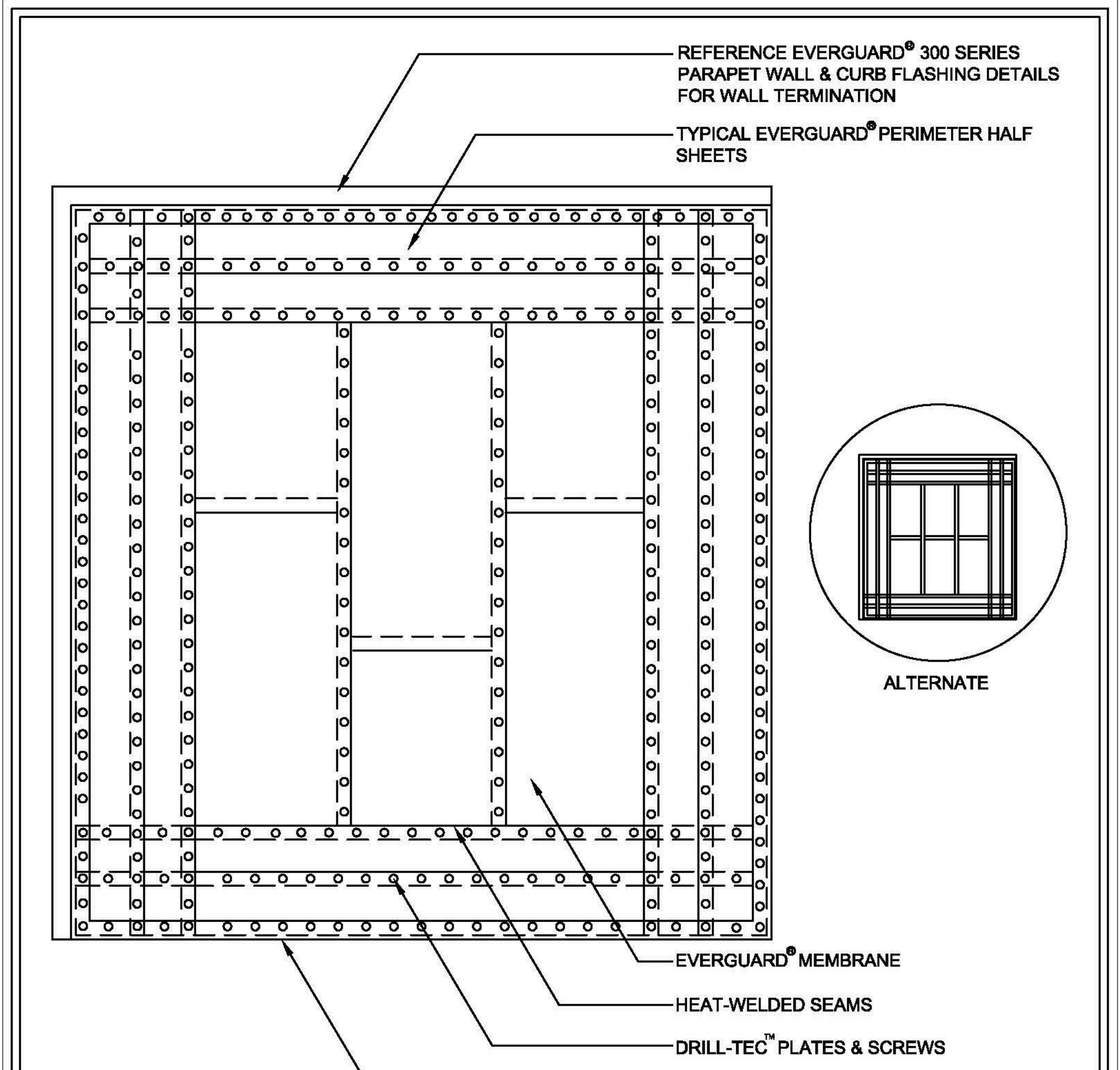
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 105A	T-JOINT COVER PATCH DETAIL	THIS DETAIL APPLIES TO: Adhered Systems, Ballasted Systems, RhinoBond Systems, Mechanically Attached Systems, TriPosite Systems
	SCALE N.T.S.	FOR 60 THRU 80 MIL TPO AND 80 MIL PVC MEMBRANES ONLY	REVISION DATE 6-6-16



NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.
2. IN SELF-ADHERED SYSTEMS, MEMBRANE MUST BE PRIMED AND DRY PRIOR TO APPLYING 6" (152mm) DOUBLE SIDED TAPE.
3. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

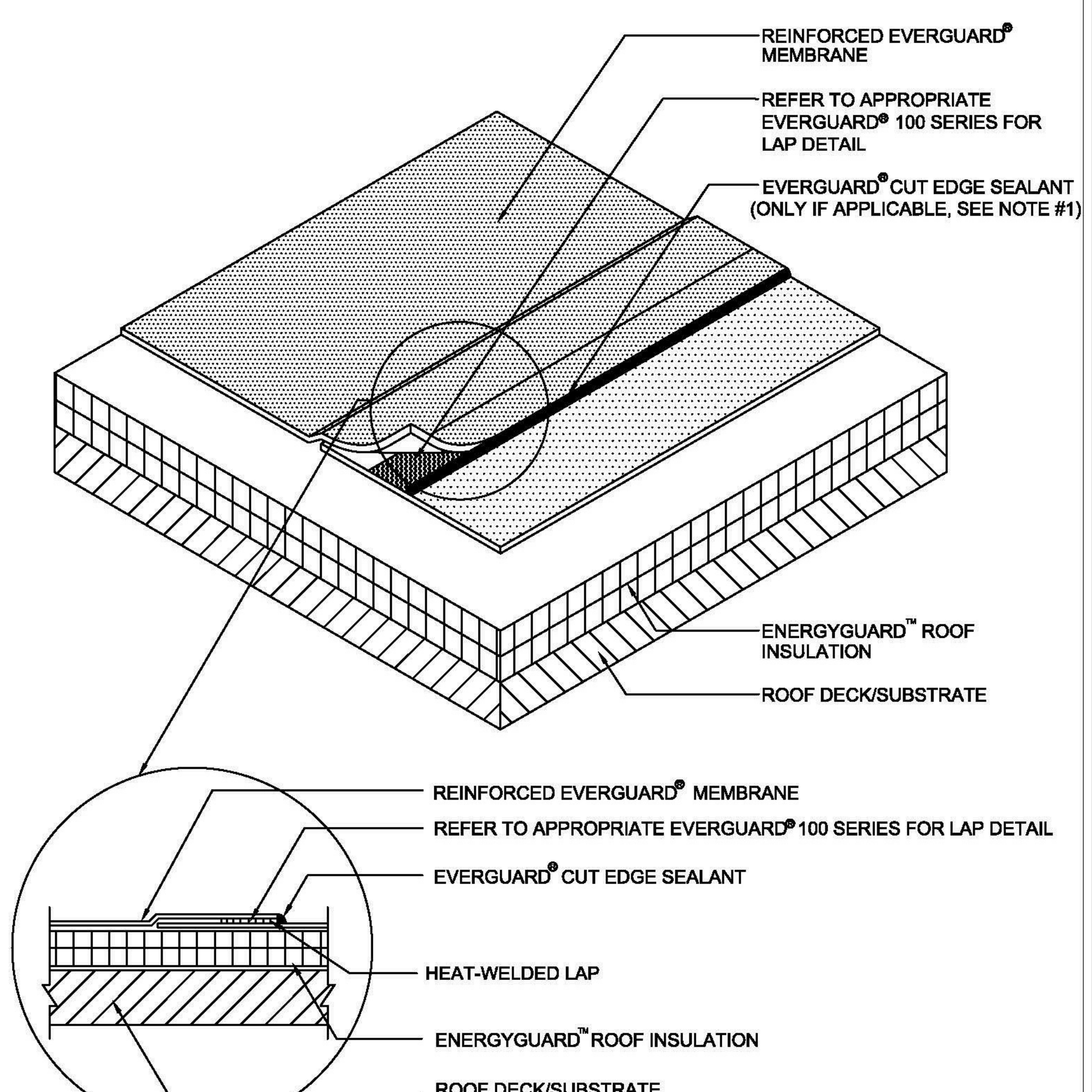
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 103	COVER STRIP END LAP DETAIL	THIS DETAIL APPLIES TO: Adhered Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
	SCALE N.T.S.		REVISION DATE 6-20-16



NOTE:

1. SEE EVERGUARD® MECHANICALLY ATTACHED SYSTEM GUIDELINES TO DETERMINE FASTENER SPACING FOR VARIOUS DECK TYPES AND WIND UPLIFT REQUIREMENTS, AND FOR REQUIRED NUMBER OF PERIMETER HALF SHEETS.
2. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.

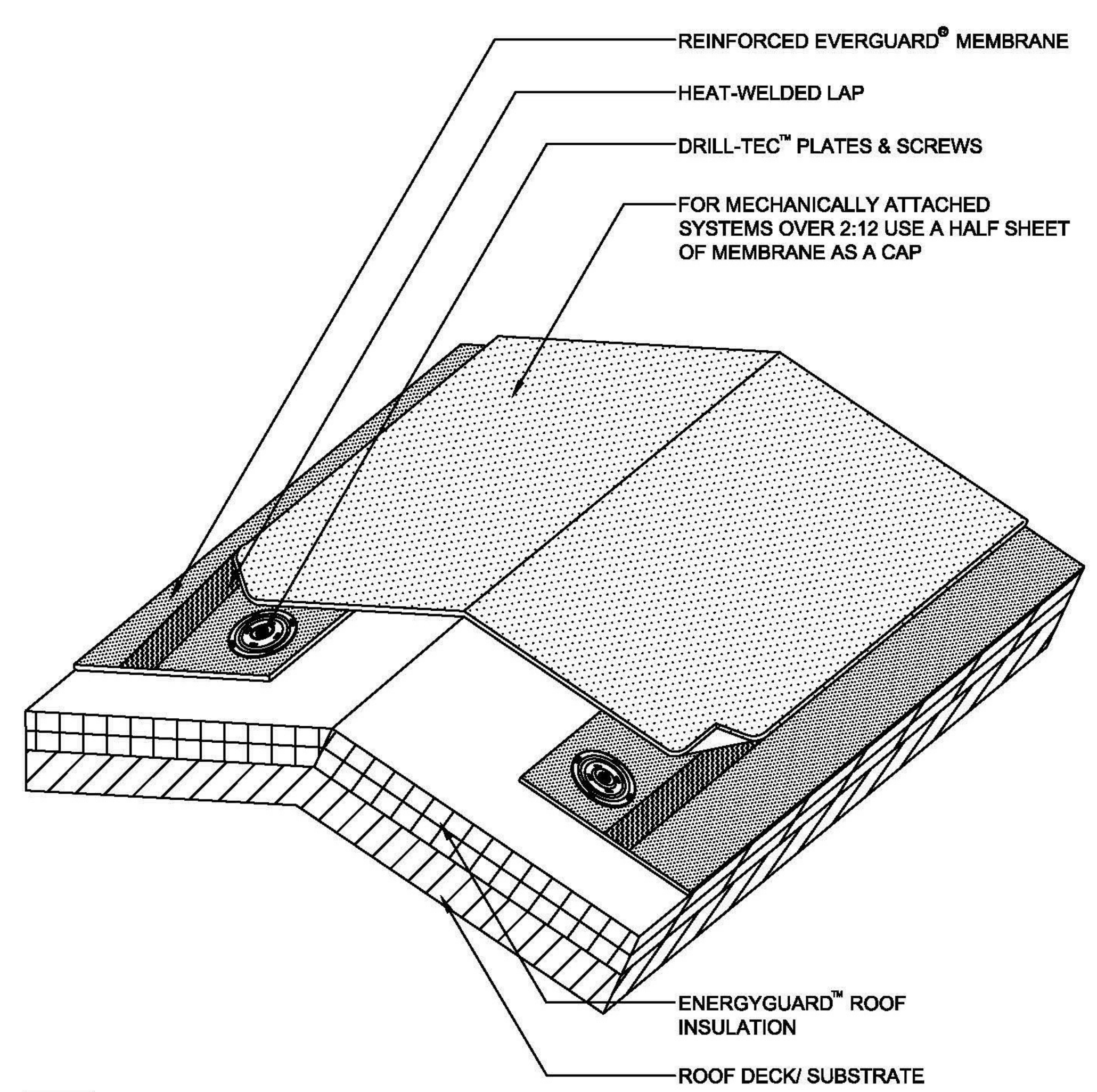
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 101A	ROOF MEMBRANE LAYOUT DETAIL	THIS DETAIL APPLIES TO: Mechanically Attached Systems
	SCALE N.T.S.		REVISION DATE 6-20-16



NOTE:

1. EVERGUARD® CUT EDGE SEALANT MUST BE USED ON ANY TPO CUT EDGES (REINFORCED ONLY).
2. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.

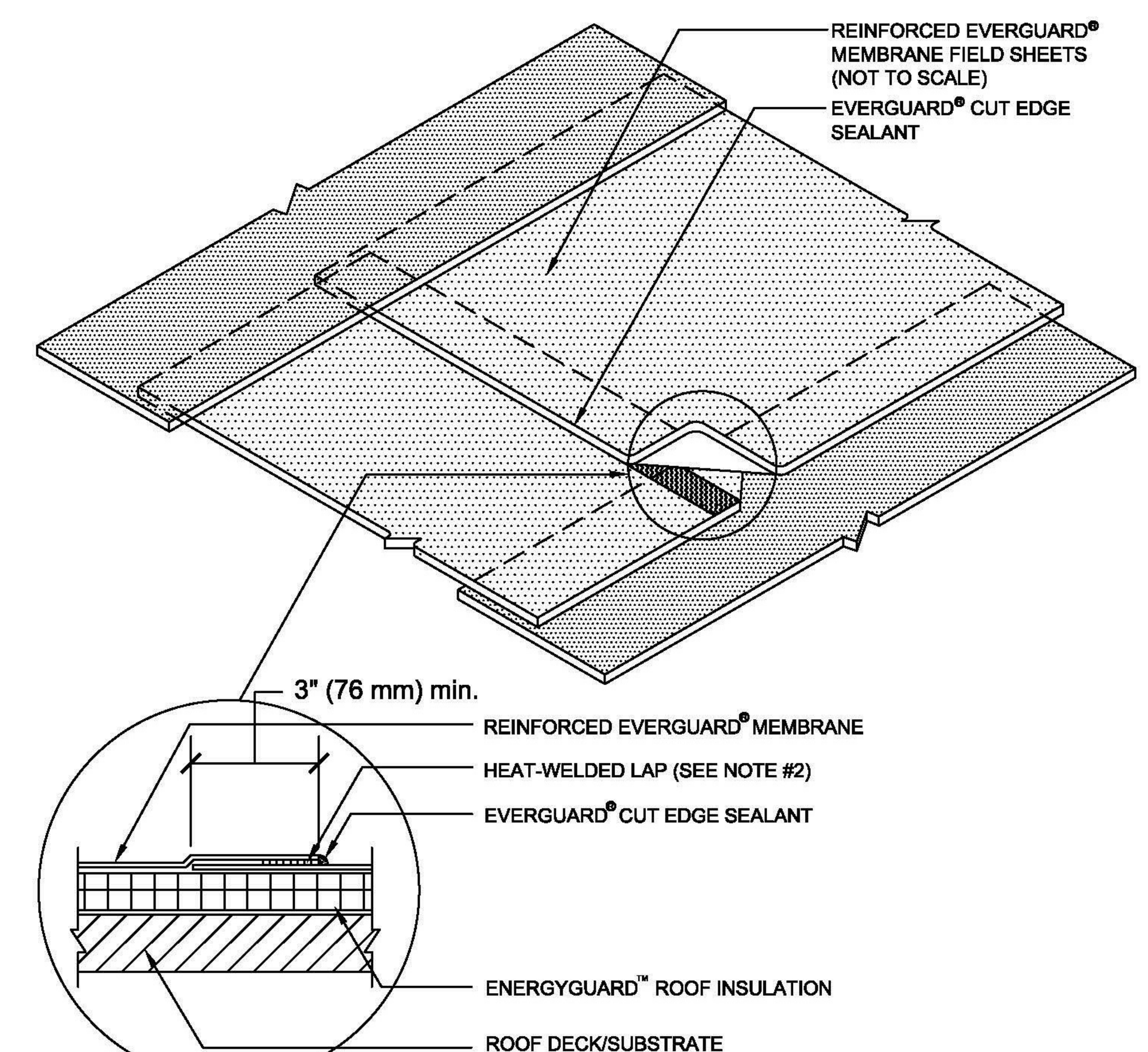
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 115	CUT EDGE SEALANT DETAIL	THIS DETAIL APPLIES TO: Adhered Systems, Ballasted Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
	SCALE N.T.S.	EVERGUARD® TPO MEMBRANE ONLY	REVISION DATE 6-20-16



NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.
2. DO NOT RUN CAP SHEET INTO THE PERIMETER HALF SHEET REGION IN MECHANICALLY ATTACHED SYSTEMS.
3. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

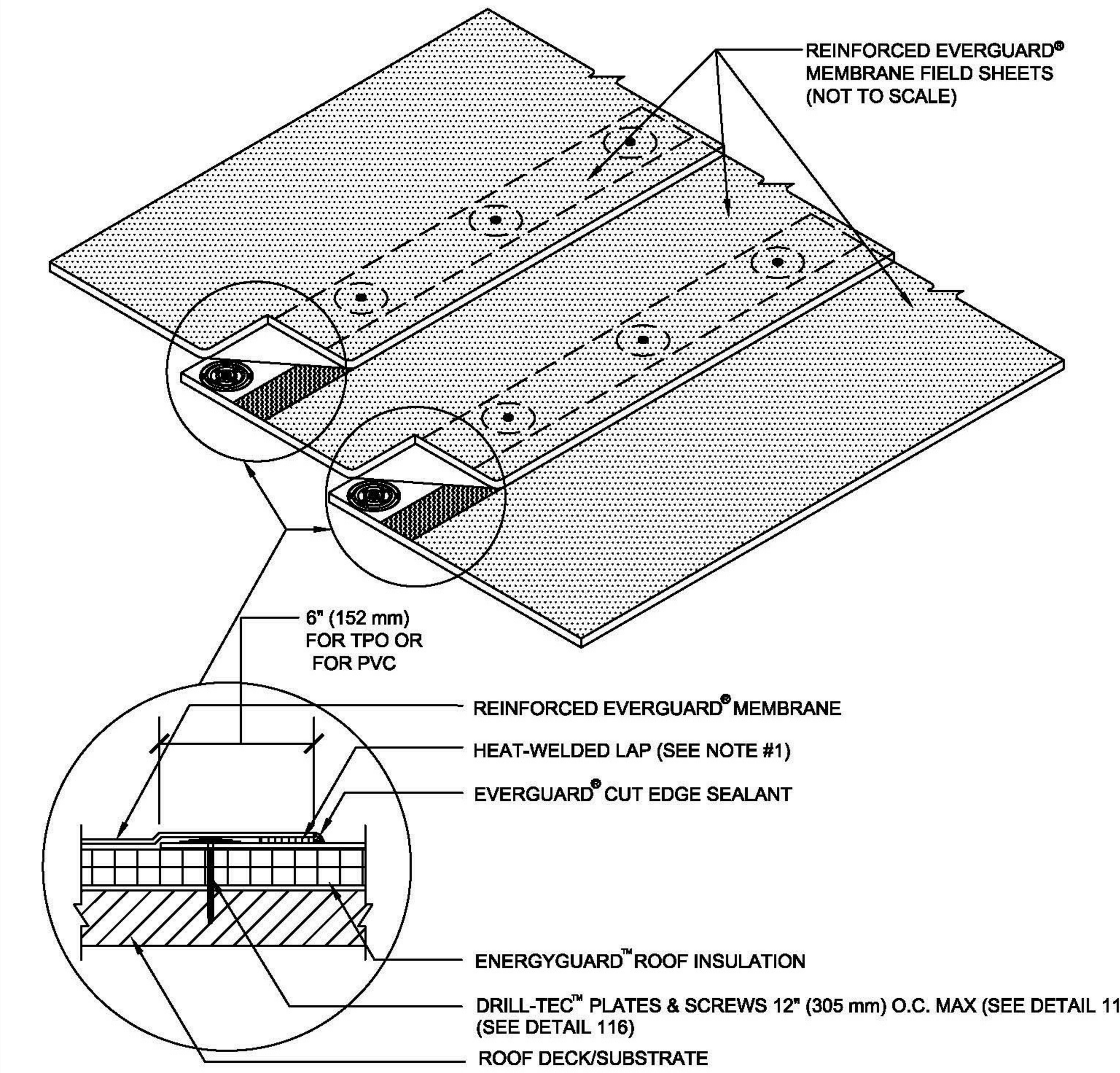
GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 110A	RIDGE DETAIL	THIS DETAIL APPLIES TO: Mechanically Attached Systems
	SCALE N.T.S.		REVISION DATE 6-20-16



NOTE:

1. T-JOINT PATCH REQUIRED FOR 60, 70 & 80 MIL TPO AND 80 MIL PVC, REFER TO EVERGUARD® DETAIL 105.
2. FOR HEAT-WELDING LAPS USE 1" MAX (25.4 mm) WELD WITH AUTOMATIC MACHINE WELDER AND 2" WELD WITH HAND WELDER.
3. FOR SELF-ADHERED HEAT-WELDED SYSTEMS, UP TP 15-YR. MAXIMUM GUARANTEE ONLY.
4. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 104A	END LAP DETAIL	THIS DETAIL APPLIES TO: Adhered Systems, Ballasted Systems, TriPosite Systems, Mechanically Attached Systems
	SCALE N.T.S.	FOR 45 MIL TPO AND 50 & 60 MIL PVC MEMBRANE ONLY	REVISION DATE 6-22-15



NOTE:

1. FOR HEAT-WELDING LAPS USE 1.5" MAX (25.4 mm) WELD WITH MACHINE AUTOMATIC WELDER AND 1.5" (127 mm) WELD WITH HAND WELDER.
2. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.
3. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

GAF® EverGuard FIELD OF ROOF SERIES www.gaf.com 1 Campus Drive, Parsippany, NJ 07054	DRAWING # 102A	SIDE LAP DETAIL	THIS DETAIL APPLIES TO: Mechanically Attached Systems
	SCALE N.T.S.		REVISION DATE 6-20-16

REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

CONSULTING WEST — MECHANICAL & ELECTRICAL ENGINEERS

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION

REGISTERED ARCHITECT — DEBORAH T. GUTHRIE — C24328 — REN. 10-31-19 — STATE OF CALIFORNIA

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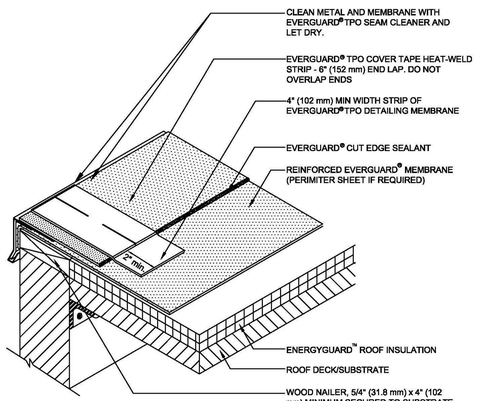
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.
SCALE:

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

MANUFACTURER DETAILS

PROJECT NUMBER 17-397
DRAWING NUMBER AD1
SHEET NUMBER 5 OF 21

20 YEAR MAX GUARANTEE

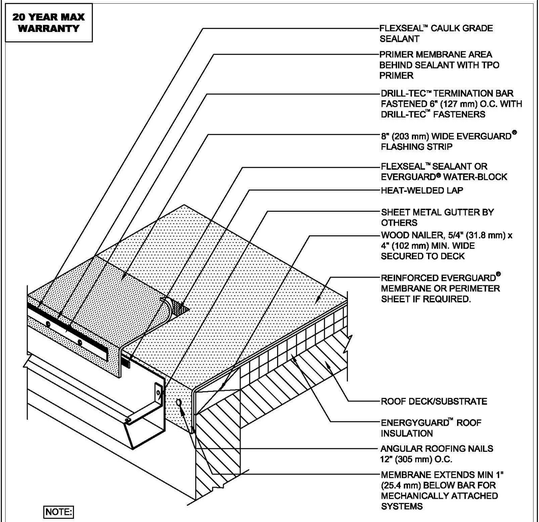


NOTE:

1. EVERGUARD® TPO COVER TAPE HEATWELD STRIP ONLY TO BE USED WITH TPO MEMBRANE SYSTEMS ONLY.
2. PRIME THE METAL ONLY WITH EVERGUARD TPO PRIMER. DO NOT SPILL PRIMER ON WELDED SEAM AREA.
3. HEAT WELD THE MEMBRANE (NON-ADHESIVE SIDE ONLY) TO MEMBRANE AREA USING EITHER A ROBOTIC OR HAND WELDER TO SPEC.
4. REFER TO DETAIL 218 FOR EVERGUARD® COVER TAPE HEATWELD ROOF EDGE INSTALLATION.
5. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICALLY FASTENED SYSTEMS ONLY.
6. APPLY EVERGUARD ®TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 219 | COVER TAPE HEATWELD STRIP END JOINT AT ROOF EDGE DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 6-20-16

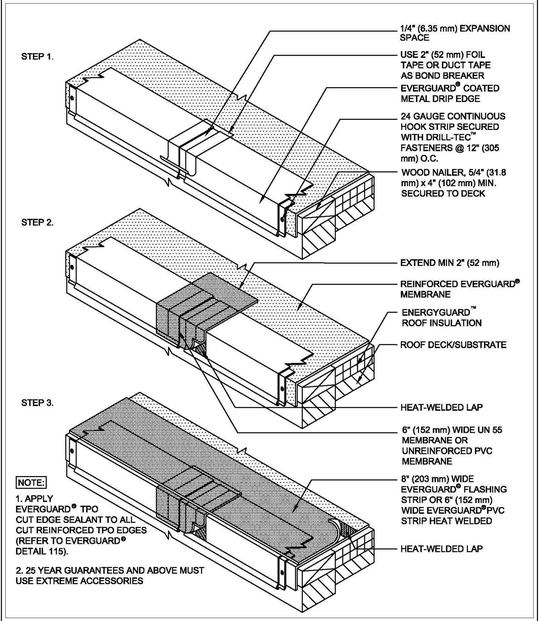
20 YEAR MAX WARRANTY



NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICALLY FASTENED SYSTEMS ONLY.
2. EDGE OF MEMBRANE SHOULD NOT TERMINATE BELOW GUTTER EDGES.
3. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

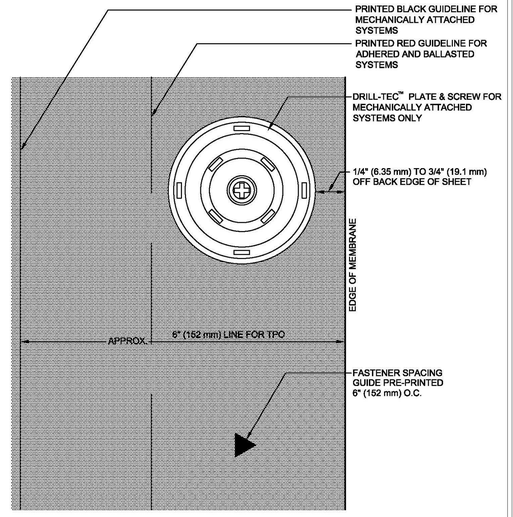
GAF | EverGuard ROOF EDGE SERIES | DRAWING # 212 | GUTTER WITH TERMINATION BAR - NEW INSTALLATION | THIS DETAIL APPLIES TO: Adhered Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 2-14-17



NOTE:

1. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).
2. 25 YEAR GUARANTEES AND ABOVE MUST USE EXTREME ACCESSORIES

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 204 | COATED METAL JOINT DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Mechanically Attached Systems, Self - Adhered Systems, TriPosite Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 6-20-16

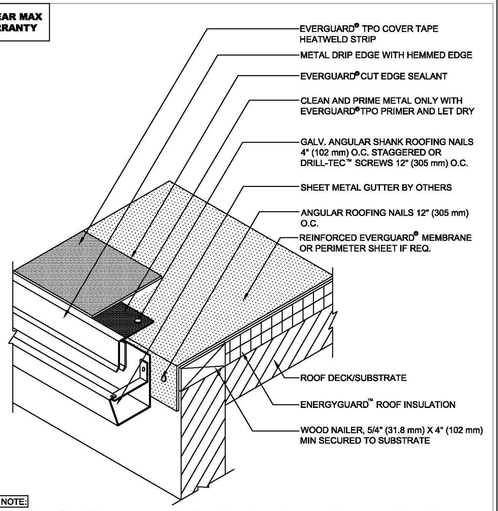


NOTE:

1. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

GAF | EverGuard FIELD OF ROOF SERIES | DRAWING # 116A | MEMBRANE EDGE DETAIL | THIS DETAIL APPLIES TO: Ballasted Systems, TriPosite Systems, Mechanically Attached Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | TPO ONLY | REVISION DATE 6-1-16

20 YEAR MAX WARRANTY

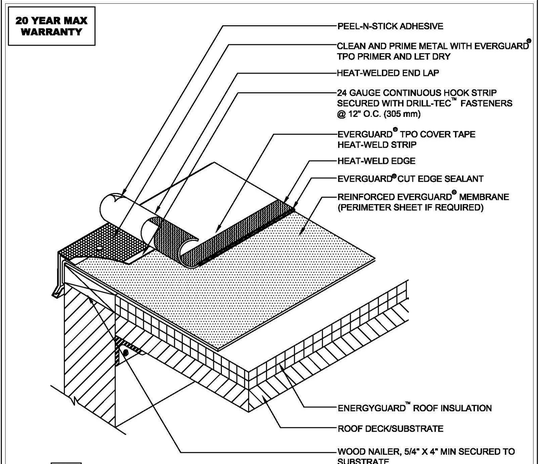


NOTE:

1. EVERGUARD® TPO COVER TAPE HEATWELD STRIP ONLY TO BE USED WITH TPO MEMBRANE SYSTEMS ONLY.
2. PRIME THE METAL ONLY WITH EVERGUARD TPO PRIMER. DO NOT SPILL PRIMER ON WELDED SEAM AREA.
3. HEAT WELD THE MEMBRANE (NON-ADHESIVE SIDE ONLY) TO MEMBRANE AREA USING EITHER A ROBOTIC OR HAND WELDER TO SPEC.
4. REFER TO DETAIL 218 FOR EVERGUARD® COVER TAPE HEATWELD ROOF EDGE INSTALLATION.
5. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICALLY FASTENED SYSTEMS ONLY.

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 220 | COVER TAPE HEAT-WELD STRIP AT GUTTER EDGE DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 6-20-16

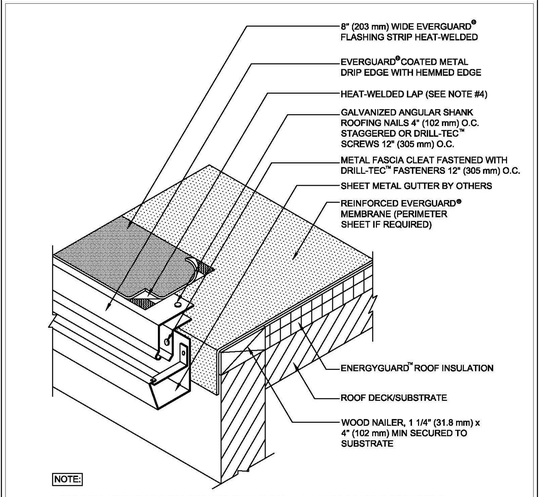
20 YEAR MAX WARRANTY



NOTE:

1. EVERGUARD® TPO COVER TAPE HEAT-WELD ONLY TO BE USED WITH EVERGUARD® TPO MEMBRANE
2. 25-YEAR GUARANTEES AND ABOVE MUST USE EXTREME ACCESSORIES.
3. PRIME THE METAL ONLY WITH EVERGUARD® TPO PRIMER, DO NOT SPILL PRIMER ON WELDED SEAM AREA.
4. HEAT-WELD THE MEMBRANE (NON-ADHESIVE SIDE ONLY) TO MEMBRANE AREA USING EITHER A ROBOTIC OR HAND WELDER TO SPEC.
5. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICALLY FASTENED SYSTEMS ONLY.
6. APPLY EVERGUARD ®TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD ®DETAIL 115).

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 218 | TPO COVER TAPE HEAT-WELD STRIP OVERLAP AT ROOF EDGE DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Mechanically Attached Systems, TriPosite Systems
www.GAF.COM 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 6-20-16

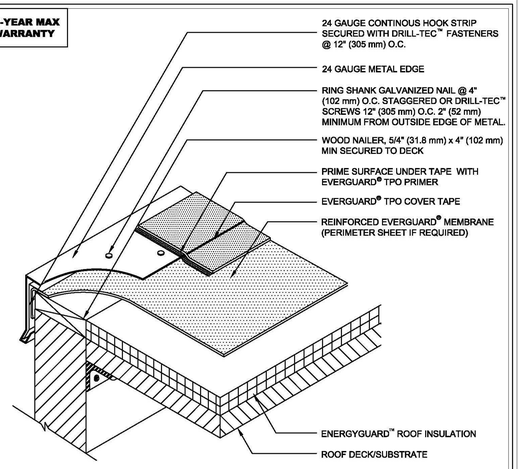


NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICALLY FASTENED SYSTEMS ONLY.
2. REFER TO EVERGUARD® DETAIL 204 FOR COATED METAL JOINTS.
3. A CONTINUOUS METAL CLEAT IS REQUIRED.
4. FOR SELF-ADHERED RAPIDSEAM™ TECHNOLOGY SYSTEMS, SEE EVERGUARD® DETAIL 330 FOR LAP APPLICATION.
5. 25-YEAR GUARANTEES AND ABOVE MUST USE EXTREME ACCESSORIES.
6. APPLY EVERGUARD® TPO CUT EDGE SEALANT TO ALL CUT REINFORCED TPO EDGES (REFER TO EVERGUARD® DETAIL 115).

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 211 | GUTTER WITH COATED METAL EDGE DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Self - Adhered Systems, TriPosite Systems, Mechanically Attached Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 6-20-16

15-YEAR MAX WARRANTY



NOTE:

1. FOR INSULATION THICKNESS GREATER THAN 8" (203 mm), A HARD BOARD IS REQUIRED ON MECHANICAL SYSTEMS ONLY.
2. BE SURE TO CLEAN METAL AND MEMBRANE WITH TPO CLEANER BEFORE ADDING PRIMER AND COVER TAPE.
3. EVERGUARD® TPO COVER TAPE ONLY TO BE USED WITH TPO MEMBRANE SYSTEMS.
4. THIS DETAIL IS NOT TO BE USED ON SLOPES GREATER THAN 1:12. FOR SLOPES GREATER THAN 1:12, REFER TO EVERGUARD® DETAIL 218 OR 219 .

GAF | EverGuard ROOF EDGE SERIES | DRAWING # 202B | ROOF EDGE WITH TPO COVER TAPE DETAIL | THIS DETAIL APPLIES TO: Adhered Systems, Mechanically Attached Systems, Self - Adhered Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054 | SCALE N.T.S. | REVISION DATE 5-1-16

REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

CONSULTING WEST ENGINEERS
DESIGNER & CONTROL ENGINEERS
31340 VIA COLINAS, SUITE 102, WESTLAKE VILLAGE, CA 91362
TEL 818/889-3383 FAX 818/889-4927

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION
REGISTERED ARCHITECT DEBORAH T. GUTHRIE C-24282 REN. 10-31-19 STATE OF CALIFORNIA

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.
SCALE:

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

MANUFACTURER DETAILS

PROJECT NUMBER 17-397
DRAWING NUMBER AD2
SHEET NUMBER 6 OF 21

Oldcastle Infrastructure™
A CRH COMPANY

STORM WATER

RECONDITION
Rooftop Runoff

Removes Non-Soluble Solids
such as sediment, debris, metals and hydrocarbons.

Corrosion-Resistant
stainless steel accepts standard diameter downspout pipes.

Variable Design
can be flush mounted or recessed.

Installation & Maintenance
is easy and economical by design.

Custom Downspout
adapter shapes and sizes are available.

Filter Medium
can be customized depending on the pollutants of concern.

INLET FILTRATION

FLOGARD® DOWNSPOUT FILTER
Inline Filter Specially Designed for Downspouts

The Flogard Downspout Filter is typically installed on downspout pipes of commercial buildings for the removal of non-soluble pollutants normally found on building roofs and parking decks.

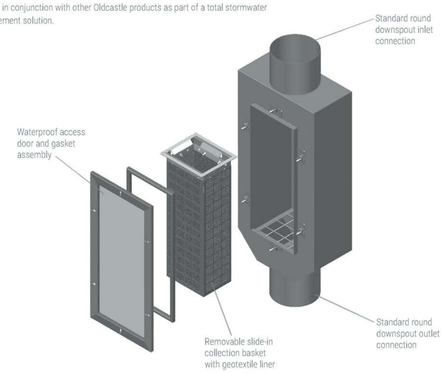
The inline downspout filter is an ideal solution for urban sites with little-to-no property area outside of the building perimeter. It is designed to provide effective filtering at low flows and incorporates a high-flow bypass to ensure conveyance is not impeded.

Oldcastle Infrastructure™
A CRH COMPANY

RECONDITION
Rooftop Runoff

Fully Scalable Solution for Stormwater Treatment

The Flogard Downspout Filter can be installed as a stand-alone treatment device or used in conjunction with other Oldcastle products as part of a total stormwater management solution.



SPECIFICATIONS

Model No.	Inlet ID (dia, in)	Box ID (in x in x in)	Solid Storage (cu ft)	Filtered Flow (gpm)	Bypass Capacity (gpm)
FG-DS4	4	14 x 29 x 7.5	0.35	30	145
FG-DS6	6	14 x 29 x 7.5	0.35	85	425
FG-DS8	8	22 x 33 x 17.5	1.70	185	915
FG-DS10	10	22 x 33 x 17.5	1.70	325	1,650

Storage capacity reflects 80% of maximum solids collection prior to impeding filtering bypass.
Filtered flow rate includes a safety factor of 2 to 1.
Available with standard Fossil Rock or other custom absorbants.
Should be used in conjunction with a regular maintenance program.
Refer to manufacturer's recommended guidelines.

CITY OF LOS ANGELES
* Research report #5584
* Filter is approved for use in the city of Los Angeles.

(800) 579-8819
oldcastleinfrastructure.com

FILTRATION SYSTEM

GAF®
Quality You Can Trust…From North America's Largest Roofing Manufacturer!™

POLYISO INSULATION
Tapered Polyiso Foam Roof Insulation
gaf.com

EnergyGuard™
TAPERED POLYISO INSULATION

Get The Longevity You Deserve Out Of Your Roof!

Tapered polyiso insulation provides a logical and economical answer for roofs that do not permit adequate positive drainage, like low-slope roofs. When correctly installed, tapered insulation helps eliminate problems due to ponding water and can extend the longevity of your low-slope roofing system.

GAF offers a full lineup of tapered panels to provide you with different options to help you create the best design for your roofing project.
- Meets ASTM C1289 Type II, Class 1, Grade 2 (20 psi) and in Grade 3 (25 psi)
- Also available with a coated glass facer.

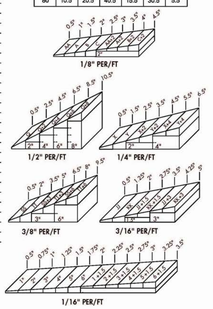
TAPERED PANELS – 4' x 4'

	BOARD STYLE	DIMENSIONS IN INCHES	AVERAGE THICKNESS	BD FEET PER PANEL
1/8	AA	0.5* - 1*	0.75*	12
	A	1* - 1.5*	1.25*	20
	B	1.5* - 2*	1.75*	28
	C	2* - 2.5*	2.25*	36
	* D	2.5* - 3*	2.75*	44
	* E	3* - 3.5*	3.25*	52
	* F	3.5* - 4*	3.75*	60
	* FF	4* - 4.5*	4.25*	68
1/4	X	0.5* - 1.5*	1*	16
	Y	1.5* - 2.5*	2*	32
	* Z	2.5* - 3.5*	3*	48
	* ZZ	3.5* - 4.5*	4*	64
	G	1* - 2*	1.5*	24
	H	2* - 3*	2.5*	40
	* I	3* - 4*	3.5*	56
1/2	Q	0.5* - 2.5*	1.5*	24
	* QQ	2.5* - 4.5*	3.5*	56
	* XX	1* - 3*	2*	32
	* JJ	0.5* - 1.25*	0.875*	14
	* KK	1.25* - 2*	1.625*	26
	* LL	2* - 2.75*	2.375*	38
3/16	* MM	2.75* - 3.5*	3.125*	50
	* J	1* - 1.75*	1.375*	22
	* K	1.75* - 2.5*	2.125*	34
	* L	2.5* - 3.25*	2.875*	46
	* M	3.25* - 4*	3.625*	58
3/8	*SS	0.5* - 2*	1.25*	20
	*TT	2* - 3.5*	2.75*	44
1/16	*S	1* - 2.5*	1.75*	28
	1	0.5* - .75*	0.625*	10
	2	.75* - 1*	0.875*	14
	3	1* - 1.25*	1.125*	18
	4	1.25* - 1.5*	1.375*	22
	5	1.5* - 1.75*	1.625*	26
	6	1.75* - 2*	1.875*	30
	* 7	2* - 2.25*	2.125*	34
	* 8	2.25* - 2.5*	2.375*	38

*Availability for these tapered panel systems may vary for each region.

TAPERED PANELS MATRIX

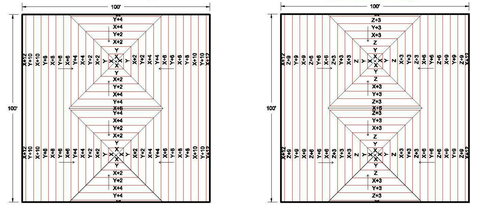
FT	1/8"	1/4"	1/2"	3/16"	3/8"	1/16"
4	1*	1.5*	2.5*	1.25*	2*	.75*
8	1.5*	2.5*	4.5*	2*	3.5*	1*
12	2*	3.5*	6.5*	2.75*	5*	1.25*
16	2.5*	4.5*	8.5*	3.5*	6.5*	1.5*
20	3*	5.5*	10.5*	4.25*	8*	1.75*
24	3.5*	6.5*	12.5*	5*	9.5*	2*
28	4*	7.5*	14.5*	5.75*	11*	2.25*
32	4.5*	8.5*	16.5*	6.5*	12.5*	2.5*
36	5*	9.5*	18.5*	7.25*	14*	2.75*
40	5.5*	10.5*	20.5*	8*	15.5*	3*
44	6*	11.5*	22.5*	8.75*	17*	3.25*
48	6.5*	12.5*	24.5*	9.5*	18.5*	3.5*
52	7*	13.5*	26.5*	10.25*	20*	3.75*
56	7.5*	14.5*	28.5*	11*	21.5*	4*
60	8*	15.5*	30.5*	11.75*	23*	4.25*
64	8.5*	16.5*	32.5*	12.5*	24.5*	4.5*
68	9*	17.5*	34.5*	13.25*	26*	4.75*
72	9.5*	18.5*	36.5*	14*	27.5*	5*
76	10*	19.5*	38.5*	14.75*	29*	5.25*
80	10.5*	20.5*	40.5*	15.5*	30.5*	5.5*



How can **EnergyGuard™ Tapered Polyiso Insulation** help you to save on materials, adhesive, and more importantly labor?

Compare and see the savings!

Traditional XY Panel Design Vs. **Extended Panel XYZ Panel Design**

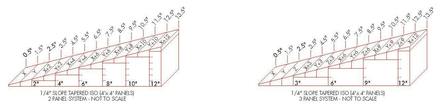


SECTION TAPERED PANELS:
X 0.500 - 1.500 396
Y 1.500 - 2.500 344
SECTION FILL PANELS: 2.000 1828

Tapered Area: 100 squares (10,000 square feet)
Total Squares of Material: 410.56
Total Squares of Application: 392.16

SECTION TAPERED PANELS:
X 0.500 - 1.500 281
Y 1.500 - 2.500 213
Z 2.500 - 3.500 245
SECTION FILL PANELS: 3.000 1105

Tapered Area: 100 squares (10,000 square feet)
Total Squares of Material: 295.68
Total Squares of Application: 276.96



An extended panel design requires *up to approximately 30% less applied ISO* which translates to *up to approximately 30% less polyiso material handled and up to approximately 30% less adhesive, which results in less labor.*

The GAF Tapered Design Group helps you save time with a fast and hassle-free service that assists you in creating a cost-effective tapered design system.

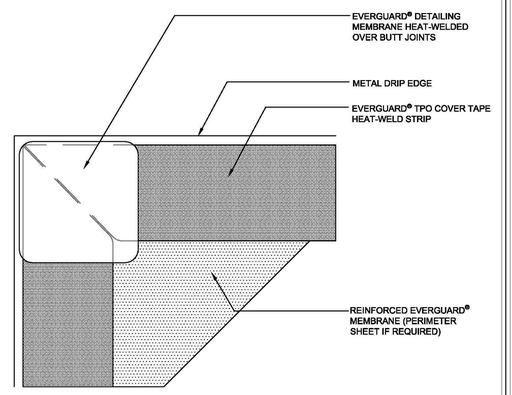
GAF TAPERED DESIGN GROUP

Let us take the hassle out of your job. By using our GAF Tapered Design Group services, you can save both time and money on your next tapered insulation job! For more information, contact **tdg@gaf.com.**

COMQN274

RIGID INSULATION

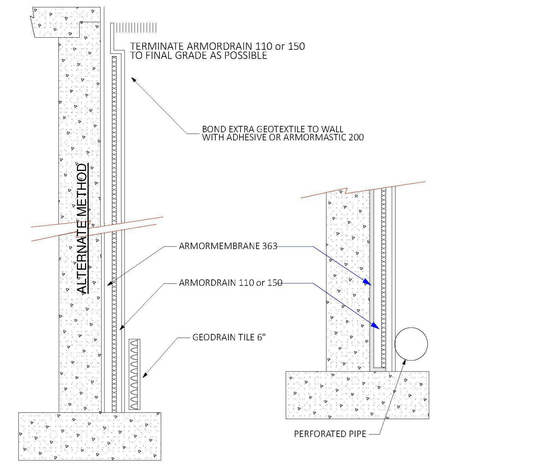
20-YEAR MAX WARRANTY



NOTE:
1. EVERGUARD® TPO COVER TAPE HEAT-WELD STRIP ONLY TO BE USED WITH TPO MEMBRANE SYSTEMS ONLY.
2. PRIME THE METAL ONLY WITH EVERGUARD TPO PRIMER. DO NOT SPILL PRIMER ON WELDED SEAM AREA.
3. HEAT WELD THE MEMBRANE (NON-ADHESIVE SIDE ONLY) TO MEMBRANE AREA USING EITHER A ROBOTIC OR HAND WELDER TO SPEC.
4. REFER TO DETAIL 218 FOR EVERGUARD® COVER TAPE HEATWELD ROOF EDGE INSTALLATION.

GAF	EverGuard ROOF EDGE SERIES	DRAWING # 221	TPO COVER TAPE HEAT-WELD AT METAL DRIP EDGE CORNER DETAIL	THIS DETAIL APPLIES TO: Adhered Systems; Mechanically Attached Systems; Self - Adhered Systems; TriPlexlite Systems
www.gaf.com 1 Campus Drive, Parsippany, NJ 07054		SCALE N.T.S.		REVISION DATE: 8-3-16

marflex WATERPROOFING & BUILDING PRODUCTS — ArmorSeries



NOTES: ALTERNATE METHOD FOR WATER COLLECTION. SEE DRAIN AWAY FOUNDATION DRAINAGE FOR FITTINGS AND ADAPTORS

DB 110 & 150 / FWD	TYPICAL FOUNDATION WALL DETAIL

FOUNDATION DRAIN PIPE

REV	DATE	BY	DESCRIPTION
	01/29/19	JU	ISSUED FOR FINAL REVIEW
	02/04/19	JU	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: DTG
DRAWN: KM/JU
CHECKED: JU/DTG
QA/QC: JU/DTG
CONSTRUCTABILITY:

SGN CONSULTING WEST
MECHANICAL & ELECTRICAL ENGINEERS
31340 VIA COLINAS, SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818/889-1383 FAX 818/889-4925

MAINSTREET ARCHITECTS + PLANNERS INC.
422 EAST MAIN STREET, VENTURA, CA 93001
805.652.2115 www.mainstreetarchitects.com

PLANS ARE PREPARED UNDER MY DIRECT SUPERVISION
REGISTERED ARCHITECT DEBORAH T. GUTTRIE REN. 11-30-19 STATE OF CALIFORNIA

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.
SCALE:

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

PROJECT NUMBER 17-397

MANUFACTURER DETAILS

DRAWING NUMBER AD3

SHEET NUMBER 7 OF 21

GENERAL NOTES:

1. GENERAL CONTRACTOR AND SUBCONTRACTORS SHALL VERIFY ALL DIMENSIONS AND CONDITIONS SHOWN ON THE PLANS, PRIOR TO COMMENCING WORK.
2. COORDINATE STRUCTURAL DETAILS & DIMENSIONS WITH RELATED REQUIREMENTS ON OTHER DRAWINGS.
3. THE ARCHITECT WILL INTERPRET THE INTENT OF THE DOCUMENTS IN CASE OF A POSSIBLE CONFLICT OR DISCREPANCY BETWEEN STRUCTURAL AND OTHER DISCIPLINES.
4. DETAILS NOTED AS "TYPICAL" OR "TYP" SHALL APPLY IN ALL CASES WHETHER OR NOT SPECIFICALLY REFERENCED.
5. WORKMANSHIP AND MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF THE 2016 EDITION OF THE CALIFORNIA BUILDING CODE (CBC).
6. FOUNDATION DESIGN IS BASED UPON MINIMUM REQUIREMENTS OF THE CBC:
   A. ALLOWABLE SOIL BEARING PRESSURE: 1500 PSF
7. MATERIAL REQUIREMENTS:
   - A. CONCRETE: f'C = 2500 PSI AT 28 DAYS; NO SPECIAL INSPECTION REQUIRED
   - B. CONCRETE BLOCK: ASTM C90 GRADE N-1 (NORMAL WEIGHT); NO SPECIAL INSPECTION REQUIRED (f'm= 1500psi); GROUT: f'c= 2,000 psi, MORTAR: f'c=1800psi
   - C. REINFORCING STEEL: ASTM A615, #4 & SMALLER – GRADE 40, #5 & LARGER – GRADE 60
   - D. STRUCTURAL STEEL: ALL STRUCTURAL STEEL SHALL COMPLY WITH ASTM A36, TYP U.N.O., STRUCTURAL TUBES SHALL COMPLY WITH ASTM A500, GRADE B. STRUCTURAL PIPES SHALL COMPLY WITH ASTM A53, GRADE B.
   - E. MACHINE BOLTS: ASTM A307
   - F. ANCHOR BOLTS: ASTM A307
   - G. TIMBER FASTENERS: SIMPSON STRONGTIE INC. OR APPROVED EQUAL.
   - H. SAWN TIMBER: ALL LUMBER SHALL BE GRADE MARKED, NO. 2 DOUGLAS FIR–LARCH OR BETTER, EXCEPT AS NOTED ON FRAMING NOTE 2 OR PLAN.
   - I. PLYWOOD/OSB SHTG: U.S. PRODUCT STANDARD 2–10, APA; WALL: APA STRUCTURAL 1 RATED, EXPOSURE 1; ROOF: 15/32" CDX, (PSR–24/0), EXPOSURE 1; FLOOR: 3/4" T&G UNDERLAYMENT GRADE, (PSR–32/16)
   - J. MECH ANCHORS: REFER TO 3/S1, TYPICAL.
   - K. EPOXY ANCHORS: REFER TO 4/S1, TYPICAL; **SPECIAL INSPECTION REQUIRED**. A REPORT SHALL BE GIVEN TO THE BUILDING INSPECTOR AT FRAMING INSPECTION. REFER TO NOTE 10 ON 5/S1.
8. STRUCTURAL DESIGN LOADS:
   - A. ROOF LOADS: DEAD LOAD = 14 PSF; LIVE LOAD = 20 PSF
   - B. WALL LOADS: 8" SOLID GROUTED CONCRETE BLOCK = 84 PSF
   - C. SEISMIC DESIGN: OCCUPANCY CATEGORY = II; SEISMIC IMPORTANCE FACTOR = 1.0; S_S = 2.381; S_1 = 0.874; S_{DS} = 1.59; S_{D1} = 0.87; SEISMIC DESIGN CATEGORY = E; SEISMIC FORCE RESISTING SYSTEM = SPECIAL REINFORCED CONCRETE BLOCK; DESIGN BASE SHEAR = 0.32W; F_P = 0.68W; R = 5; ANALYSIS PROCEDURE = "EQUIVALENT LATERAL FORCE PROCEDURE"
   - D. WIND DESIGN: ULTIMATE WIND SPEED = 110 M.P.H.; DESIGN WIND SPEED = 85 M.P.H.; WIND IMPORTANCE FACTOR = 1.0; WIND EXPOSURE = C; INTERNAL PRESSURE COEFFICIENT = ±0.18; DESIGN WIND PRESSURE = 20.44 PSF

FOUNDATION NOTES:

1. ALL CONCRETE SHALL HAVE 2500 PSI MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS. NO SPECIAL INSPECTION REQUIRED.
2. ALL HOLDDOWN ANCHORS SHALL BE FIRMLY HELD IN PLACE BY A TEMPLATE PRIOR TO PLACING CONCRETE. EXACT HOLDDOWN LOCATION MUST BE COORDINATED BETWEEN CONCRETE AND FRAMING CONTRACTOR.
3. ALL REINFORCING STEEL SHALL COMPLY WITH MATERIAL REQUIREMENTS NOTED ABOVE. PLACING OF REINFORCING STEEL SHALL COMPLY WITH CHAPTER 19 OF THE CALIFORNIA BUILDING CODE.
4. ALL SHEAR WALL SILL PLATE ANCHOR BOLTS SHALL HAVE 3" X 3" X 1/4" STEEL PLATE WASHERS, TYPICAL.

FRAMING NOTES:

1. ALL FRAMING AND METAL STUD WORK SHALL BE DONE IN ACCORDANCE WITH THOSE APPLICABLE SECTIONS OF THE LATEST ADOPTED EDITION OF THE CALIFORNIA BUILDING CODE AND DETAILS INDICATED ON THE DRAWINGS.
2. ALL STRUCTURAL FRAMING SHALL BE THE SAME SIZE AND GAGE AS NOTED ON THE PLAN AND SHALL COMPLY WITH ONE OF THE FOLLOWING THREE APPROVALS:
   - A. STEEL STUD MANUFACTURER'S ASSOCIATION (ICC ESR ER–3064P)
   - B. CLARK–DIETRICH INDUSTRIES METAL FRAMING (ICC ESR 1166P)
   - C. CALIFORNIA EXPANDED METAL PRODUCTS (CEMCO) (ICC ESR ER–3016)
3. BOTTOM TRACKS SHALL BE ONE GAGE THICKER THAN TYPICAL STUD FRAMING.
4. STRUCTURAL MEMBERS WILL NOT BE CUT FOR PIPE, CONDUIT, ETC.
5. C–STUD BRIDGING SHALL BE INSTALLED AS NOTED ON PLANS.
6. ALL BOLTS SHALL HAVE FLAT WASHERS UNDER HEAD AND NUT.
7. ALL PLYWOOD EXPOSED TO WEATHER SHALL BE EXTERIOR GRADE.
8. HOLDDOWN CONNECTORS & SILL BOLTS MUST BE TIGHTENED JUST PRIOR TO COVERING THE WALL FRAMING.

MASONRY NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND CONDITIONS ON THE JOB. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TEMPORARY SUPPORT OF ANY VERTICAL EARTH CUTS OVER 6'–0" IN HEIGHT.
2. CONCRETE MASONRY UNITS SHALL NOT BE WETTED PRIOR TO PLACING GROUT.
3. ALL CELLS BELOW BACKFILL AND ALL OTHER CELLS WHICH CONTAIN REINFORCEMENT TO BE FILLED W/ GROUT.
4. REINFORCEMENT TO BE SPLICED 48 DIAMETERS (40 KSI STEEL), MINIMUM. REINFORCEMENT TO BE SPLICED 72 DIAMETERS (60 KSI STEEL), MINIMUM.
5. REINFORCEMENT SHALL BE ACCURATELY SPLICED AND SECURED SO THAT IT WILL NOT BE DISPLACED. ALL CONCRETE SHALL BE PROPERLY CONSOLIDATED DURING PLACEMENT. ALL REINFORCING STEEL & EMBEDED ITEMS SHALL BE SECURELY TIED IN PLACE PRIOR TO PLACEMENT OF CONCRETE.
6. GROUT SHALL BE WELL RODDED TO INSURE A GOOD CONTACT WITH REINFORCEMENT AN TO ELIMINATE ROCK POCKETS AND VOIDS. THE CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS FOR MIXING, PLACING, FINISHING, CURING AND PROTECTING CONCRETE DURING UNFAVORABLE WEATHER CONDITIONS.
7. POUR LIFTS SHALL BE 6'–0" MAXIMUM WITHOUT SPECIAL INSPECTION.
8. POUR ALL FOOTINGS AGAINST SOLID NATURAL UNDISTURBED EARTH OR COMPACTED FILL COMPACTED TO 90% RELATIVE DENSITY.
9. USE 4" PERFORATED P.V.C. DRAIN OR OMIT HEAD–JOINTS AT 32" O.C. FOR DRAINAGE. P.V.C. PIPE MUST DRAIN DOWN SLOPE AND BE NO LONGER THAN 40 FEET WITHOUT SPECIAL DESIGN.
10. BACKFILL WITH 6" WIDTH OF SAND OR CLEAN COURSE GRAVEL AND COVER WITH A 12" THICK COMPACTED FILL BLANKET AT THE SURFACE. BACKFILL SHALL NOT BE PLACED UNTIL SEVEN (7) DAYS AFTER GROUTING.
11. ALL WALLS SHALL BE WATERPROOFED ON THE SOIL SIDE.
12. GROUT STRENGTH SHALL BE EQUAL TO OR GREATER THAN CONCRETE STRENGTH.

METAL DECK NOTES

1. METAL DECK SHALL BE SYSTEM B36 AS MANUFACTURED BY ASC OR EQUAL. (ICC ESR–1414)
2. METAL DECK SHALL CONFORM WITH ASTM A446 AND A525.
3. DECK ERECTION CONTRACTOR SHALL CUT TO SUIT DETAILS AT ALL FRAMED OPENINGS, COLUMNS, AND AS INDICATED ON DRAWINGS. CLOSURE AT DECK ENDS SHALL CLOSE OFF OPEN FLUTES ONLY. (I.E. NOT CONTINUOUS)
4. OPENINGS SHOWN ON THE FRAMING PLANS INDICATE THE GENERAL ARRANGEMENT AND LOCATION ONLY. VERIFY CUTTING LENGTH OF DECK WITH ARCH., ELEC., AND MECHANICAL DWGS.
5. ALL WELDERS SHALL BE AWS CERTIFIED FOR LIGHT GAGE STEEL WELDING BY THE BUILDING DEPT.
6. CONTINUOUS INSPECTION BY A DEPUTY INSPECTOR IS REQ'D FOR WELDING OF DECKS.
7. ALL LIGHT GAGE STEEL DECKING AND FLASHING SHALL BE FABRICATED OF SHEET METAL CONFORMING TO A.S.T.M. A–446. DECK AT ELASTOMERIC COATED AREAS SHALL BE VENTED.
8. EDGE OF PERIMETER CLOSURE SHALL BE HELD WITHIN 1/4" OF THE DIMENSION REQUIRED ON THE ARCH'L DRAWINGS CONFIRM THE LOCATION OF BEAM & COLUMN CENTER LINES FROM FIXED REFERENCE.
9. DECK TO BEAR ON SUPPORTS 2" MIN.
10. DECKING SHALL BE CONTINUOUS OVER AT LEAST 2 SPANS AND 3 SPANS WHERE FRAMING PERMITS.

STRUCTURAL STEEL

1. STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED, AND ERECTED IN ACCORDANCE WITH "THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS" (AISC LATEST EDITION)
2. ALL STRUCTURAL STEEL SHAPES AND PLATES SHALL CONFORM TO ASTM A36, WITH A MINIMUM YIELD STRESS OF 36 KSI.
3. ALL STEEL PIPE SHALL CONFORM TO ASTM A53, GRADE B, WITH A MINIUM YIELD STRENGTH OF 35 KSI.
4. ALL ANCHOR BOLTS AND BOLTS SHALL CONFORM TO ASTM A307, GRADE A, UNLESS OTHERWISE NOTED ON THE DRAWINGS.
5. ALL WELDING OF STRUCTURAL STEEL SHALL BE PERFORMED WITH E70XX ELECTRODES CONFORMING TO AWS D1.1 (LATEST EDITION)
6. ALL WELDERS SHALL BE CERTIFIED BY THE BUILDING DEPARTMENT FOR WELDING OF STRUCTURAL STEEL, OR REINFORCING STEEL, AS APPLICABLE BY AWS STANDARDS.
7. THE CONTRACTOR SHALL SUBMIT MISCELLANEOUS AND STRUCTURAL STEEL SHOP DRAWINGS FOR REVIEW BY THE STRUCTURAL ENGINEER PRIOR TO ERECTION AND/OR INSTALLATION. SUBMIT 3 SETS OF PRINTS AND ONE SET OF REPRODUCABLES.
8. ALL FABRICATORS SHALL BE CERTIFIED FOR FABRICATION OF STRUCTURAL STEEL.
9. ALL FIELD WELDING & ALL MULTI–PASS WELDS SHALL HAVE CONTINUOUS INSPECTION.
10. ALL STEEL SURFACE ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
11. ALL STEEL TUBING SHALL CONFORM TO ASTM A 500, GRADE B, WITH A MINIMUM YIELD STRENGTH OF 46 KSI
12. ALL BOLTS AND THREADED RODS SHALL CONFORM TO ASTM A 307, GRADE A, UNLESS NOTED OTHERWISE. ALL THREADED RODS SHALL BE ZINC–PLATED.
13. ALL STEEL SHALL BE PRIMED AND PAINTED, EXCEPT STEEL SURFACES ENCASED IN CONCRETE SHALL BE LEFT UNPAINTED.
14. VERIFY ALL DIMENSIONS & CONDITIONS AT THE SITE PRIOR TO FABRICATION OF STEEL.

SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS AND SUBSEQUENT REPORTS SHALL BE REINFORCED IN CONFORMANCE WITH SECTION 1704 OF THE 2016 CBC AT THE OWNERS EXPENSE.
2. ALL SPECIAL INSPECTIONS SHALL BE MADE BY AN INDEPENDENT INSPECTION AGENCY SUBJECT TO APPROVAL BY THE BUILDING DEPARTMENT, AND SHALL BE PAID BY THE OWNER.
3. THE FOLLOWING WORK SHALL BE PERFORMED UNDER CONTINUOUS DEPUTY INSPECTION IN THE PRESENCE OF THE OWNER'S SPECIAL INSPECTOR.
   - A. PLACEMENT OF CONCRETE WITH f'c = 3,000 PSI & GREATER
   - B. INSTALLATION OF EPOXY GROUTED DOWELS
   - C. FIELD WELDING OF STRUCTURAL STEEL.
4. THE FOLLOWING WORK SHALL BE PERFORMED UNDER PERIODIC DEPUTY INSPECTION IN THE PRESENCE OF THE OWNER'S SPECIAL INSPECTOR.
   - A. SHEARWALL NAILING WHERE FASTENER SPACING IS 2" O.C. OR LESS.
   - B. ROOF AND FLOOR DIAPHRAGM NAILING WHERE FASTENER SPACING IS 4" O.C. OR LESS.
   - C. DRAG STRUT AND HOLDDOWN CONNECTIONS.
5. SPECIAL INSPECTION & PROFESSIONAL OBSERVATION REPORTS SHALL BE SUBMITTED TO THE OWNER, ENGINEER, AND AUTHORITY HAVING JURISDICTION NO LATER THAN SEVEN (7) WORKING DAYS FROM THE DATE OF INSPECTION/OBSERVATION.

STRUCTURAL OBSERVATION PROGRAM

THE OWNER SHALL EMPLOY THE ENGINEER REGISTERED/LICENSED IN THE STATE OF CALIFORNIA WHO IS RESPONSIBLE FOR THE STRUCTURAL DESIGN TO DO THE STRUCTURAL OBSERVATION.

PROJECT ENGINEERS: JAMES VINCI, S.E. S–4411

THE ENGINEER RESPONSIBLE FOR THE STRUCTURAL OBSERVATION, THE CONTRACTOR, AND APPROPRIATE SUBCONTRACTORS SHALL HOLD A PRE–CONSTRUCTION MEETING TO REVIEW THE DETAILS OF THE STRUCTURAL SYSTEM TO BE STRUCTURALLY OBSERVED.

THE FOLLOWING ITEMS SHALL BE OBSERVED AT EACH PHASE OF CONSTRUCTION:

FOUNDATION:	ANCHORS, HOLDOWNS, STEEL PLACEMENT, FOOTING DIMENSIONS
CMU WALL:	WALL REINFORCING PRIOR TO GROUTING
ROOF DECK:	FRAMING MEMBER SIZE, DECK GRADE & WELDING ROOF JOIST CONNECTIONS
LIGHT GAUGE FRAMING:	FRAMING & CONNECTIONS
FINAL OBSERVATION:	ALL STRUCTURAL ELEMENTS

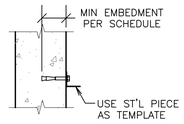
GENERAL NOTES

DRILLED EXPANSION TYPE ANCHOR BOLTS SHALL BE USED ONLY WHERE DETAILED OR FOR ATTACHMENT OF MECH. ELEC. OR MISC. ACCESSORIES OR EQUIPMENT TO THE STRUCTURE.

ACCEPTABLE WEDGE ANCHORS:
1. HILI–KWIK–BOLT–TZ (ICC ESR–1917, LARR 25701) IN NORMAL WT CONC.
2. ITW RAMSET/REDHEAD TRUBOLT+ (ICC ESR–2427, LARR 2748) IN NORMAL WT CONC.
3. SIMPSON STRONG–BOLT 2 (ICC ESR–3037, LARR 25891) IN NORMAL WT CONC.
4. SIMPSON WEDGE–ALL (ICC ESR 1396, LARR 24682) IN MASONRY ONLY.
5. DEWALT POWER–STUD+SD2 (ESR 2502, LARR 25831) IN NORMAL WT CONC.
6. DEWALT POWER–STUD+SD1 (ESR 2818, LARR 25864) IN CMU

ACCEPTABLE SCREW ANCHORS:
1. SIMPSON TITEN HD SCREW ANCHOR (ICC ESR–2713, LARR 25741) IN NORMAL WT CONC.
2. SIMPSON TITEN HD SCREW ANCHOR (ICC ESR–1056, LARR 25560) IN CMU
3. DEWALT SCREW–BOLT+ (ICC ESR 3889) IN CONCRETE
4. DEWALT WEDGE BOLT+ (ICC ESR 1678) IN CMU

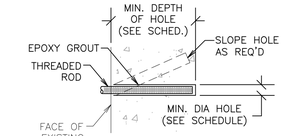
TEST		DRILLED BOLT SCHEDULE	3/8"	1/2"	5/8"	3/4"
		MIN. EMBEDMENT	3"	4"	4"	5"
	DIRECT–PULL TENSION (FT,LBS)	HARD ROCK	1100	2000	2300	3700
	TORQUE WRENCH (FT,LBS)	HARD ROCK	25	50	80	50



SPECIAL INSPECTION REQUIRED FOR INSTALLATION OF MECHANICAL ANCHORS ONLY WHERE UTILIZED TO RESIST SEISMIC FORCES, TYPICAL.

TYPICAL MECHANICAL ANCHOR DETAIL 3

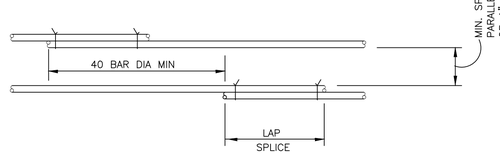
PROCEDURE
1. DRILL HOLE OF PROPER DIAMETER AND DEPTH USING A CARBIDE TIPPED DRILL OR CORING BIT. AVOID ANY EXISTING REINFORCING STEEL BY RELOCATING HOLE SLIGHTLY.
2. CLEAN HOLE THOROUGHLY BY AIR PRESSURE.
3. MAKE SURE THAT HOLE IS DRY AND CLEAN BEFORE GROUTING.
4. PLACE EPOXY GROUT IN HOLE w/ CAULKING GUN OR SIMILAR EQUIPMENT STARTING AT BOTTOM, FILL HOLE APPROX. 1/2 FULL.
5. COAT DOWEL WITH SAME EPOXY GROUT AND INSERT INTO HOLE, FORCING MATERIAL AROUND THE SIDES OF THE BAR AND COMPLETELY FILLING ALL VOIDS.
6. PROVIDE SUPPORT FOR DOWEL BY TYING TO REBAR OR OTHER ELEMENT UNTIL GROUT HAS CURED.
7. EPOXY GROUT IN CMU SHALL BE SIMPSON SET EPOXY TIE (ESR 1772, LARR 25279), HILTI HIT–HY 150 MAX (ESR 1967, LARR 25881), AC100+ GOLD BY DEWALT (ESR 3200, LARR 26049)
8. EPOXY GROUT IN CONCRETE SHALL BE HIT–RE 500–SD BY HILTI CORP. (ESR 2322, LARR 25700), SIMPSON SET–XP (ESR–2508, LARR 03151) OR PURE110+ BY DEWALT (ICC ESR 3298, LARR 26035)
9. **SPECIAL INSPECTION REQUIRED**
10. SPECIAL INSPECTION IS REQUIRED FOR THE INSTALLATION OF EPOXY ADHESIVE ANCHORS. A REPORT SHALL BE GIVEN TO THE BUILDING INSPECTOR AT FRAMING INSPECTION.



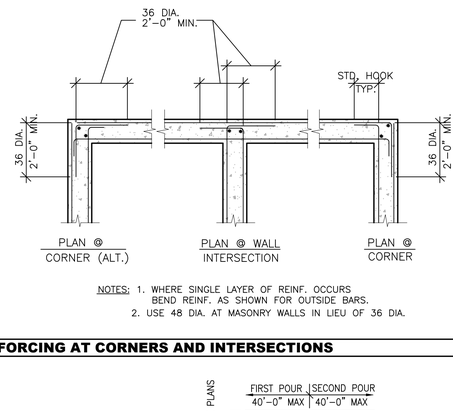
BAR SIZE	ROD SIZE	BIT DIAM.	MIN. DEPTH
#3	–	1/2"	4"
#4	1/2"	5/8"	5"
#5	5/8"	3/4"	6"
#6	3/4"	7/8"	7"
–	7/8"	1"	8"
–	1"	1–1/8"	9"

TYPICAL EPOXY GROUTED DOWELS / ANCHORS 4

HORIZONTALLY PLACED REINFORCING	CONC. F'C PSI	BAR SIZE 3	4	5	6	7	8	9	10	11
		LAP SPLICE IN INCHES								
	2000	21	29	36	50	69	91	115	145	178
	3000	21	29	36	46	63	82	104	132	163
	4000	21	29	36	43	54	71	90	115	141
	5000	21	29	36	43	50	64	81	103	126
	MASONRY	21	23	36	50	69	91	115	145	178

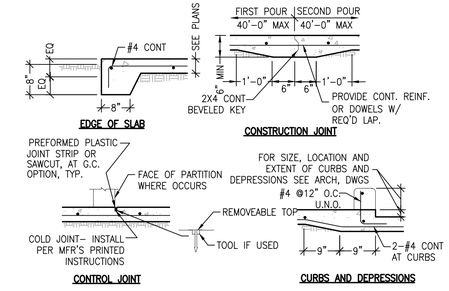


REINFORCING SPLICE DETAIL 7



NOTES: 1. WHERE SINGLE LAYER OF REINF. OCCURS BEND REINF. AS SHOWN FOR OUTSIDE BARS.
2. USE 48 DIA. AT MASONRY WALLS IN LIEU OF 36 DIA.

REINFORCING AT CORNERS AND INTERSECTIONS 8



REINFORCING BENDS AND HOOKS 11

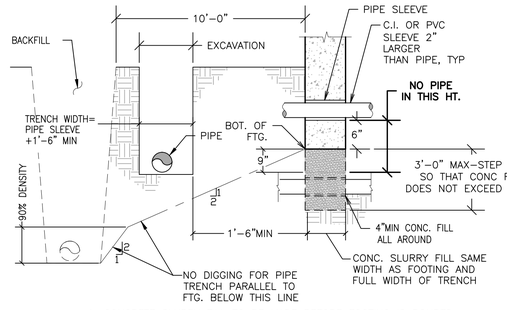
TYPICAL SLAB-ON-GRADE 12

LEGEND

- CAST–IN–PLACE CONCRETE
- CONCRETE BLOCK
- EARTH
- NUMBER REFERENCE / SECTION OR DETAIL / SHEET REFERENCE
- NUMBER REFERENCE / FULL HEIGHT SECTION / SHEET REFERENCE
- NUMBER REFERENCE / WALL ELEVATION / SHEET REFERENCE
- FINISH ELEVATION

TYP	=	TYPICAL
SIM.	=	SIMILAR
O.H.	=	OPPOSITE HAND
(N)	=	NEW
(E)	=	EXISTING

LEGEND



NOTE: 1. CONCRETE SLURRY FILL TO BE MADE BEFORE FOOTING IS POURED
2. PIPES MORE THAN 3'–0" BELOW BOTTOM OF FOOTING TRENCH MAY BE BACKFILLED WITH CONTROLLED, COMPACTED FILL.

PIPE IN ADJACENT FOOTING 15

SHEET INDEX

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	JRV
DRAWN:	JWB
CHECKED:	JRV
QA/QC:	XX
CONSTRUCTABILITY:	XX

KOEBIG & KOEBIG ENGINEERING CONSULTING WEST
3160 VIA PASEO, SUITE 102, CAMARILLO, CA 93012
TEL 805.389.3383 FAX 805.389.4827

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103 • THOUSAND OAKS, CA 91360
p - 805.496.2100 f - 805.496.2442 VinciSE.com

REGISTERED PROFESSIONAL ENGINEER JAMES RICHARD VINCI No. S4411 Exp. 10/31/19 STRUCTURAL STATE OF CALIFORNIA

Mar 14, 2019

0 1/2 1 2

THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE: AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

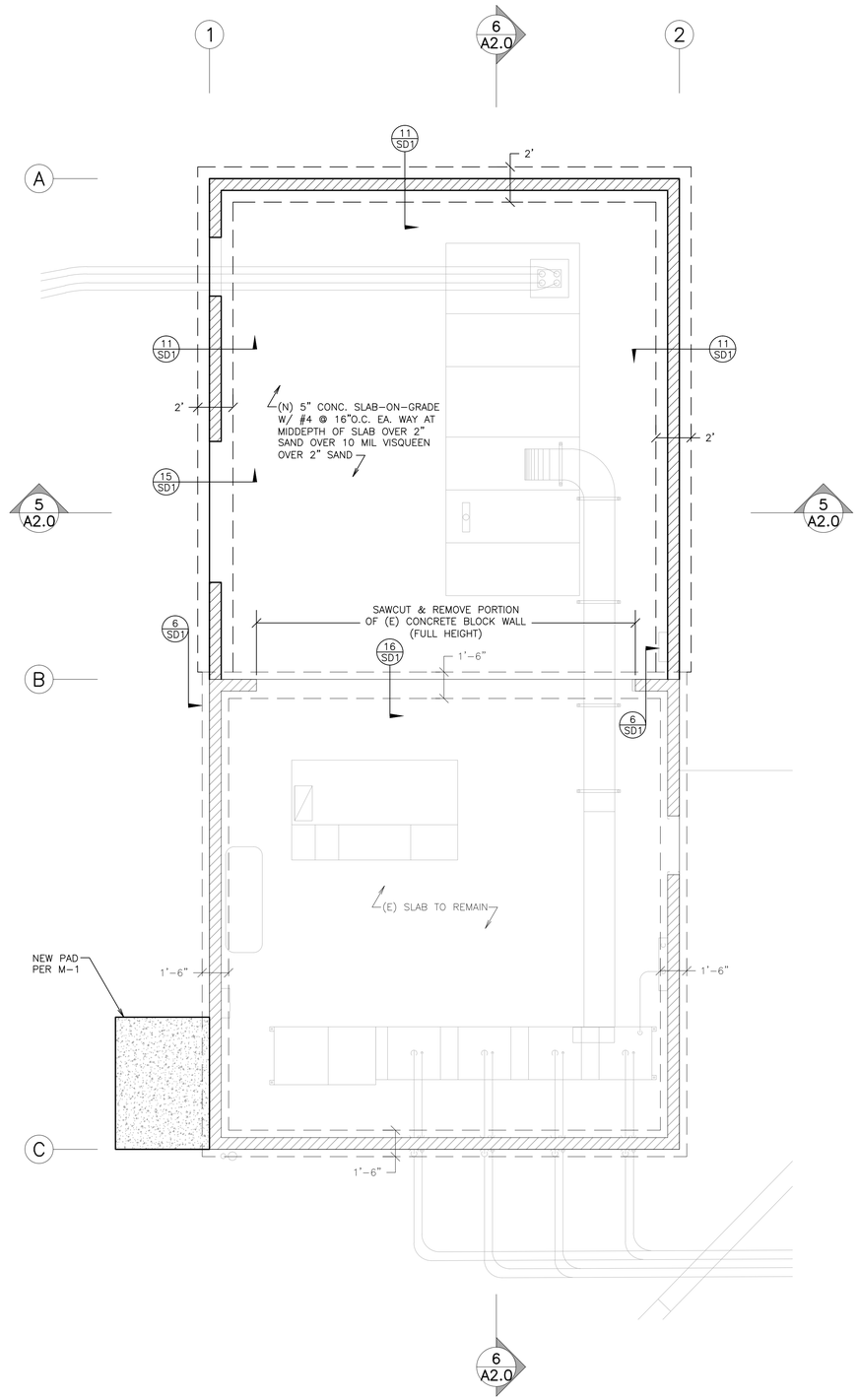
GENERAL NOTES AND DETAILS

PROJECT NUMBER 17-397

DRAWING NUMBER S1

SHEET NUMBER 8 OF 21

F:\Autocad Dwgs\A-Jobs\18-5500\18-5564 - Rincon Pump Station\Sheets\18-5564-Detail Sheets.dwg, S1, 2/14/2019 10:07:36 AM, Josh



LEGEND

INDICATES CONCRETE BLOCK WALL PER 8/SD1

INDICATES EXISTING CONCRETE BLOCK WALL

5' 0' 5'

HORIZ: 1"=5'
VERT: 1"=1'

FOUNDATION PLAN — **SCALE: 1/4" = 1'-0"**

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	JRV
DRAWN:	JWB
CHECKED:	JRV
QA/QC:	XX
CONSTRUCTABILITY:	XX

KEVORK & BEDROS ENGINEERS CONSULTING WEST
3130 VIA COLINAS SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818/889-3383 FAX 818/889-4927

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103 • THOUSAND OAKS, CA 91360
p - 805.496.2100 f - 805.496.2442 VinciSE.com

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 10/31/19
STRUCTURAL
STATE OF CALIFORNIA

Mar 14, 2019

0 1/2 1 2

THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:

AS INDICATED

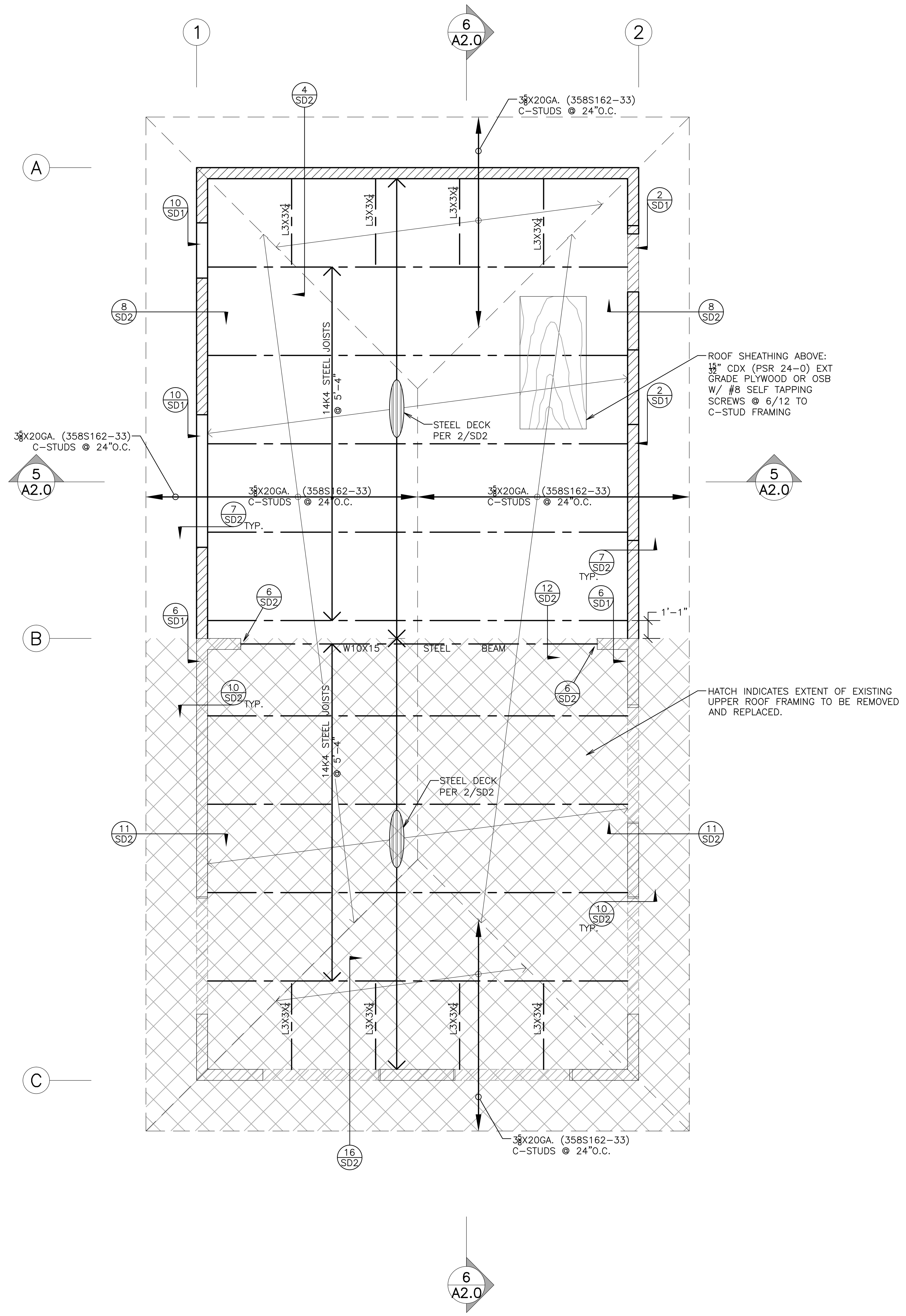
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

FOUNDATION PLAN

PROJECT NUMBER
17-397

DRAWING NUMBER
S2

SHEET NUMBER
9 OF 21



LEGEND

INDICATES CONCRETE BLOCK WALL PER 10/SD1

INDICATES EXISTING CONCRETE BLOCK WALL

5' 0' 5'
HORIZ: 1"=5'
VERT: 1"=1'

FOUNDATION PLAN

SCALE: 1/4" = 1'-0"

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	JRV
DRAWN:	JWB
CHECKED:	JRV
QA/QC:	XX
CONSTRUCTABILITY:	XX

CNC CONSULTING WEST
MECHANICAL & ELECTRICAL ENGINEERS
31340 VIA COLINAS SUITE 102
WESTLAKE VILLAGE CA 91362
TEL 818/889-3383 FAX 818/889-4927

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103 - THOUSAND OAKS, CA 91360
p - 805.496.2100 f - 805.496.2442 VinciSE.com

REGISTERED PROFESSIONAL ENGINEER
JAMES RICHARD VINCI
No. S4411
Exp. 12/31/19
STRUCTURAL
STATE OF CALIFORNIA
Mar 14, 2019

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE:
AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

ROOF FRAMING PLAN

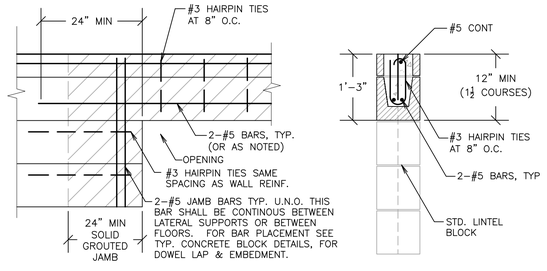
PROJECT NUMBER
17-397

DRAWING NUMBER
S3

SHEET NUMBER
10 OF 21

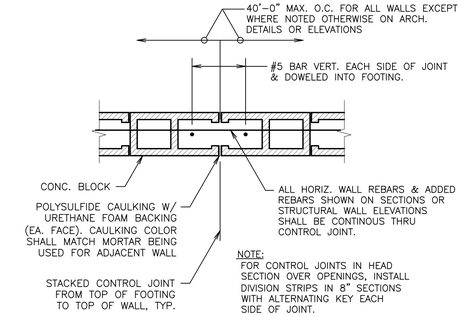
.

1

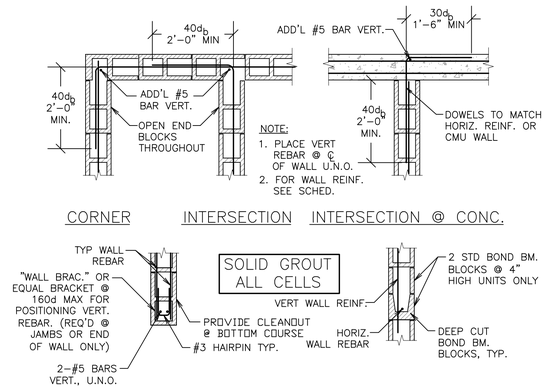


TYP. ELEVATION SECTION

12" LINTEL AT CLEARSTORY WINDOWS 2



TYPICAL CONTROL JOINT DETAIL 3



CORNER INTERSECTION INTERSECTION @ CONC.

JAMB OR WALL END BOND BEAM BLOCK (AT ALL HORIZ. REBAR)

SCHEDULED REINF.SHALL APPLY IN ALL CASES UNLESS NOTED OTHERWISE ON SPECIFIC DETAILS OR SECTIONS.

TYPICAL WALL REINFORCING SCHEDULE			
WALL THICKNESS	VERT. REINF.	HORIZ. REINF.	REMARKS
8"	#5 @ 24"O.C.	#5 @ 24"O.C.	@ ℄

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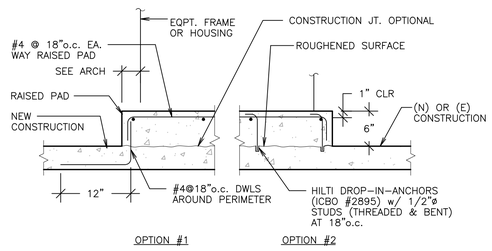
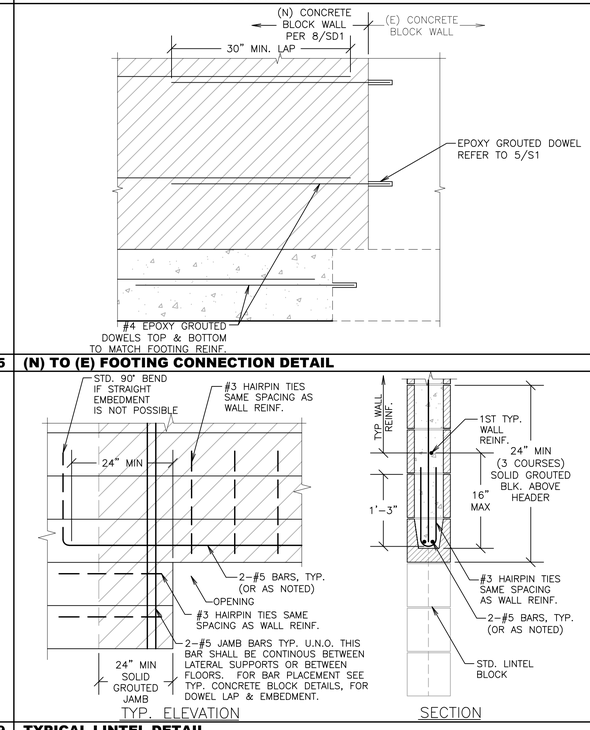


OPTION #1 OPTION #2

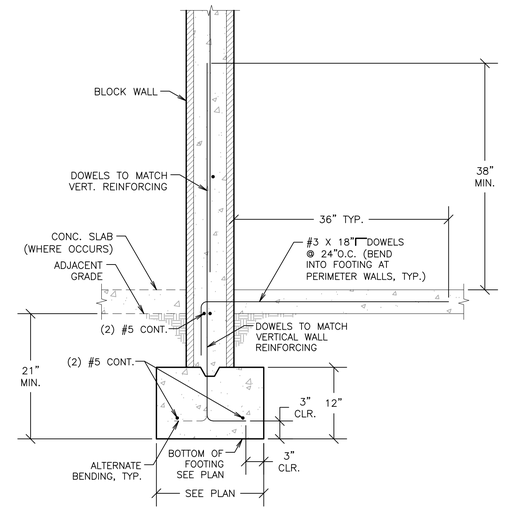
NOTE:
1. FOR SLAB REBAR SEE PLAN.
2. FOR SIZE, DEPTH, AND LOCATION OF RAISED PADS SEE ARCH. AND MECH. DRAWINGS U.N.O.

TYPICAL RAISED PAD DETAIL 9



TYP. ELEVATION SECTION

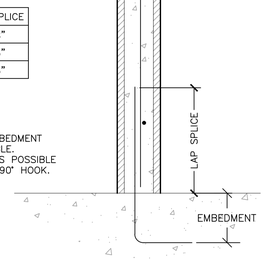
(N) TO (E) FOOTING CONNECTION DETAIL 6



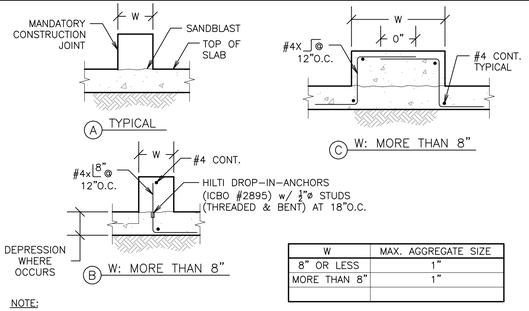
TYPICAL CONCRETE BLOCK DETAIL 8

	EMBEDMENT	LAP SPLICE
#5	18"	38"
#6	20"	45"
#7	26"	53"

NOTE:
WHERE SCHEDULED EMBEDMENT LENGTH IS NOT POSSIBLE. EXTEND BAR AS FAR AS POSSIBLE AND PROVIDE TYPICAL 90° HOOK.



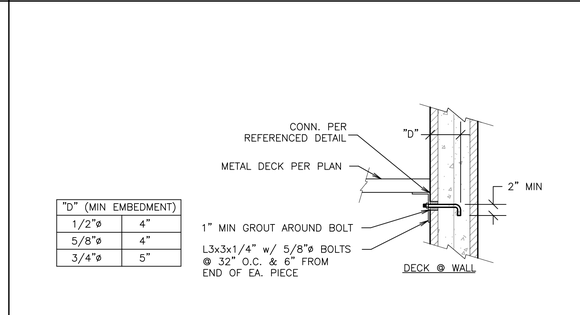
TYPICAL RAISED CURB DETAIL 13



NOTE:
1. COORDINATE WIDTH, HEIGHT AND LOCATION OF CURBS WITH ARCHITECTURAL DRAWINGS.
2. SEE STRUCTURAL SECTIONS FOR CURB REINFORCING AT SHEAR WALLS, BEARING WALLS, EXTERIOR WALLS AND SPECIAL CONDITIONS.

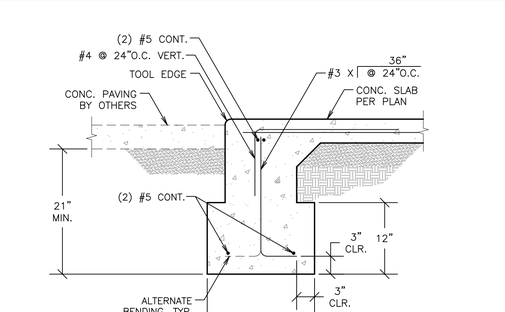
W	MAX. AGGREGATE SIZE
8" OR LESS	1"
MORE THAN 8"	1"

TYPICAL LINTEL DETAIL 10

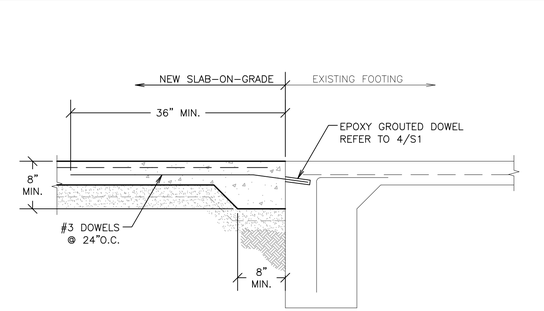


"D" (MIN EMBEDMENT)	
1/2"ø	4"
5/8"ø	4"
3/4"ø	5"

TYPICAL FOOTING DETAIL 11



SECTION AT DOOR 15



SECTION AT NEW SLAB TO EXISTING FOOTING 16

DETAIL 14

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	JRV
DRAWN:	JWB
CHECKED:	JRV
QA/QC:	XX
CONSTRUCTABILITY:	XX

ENGINEERS CONSULTING WEST
11340 VIA COLINAS SUITE 102
WESTLAKE VILLAGE CA 91362
TEL 818/889-3383 FAX 818/889-4927

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103 • THOUSAND OAKS, CA 91360
:- 805.496.2100 :- 805.496.2442 VinciSE.com

REGISTERED PROFESSIONAL ENGINEER JAMES RICHARD VINCI No. S4411 Exp. 12/31/19 STRUCTURAL STATE OF CALIFORNIA
Mar 14, 2019

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SCALE:
AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

FOUNDATION AND CONCRETE BLOCK DETAILS

PROJECT NUMBER 17-397
DRAWING NUMBER SD1
SHEET NUMBER 11 OF 21

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1

NOTE:

1. METAL DECK SHALL BE 20 GA ASC B-36 STEEL DECK CONFORMING TO ICC REPORT NO. ESR-1414 OR EQUAL
2. DECK WELDING
   A. ATTACHMENT TO FRAMING PERPENDICULAR TO DECK: 3/4"ø PUDDLE WELD (1/2"ø EFFECTIVE) @ EA. FLUTE.
   B. ATTACHMENT TO FRAMING PARALLEL TO DECK: 3/4"ø PUDDLE WELD (1/2"ø EFFECTIVE(@ 12" O.C.
   C. SEAM ATTACHMENT: 1 1/2" SEAM WELD @ 24" O.C. (MAX.)
3. DECKING SHALL BE CONTIONOUS OVER AT LEAST 2 SPANS AND 3 SPANS WHERE FRAMING PERMITS.
4. DECK SECTION PROPERTIES
   I+MIN./I-MIN(IN) 0.220/0.220
   S+MIN/S-MIN(IN)0.235/0.246
5. FOR ADDITIONAL NOTES, REFER TO METAL DECK NOTES ON SHT. S1.

METAL ROOF DECK 2

SECTION AT SOUTH WALL 4

STEEL BEAM CONNECTION 6

DETAIL AT JOIST 7

SECTION AT EAST AND WEST WALL 8

.

9

REINFORCING BENDS AND HOOKS 10

SECTION AT EXISTING EAST AND WEST WALL 11

SECTION AT NEW STEEL BEAM 12

.

13

.

14

SECTION AT NORTH WALL 16

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	JRV
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CONSULTING WEST ENGINEERS
31340 VIA COLINAS, WESTLAKE VILLAGE, CA 91362
TEL 818.889.5565 FAX 818.889.4927

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, SUITE 103 • THOUSAND OAKS, CA 91360
P - 805.496.2100 F - 805.496.2442 VinciSE.com

REGISTERED PROFESSIONAL ENGINEER — JAMES RICHARD VINCI — No. S4411 Exp. 12/31/19 — STRUCTURAL — STATE OF CALIFORNIA

Mar 14, 2019

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SCALE:

AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE

CASITAS MUNICIPAL WATER DISTRICT

ROOF FRAMING DETAILS

PROJECT NUMBER 17-397

DRAWING NUMBER SD2

SHEET NUMBER 12 OF 21

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CASITAS MUNICIPAL WATER DISTRICT

OAK VIEW, CALIFORNIA

RINCON PUMP PLANT ELECTRICAL UPGRADE

ABBREVIATIONS

A, AMP	AMPERE
AF	AMP FUSE
AIC	INTERRUPTING CAPACITY RATING
AS	AMP. SWITCH
AT	AMP. TRIP
AFF	ABOVE FINISHED FLOOR
ATS	AUTOMATIC TRANSFER SWITCH
C	CONDUIT
CKT	CIRCUIT
CB	CIRCUIT BREAKER
C.O.	CONDUIT ONLY
CT	CURRENT TRANSFORMER
CU	COPPER
DB	DISTRIBUTION BOARD
DN	DOWN
DWG	DRAWING
EA	EACH
ELEC	ELECTRICAL
EM	EMERGENCY
EQ	EQUIPMENT
EX	EXISTING (E)
FLUOR	FLUORESCENT
FVNR	FULL VOLTAGE NON-REVERSING
F	FUSED
FA	FIRE ALARM
G, GND	GROUND
GFI	GROUND FAULT INTERRUPTER
HOA	HAND-OFF-AUTOMATIC
HP	HORSE-POWER
HV	HIGH VOLTAGE
Isc	RMS SHORT CIRCUIT CURRENT
JB	JUNCTION BOX
KV	KILO VOLT
KVA	KILO VOLT- AMPERE
KW	KILO WATT
LTG	LIGHTING
LTS	LIGHTS
LV	LOW VOLTAGE
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MFG	MANUFACTURER
MIN	MINIMUM
MSB	MAIN SWITCHBOARD
MTD	MOUNTED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASS.
NU	NEUTRAL
N/A	NOT APPLICABLE
NL	NITE LITE CIRCUIT
NO, #	NUMBER
NTS	NOT TO SCALE
N	NEW
PLC	PROGRAM LOGIC CONTROLLER
PB	PULL BOX
PH, ø	PHASE
PNL	PANEL
PVC	POLYVINYL CHLORIDE
PWR	POWER
RECEPT.	RECEPTACLE
RM	ROOM
SHT	SHEET
SPEC	SPECIFICATIONS
SW	SWITCH
SWBD	SWITCHBOARD
T/C	TIME CLOCK LIGHT. CONTROL PANEL
TEL	TELEPHONE
TTC	TELEPHONE TERMINAL CABINET
TYP	TYPICAL
XFMR	TRANSFORMER
UG	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
V	VOLT
VA	VOLT-AMPERES
V.I.	VERIFY EXACT LOCATION IN FIELD
W/	WITH
W	WATT
WP	WEATHERPROOF
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED

LIST OF DRAWINGS

BASIS OF DESIGN AND CONSTRUCTION SEQUENCE

OVERVIEW

THE CASITAS MUNICIPAL WATER DISTRICT WILL BE UPGRADING THE EXISTING ELECTRICAL SERVICE OF THE RINCON PUMP PLANT TO ACHIEVE THE FOLLOWING OVERALL OBJECTIVES:

1. REPLACE AGING 2.4KV–3ø–SERVICE SWITCHGEAR AND PRIMARY SERVICE.
2. BUILD A NEW ELECTRICAL ROOM EXTENSION IN ORDER TO HOUSE THE NEW SWITCHGEAR AND PRIMARY SERVICE.
3. IMPLEMENT ABOVE WITHOUT DISRUPTING WATER SERVICE TO END USERS.

ELECTRICAL OBJECTIVES

THE FOLLOWING CHANGES TO THE EXISTING ELECTRICAL SYSTEM WILL BE REQUIRED AS PART OF THE ABOVE OVERALL OBJECTIVES:

A. PROVIDE A NEW 2.4KV SWITCHGEAR.
B. INSTALL NEW UNDERGROUND CONDUITS AND 5KV FEEDERS FROM NEW PAD MOUNT TRANSFORMER TO NEW SWITCHGEAR, AS WELL AS RECONNECT EXISTING MOTOR CONTROL CENTER TO NEW SWITCHGEAR.
C. PROTECT AND MAINTAIN EXISTING SWITCHGEAR DURING CONSTRUCTION IN ORDER TO ACCOMPLISH THE ABOVE WITHOUT DISRUPTING WATER SERVICE TO END USERS.

CONSTRUCTION SEQUENCE :

1. PROTECT EXISTING SWITCHGEAR AND MOTOR CONTROL CENTER DURING CONSTRUCTION. CONTRACTOR SHALL BUILD A TEMPORARY SHED WITH PLYWOOD TOP OVER EQUIPMENT.
2. AFTER COMPLETION OF NEW ELECTRICAL ROOM, PROCEED WITH INSTALLATION OF NEW SWITCHGEAR, AND COMPLETE ALL INSTALLATION ACTIVITIES.
3. COORDINATE AN 8 HOUR POWER DOWN FROM SC EDISON AND DISCONNECT EXISTING 5KV POWER CABLES TO 'MCC'. COMPLETE FINAL CONNECTIONS FROM NEW SWITCHGEAR TO EXISTING MOTOR CONTROL CENTER. CHECK PHASE ROTATION.
4. START UP, TESTING AND COMMISSIONING OF NEW SWITCHGEAR BY MANUFACTURER.
5. CONNECT LOW VOLTAGE LIGHTING PANEL 'LP' TO PANEL 'NP'.
6. COMPLETE ALL REMAINING SITE ACTIVITY, INCLUDING RODENT CONTROL.
7. DISCONNECT AND REMOVE 'OLD' SWITCHGEAR, OVERHEAD CABLE TRAY, 5KV CABLES, OVERHEAD 5KV BUS, AND OUTDOOR FENCING AS SHOWN ON DRAWINGS.
8. FURNISH AND INSTALL AIR CONDITIONING SYSTEM AS SHOWN ON THE MECHANICAL DRAWINGS.
9. SUBMIT ALL REQUIRED DOCUMENTATION (AS-BUILT DWGS, MANUALS, ETC.)

NOTE: ALL POWER-DOWN PERIODS REQUIRE 48-HOUR ADVANCE NOTICE TO AND APPROVAL FROM CMWD PROJECT MANAGEMENT, AND MUST BE LIMITED TO 8 HOURS MAXIMUM PER EVENT.

GENERAL NOTES

1. THE COMPLETE ELECTRICAL INSTALLATION SHALL BE IN ACCORDANCE WITH THE 2016 CEC BASED ON 2014 EDITION OF THE NATIONAL ELECTRICAL CODE, THE LATEST RULES AND REGULATIONS OF THE SAFETY ORDERS ISSUED BY THE DIVISION OF INDUSTRIAL SAFETY, THE NATIONAL BOARD OF FIRE UNDERWRITERS AND ALL APPLICABLE STATE AND LOCAL CODES ISSUED BY THE AUTHORITIES HAVING JURISDICTION.
2. THE CONTRACTOR, PRIOR TO BIDDING, SHALL VISIT THE JOB SITE TO BECOME ACQUAINTED WITH THE EXISTING INSTALLATION AND SYSTEMS RELATED TO HIS WORK AND SHALL INCLUDE IN THE BID PROPOSAL ALL LABOR AND MATERIALS REQUIRED FOR THE ELECTRICAL INSTALLATION TO BE COMPLETE AND OPERATIVE.
3. **CONSTRUCTION SEQUENCING AND PHASING-** PROVIDE CONSTRUCTION IN PHASES AND IN CONJUNCTION WITH THE CONSTRUCTION SEQUENCE INDICATED ON THESE PLANS AND AS REQUIRED BY THE PROJECT.
4. **RODENT CONTROL-** RODENTS ARE A PERSISTENT NUISANCE AT THIS SITE. ALL CONDUITS, J-BOXES, & PANELS SHALL BE SEALED TO PREVENT RODENTS FROM GAINING ACCESS TO ELECTRICAL EQUIPMENT OR BUILDINGS BY MEANS OF CONDUITS, WIREWAYS, OR BUILDING PENETRATIONS.
5. THE CONTRACTOR SHALL REVIEW THE ELECTRICAL SPECIFICATIONS BOOKLET AND THE CASITAS MUNICIPAL WATER DISTRICT (CMWD) ADDITIONAL DRAWINGS RELATED TO THIS PROJECT FOR REQUIRED WORK TO BE PROVIDED.
6. ANY POWER SHUTDOWN SHALL BE COORDINATED WITH THE CMWD CONSTRUCTION COORDINATOR. A SHUTDOWN SCHEDULE SHALL BE PRESENTED TO THE OWNER FOR APPROVAL TWO WEEKS PRIOR TO COMMENCEMENT OF WORK.
7. THE OWNER RETAINS FIRST SALVAGE RIGHTS TO ALL EXISTING EQUIPMENT REMOVED UNDER THIS CONTRACT. THE ELECTRICAL CONTRACTOR SHALL CONSULT WITH THE OWNER FOR DISPOSITION OF THE EXISTING EQUIPMENT TO BE REMOVED BY HIM. THE CONTRACTOR SHALL INCLUDE IN HIS BID PROPOSAL ALL COSTS RELATED TO THE DISPOSITION OF EXISTING EQUIPMENT REMOVED UNDER THIS CONTRACT.
8. DEMOLITION WORK SHALL BE PROVIDED AS REQUIRED TO ACCOMPLISH NEW WORK CALLED FOR AND AS NOTED. WORK SHALL BE PERFORMED CAREFULLY TO AVOID DAMAGE TO SURFACES, STRUCTURES, AND EQUIPMENT NOT BEING REMOVED. EXISTING EQUIPMENT AND/OR ELECTRICAL WIRING WHICH IS TO REMAIN, BUT HAS BEEN REMOVED TO FACILITATE THE INSTALLATION OF THE NEW EQUIPMENT, SHALL BE RESTORED TO ITS ORIGINAL OPERATING CONDITION.
9. THE CONTRACTOR SHALL REMOVE ALL ELECTRICAL ITEMS INDICATED ON PLANS, WHICH WILL BE REMOVED FOR THE RENOVATION WORK OF THIS PROJECT. DISCONNECT COMPLETELY BEFORE START OF REMOVAL.
10. WHERE OUTLETS ARE REMOVED AND/OR CONDUIT IS CUT OFF, ALL EXISTING CONDUCTORS SHALL BE REMOVED BACK TO THE NEXT OUTLET, JUNCTION BOX OR BACK TO MOTOR CONTROL CENTER.
11. EXISTING CONDUCTORS REMOVED FROM SERVICE SHALL NOT BE PERMITTED TO BE USED FOR NEW WORK UNDER THIS CONTRACT, EXCEPT ON A TEMPORARY BASIS AS SHOWN ON DRAWINGS.
12. EXISTING CONDUIT RUNS REMAINING IN PLACE MAY BE UTILIZED FOR THE RENOVATION WORK, PROVIDED THAT THE CONDUIT IS OF ADEQUATE SIZE PER N.E.C. FOR THE NUMBER AND SIZE OF CONDUCTORS BEING INSTALLED.
13. BLANK COVERS SHALL BE INSTALLED WHEREVER DEVICE IS REMOVED AND OUTLET BOX REMAINS IN PLACE.
14. SEPARATE INSULATED GROUND CONDUCTORS SHALL BE INSTALLED IN ALL FEEDER AND BRANCH CIRCUIT CONDUITS.
15. PROVIDE LABELS ON ALL EQUIPMENT AND DEVICES. LABELS SHALL BE SELF-ADHESIVE PHENOLIC TYPE WITH WHITE LETTERS ON BLACK BACKGROUND.
16. THE CONTRACTOR SHALL PROVIDE A TYPEWRITTEN DIRECTORIES FOR THE ELECTRICAL PANELS INVOLVED IN THIS PROJECT. THE PANEL DIRECTORY SHALL REFLECT THE AS-BUILT CIRCUITS. ONE COPY OF SCHEDULE SHALL BE TAPED TO THE INSIDE OF THE PANEL DOOR, AND ONE COPY SHALL BE SUBMITTED TO THE ENGINEER AS AN "AS-BUILT" DRAWING.
17. ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND/OR ANCHORED IN ACCORDANCE WITH UBC ZONE 4, IMPORTANCE FACTOR 1.5 SEISMIC REQUIREMENTS.
18. THE CONTRACTOR SHALL MAINTAIN, AT THE JOB SITE, AN UP TO DATE DRAWING SET. THE DRAWING SET SHALL REFLECT ALL APPROVED CHANGES TO THE DESIGN DRAWINGS. AN "AS-BUILT" DRAWING SET SHALL BE KEPT CLEAN AND IN GOOD CONDITION AND SHALL BE TURNED OVER TO THE CMWD AT THE COMPLETION OF THE PROJECT.
19. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL SCHEDULE AND PERFORM A COMPLETE FUNCTIONAL TEST TO DEMONSTRATE TO THE OWNER THAT THE NEW INSTALLATION IS OPERATING AS INTENDED. ANY DEFECTS OR DEFICIENCIES IN THE MATERIALS OR WORK SHALL BE CORRECTED IMMEDIATELY BY AND AT THE CONTRACTOR'S EXPENSE.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURING ANY REQUIRED ELECTRICAL PERMITS AND INSPECTIONS.
21. THE SUBMISSION OF A BID OR PROPOSAL SHALL BE CONSIDERED AS CONCLUSIVE EVIDENCE THAT THE CONTRACTOR IS THOROUGHLY FAMILIAR WITH THE INTENT OF THE CONTRACT DOCUMENT, AND NO CHANGE ORDER WILL BE ISSUED FOR ANY ADDITIONAL LABOR OR MATERIAL REQUIRED TO RECTIFY ANY DISCREPANCY DISCOVERED OR REPORTED TO THE ENGINEER AFTER THE EXECUTION OF THE CONTRACT.
22. PROVIDE 120 VOLT A/C CIRCUITS AS REQUIRED TO SERVE AUXILIARY EQUIPMENT SUCH AS CONTROL PANELS AND SERVICE OUTLETS.
23. CONTRACTOR SHALL PROVIDE ANY TEST REPORTS AS PART OF TURNOVER PACKAGE TO THE OWNER.
24. CONDUITS SHALL BE SUPPORTED AND BRACED PER THE SMACNA "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL AND PLUMBING PIPING SYSTEMS", OR THE SUPERSTRUT "SEISMIC RESTRAINT SYSTEM".
25. ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT SHALL BE WEATHERPROOF TYPE, NEMA "3R".
26. GROUNDING: IN ADDITION TO ALL OTHER GROUNDING REQUIREMENTS, ADJACENT CABLE TRAY SECTIONS ON EACH SHALL BE SECURELY GROUNDED.
27. VAPOR-SEAL ALL CONDUITS AT POINT OF ENTRY INTO BUILDINGS OR ENCLOSURES.
28. EXPOSED EMT ACCEPTABLE FOR NEW INTERIOR 120/208V CONDUIT RUNS. COORDINATE WITH CASITAS MUNICIPAL WATER DISTRICT REPRESENTATIVE.

5' 0' 5'
HORIZ: 1"=5'
VERT: 1"=1'

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CASITAS Municipal Water District

DESIGNED: XX
DRAWN: XX
CHECKED: XX
QA/QC: XX
CONSTRUCTABILITY: XX

CONSULTING WEST ENGINEERS
30340 VIA COLINAS WESTLAKE VILLAGE CA 91362
TEL 818/889-1301 FAX 818/889-4927

PROJECT ENGINEER:
R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER ROD O. VASQUEZ Electrical STATE OF CALIFORNIA

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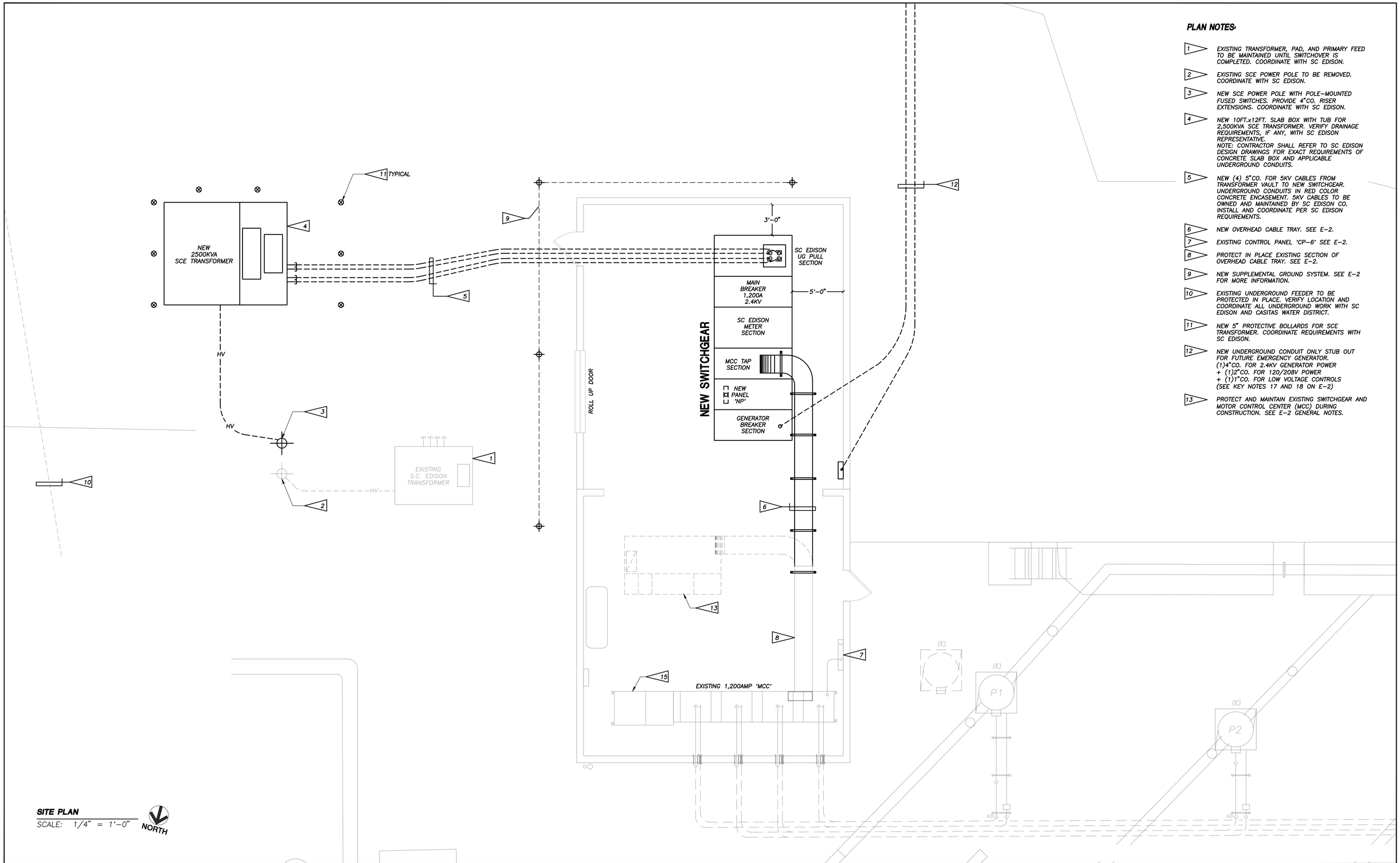
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

ELECTRICAL TITLE SHEET

PROJECT NUMBER 17-397
DRAWING NUMBER E-0
SHEET NUMBER 13 OF 21



SITE PLAN
SCALE: 1/4" = 1'-0"

PLAN NOTES:

1. EXISTING TRANSFORMER, PAD, AND PRIMARY FEED TO BE MAINTAINED UNTIL SWITCHOVER IS COMPLETED. COORDINATE WITH SC EDISON.
2. EXISTING SCE POWER POLE TO BE REMOVED. COORDINATE WITH SC EDISON.
3. NEW SCE POWER POLE WITH POLE-MOUNTED FUSED SWITCHES. PROVIDE 4"CO. RISER EXTENSIONS. COORDINATE WITH SC EDISON.
4. NEW 10FT.x12FT. SLAB BOX WITH TUB FOR 2,500KVA SCE TRANSFORMER. VERIFY DRAINAGE REQUIREMENTS, IF ANY, WITH SC EDISON REPRESENTATIVE.
   NOTE: CONTRACTOR SHALL REFER TO SC EDISON DESIGN DRAWINGS FOR EXACT REQUIREMENTS OF CONCRETE SLAB BOX AND APPLICABLE UNDERGROUND CONDUITS.
5. NEW (4) 5"CO. FOR 5KV CABLES FROM TRANSFORMER VAULT TO NEW SWITCHGEAR. UNDERGROUND CONDUITS IN RED COLOR CONCRETE ENCASEMENT. 5KV CABLES TO BE OWNED AND MAINTAINED BY SC EDISON CO. INSTALL AND COORDINATE PER SC EDISON REQUIREMENTS.
6. NEW OVERHEAD CABLE TRAY. SEE E-2.
7. EXISTING CONTROL PANEL 'CP-6' SEE E-2.
8. PROTECT IN PLACE EXISTING SECTION OF OVERHEAD CABLE TRAY. SEE E-2.
9. NEW SUPPLEMENTAL GROUND SYSTEM. SEE E-2 FOR MORE INFORMATION.
10. EXISTING UNDERGROUND FEEDER TO BE PROTECTED IN PLACE. VERIFY LOCATION AND COORDINATE ALL UNDERGROUND WORK WITH SC EDISON AND CASITAS WATER DISTRICT.
11. NEW 5" PROTECTIVE BOLLARDS FOR SCE TRANSFORMER. COORDINATE REQUIREMENTS WITH SC EDISON.
12. NEW UNDERGROUND CONDUIT ONLY STUB OUT FOR FUTURE EMERGENCY GENERATOR.
    (1)4"CO. FOR 2.4KV GENERATOR POWER
    + (1)2"CO. FOR 120/208V POWER
    + (1)1"CO. FOR LOW VOLTAGE CONTROLS
    (SEE KEY NOTES 17 AND 18 ON E-2)
13. PROTECT AND MAINTAIN EXISTING SWITCHGEAR AND MOTOR CONTROL CENTER (MCC) DURING CONSTRUCTION. SEE E-2 GENERAL NOTES.

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CASITAS Municipal Water District

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31340 VIA COLINAS SUITE 102
WESTLAKE VILLAGE CA 91362
TEL 818/889-3383 FAX 818/889-4927

PROJECT ENGINEER:
R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER — ROD O. VASQUEZ — No. Exp. — STATE OF CALIFORNIA

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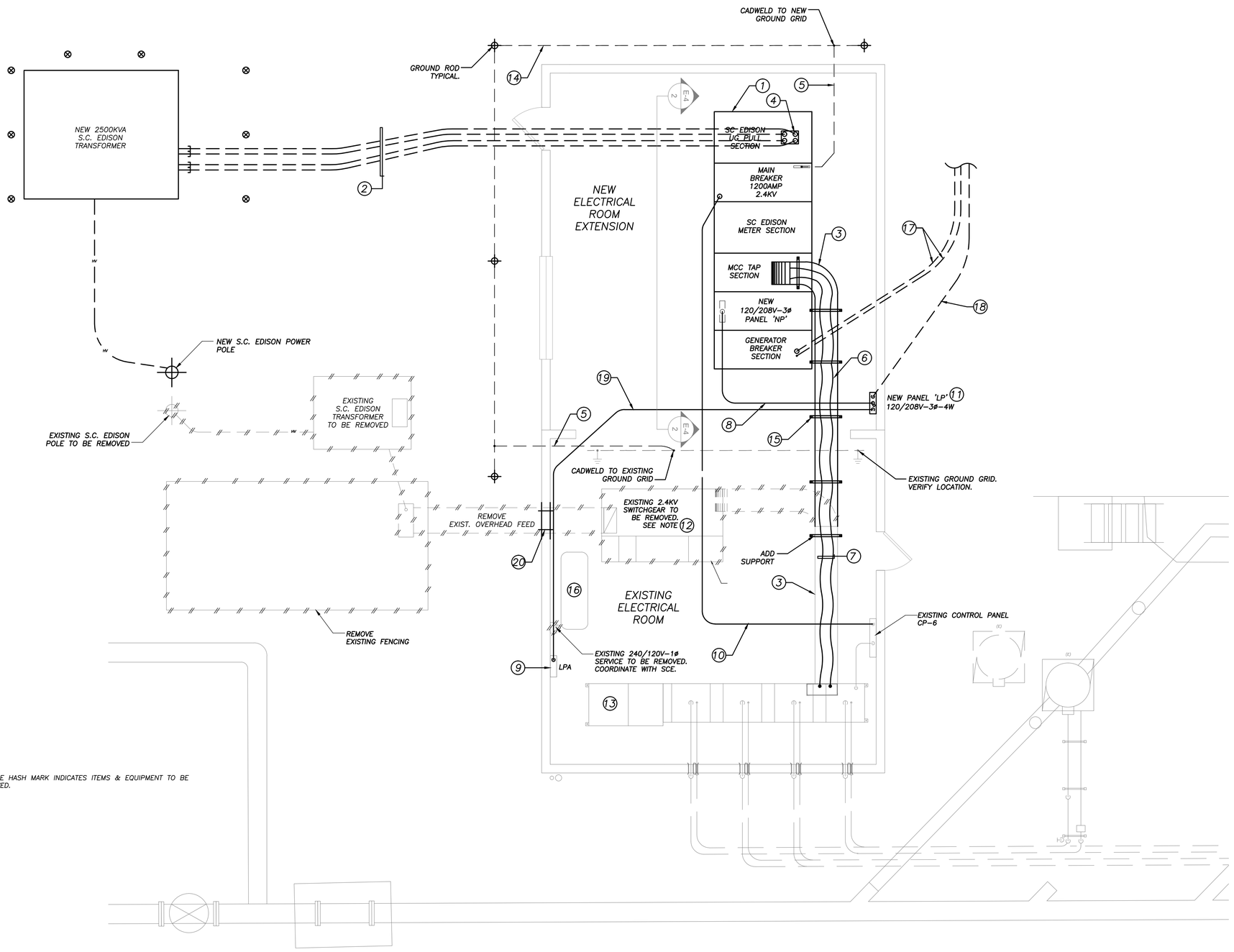
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

ELECTRICAL SITE PLAN

PROJECT NUMBER
17-397

DRAWING NUMBER
E-1

SHEET NUMBER
14 OF **21**



LEGEND:

DOUBLE HASH MARK INDICATES ITEMS & EQUIPMENT TO BE REMOVED.

NEW POWER PLAN
SCALE: 1/2" = 1'-0"

NORTH

GENERAL NOTES:

1. CONTRACTOR SHALL PROTECT AND MAINTAIN EXISTING MCC AND SWITCHGEAR DURING CONSTRUCTION. MAKE AN INSPECTION OF THE EXISTING SERVICE SWITCHGEAR AND MOTOR CONTROL CENTER. DETERMINE THE BEST METHOD OF PROTECTION USING TEMPORARY WOOD POSTS WITH PLYWOOD SHEETING ABOVE EQUIPMENT.
2. PROVIDE NEW WIRING FEEDERS AND BREAKERS FOR ALL EXISTING ELECTRICAL TO REMAIN IN SERVICE WHICH HAS ITS EXISTING SUPPLY CIRCUIT INTERRUPTED BY DEMOLITION WORK PERFORMED UNDER THIS CONTRACT. DO NOT RECONNECT TO A SOURCE WHICH COULD BE OVERLOADED BY THE ADDITION OF THIS ITEM.
3. WHERE EXISTING CONDUIT AND/OR CIRCUIT HAS BEEN INTERRUPTED BY REMOVAL OF AN OUTLET(S), WALL, OR PORTION OF THE CIRCUIT, THE REMAINING CONDUIT AND/OR CIRCUIT SHALL BE REROUTED, EXTENDED AND RECONNECTED REQUIRED TO PROVIDE CONTINUITY FOR THE CIRCUIT THAT IS TO REMAIN IN SERVICE.
4. PERFORM DEMOLITION WORK IN SEQUENCE AND IN COORDINATION WITH THE PHASING OF CONSTRUCTION FOR NEW ELECTRICAL ROOM.
5. COORDINATE WITH S.C.EDISON FOR FINAL INSPECTION. VERIFY PHASE ROTATION BEFORE RE-ENERGIZING.

KEY NOTES:

1. NEW 2.4KV-3ø-1,200AMP SWITCHGEAR, SEE SINGLE LINE SHEET E-3. CONTRACTOR SHALL HIRE THE SERVICES OF SPECIALIZED RIGGING COMPANY TO PICK UP, TRANSPORT AND PLACE SWITCHGEAR AS SHOWN. COMPLETE INSTALLATION PER PLANS.
2. NEW (4) 5" CO. UNDERGROUND, CONCRETE ENCASED, RED COLORED, PER SC EDISON REQUIREMENTS. SEE E-1.
3. NEW CABLE TRAY SYSTEM INCLUDING VERTICAL AND HORIZONTAL 90 DEGREE BENDS, BOX CONNECTOR, SPLICE PLATE, ETC. PROVIDE GROUNDING USING #4/0 COPPER CONDUCTOR.
4. CONDUIT TERMINATION AREA AT NEW SWITCHGEAR UG PULL SECTION. VERIFY EXACT LOCATION WITH DRAWINGS OF SWITCHGEAR MANUFACTURER.
5. PROVIDE NEW 250MCM CU-GND. CONDUCTOR FROM NEW AND EXISTING GROUND GRID TO NEW SWITCHGEAR GND. BUS. USE ONLY CADWELD CONNECTIONS. RISER THRU SLAB WITH PROTECTIVE CONDUIT OF 1"ø. CONTRACTOR TO VERIFY EXACT LOCATION OF GRID BEFORE PROCEEDING.
6. NEW OVERHEAD (4) SETS OF 3#250MCM 5KV CABLES + 4/0 GND. IN CABLE TRAY. TRAY TO TERMINATE IN EXISTING OVERHEAD CABLE TRAY. SEE 2/E-3 FOR MORE INFORMATION.
7. NEW 250MCM-5K CABLES ON EXISTING TRAY. PROVIDE NEW CABLE CONNECTIONS TO EXISTING 2.4KV 'MCC'. USE 5KV CABLE TERMINATIONS AND INSULATION. DE-ENERGIZE SERVICE IN COORDINATION WITH OWNER AND SC EDISON CO. BEFORE PROCEEDING. VERIFY EXACT POINT OF CONNECTIONS TO EXISTING BUS SYSTEM. PROVIDE 5KV LUGS AS REQUIRED.
8. NEW OVERHEAD 2-1/2"CO.-4#4/0 + #4 GND. (FEEDER TO 'LP').
9. EXISTING PANEL TO BE REPLACED WITH NEW 120/208-3ø-100A PANEL 'LPA'. INTERCEPT ALL EXISTING CIRCUITS, CONDUIT AND WIRE, AND RECONNECT WIRING TO NEW PANEL 'LPA'. SEE PANEL SCHEDULE ON E-6.
10. NEW OVERHEAD 3/4"CO. TO SCADA PANEL CP-6.
11. NEW 120/208-3ø-4W PANEL 'LP'. SEE PANEL SCHEDULE ON E-6.
12. AFTER SWITCHOVER IS COMPLETED, DISCONNECT AND REMOVE EXISTING SWITCHGEAR. CONTRACTOR SHALL REQUEST A POWER DOWN FROM S.C. EDISON AND PROCEED WITH REMOVAL OF SWITCHGEAR, OVERHEAD BUSWAY, CABLES, CONNECTIONS, ETC.
13. PROTECT AND MAINTAIN EXISTING ALLEN BRADLEY MOTOR CONTROL CENTER.
14. NEW SUPPLEMENTAL GROUND SYSTEM: 250MCM-CU, BARE COPPER CONDUCTOR BURIED 30" BELOW GRADE AND CONNECTED TO (4)3/4"øX10'-0" LONG DRIVEN GROUND RODS. 20'-0" MINIMUM SEPARATING DISTANCE BETWEEN RODS. VERIFY EXISTING UNDERGROUND CONDITIONS AND COORDINATE WITH CASITAS MUNICIPAL WATER DISTRICT.
15. TYPICAL CABLE TRAY SUPPORT TO CEILING. COORDINATE WITH CASITAS MUNICIPAL WATER DISTRICT.
16. PROTECT IN PLACE EXISTING COMPRESSOR.
17. NEW UNDERGROUND CONDUIT ONLY STUB OUT FOR FUTURE EMERGENCY GENERATOR. (1)4"CO. FOR 2.4KV GENERATOR POWER + (1)1"CO. FOR LOW VOLTAGE CONTROLS
18. NEW UNDERGROUND CONDUIT ONLY STUB OUT FOR FUTURE EMERGENCY GENERATOR. (1)2"CO. FOR 120/208V POWER
19. NEW 1-1/2"CO.-4#2 + 1#4 GND SUBPANEL 'LPA' OVERHEAD FEEDER.
20. INFILL OPENING AND PROVIDE 36"x30"x1/8" STEEL PLATES WITH BOLTS. PAINT FINISH AS REQUIRED.

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	XX
DRAWN:	XX
CHECKED:	XX
QA/QC:	XX
CONSTRUCTABILITY:	XX

CONSULTING WEST ENGINEERS
31340 VIA COLINAS SUITE 102
WESTLAKE VILLAGE CA 91362
TEL 818/889-3383 FAX 818/889-4927

PROJECT ENGINEER: R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER — ROD O. VASQUEZ — STATE OF CALIFORNIA

0 1/2 1 2

THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE: AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE

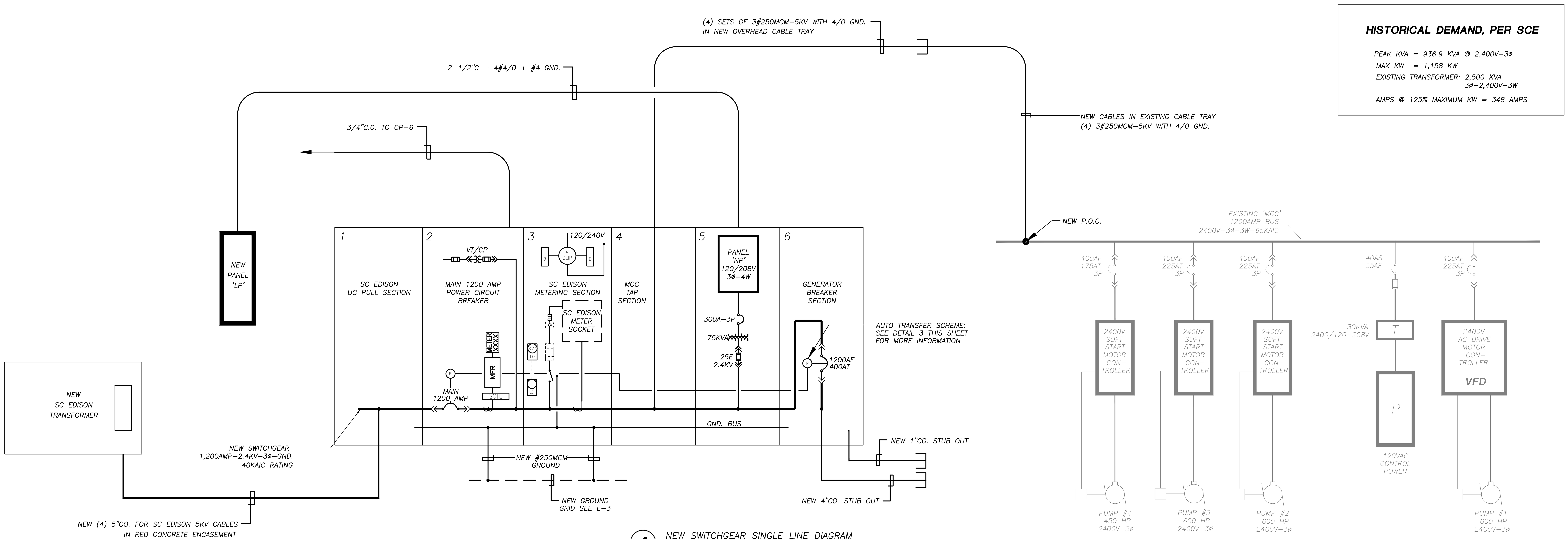
CASITAS MUNICIPAL WATER DISTRICT

NEW ELECTRICAL SERVICE PLAN

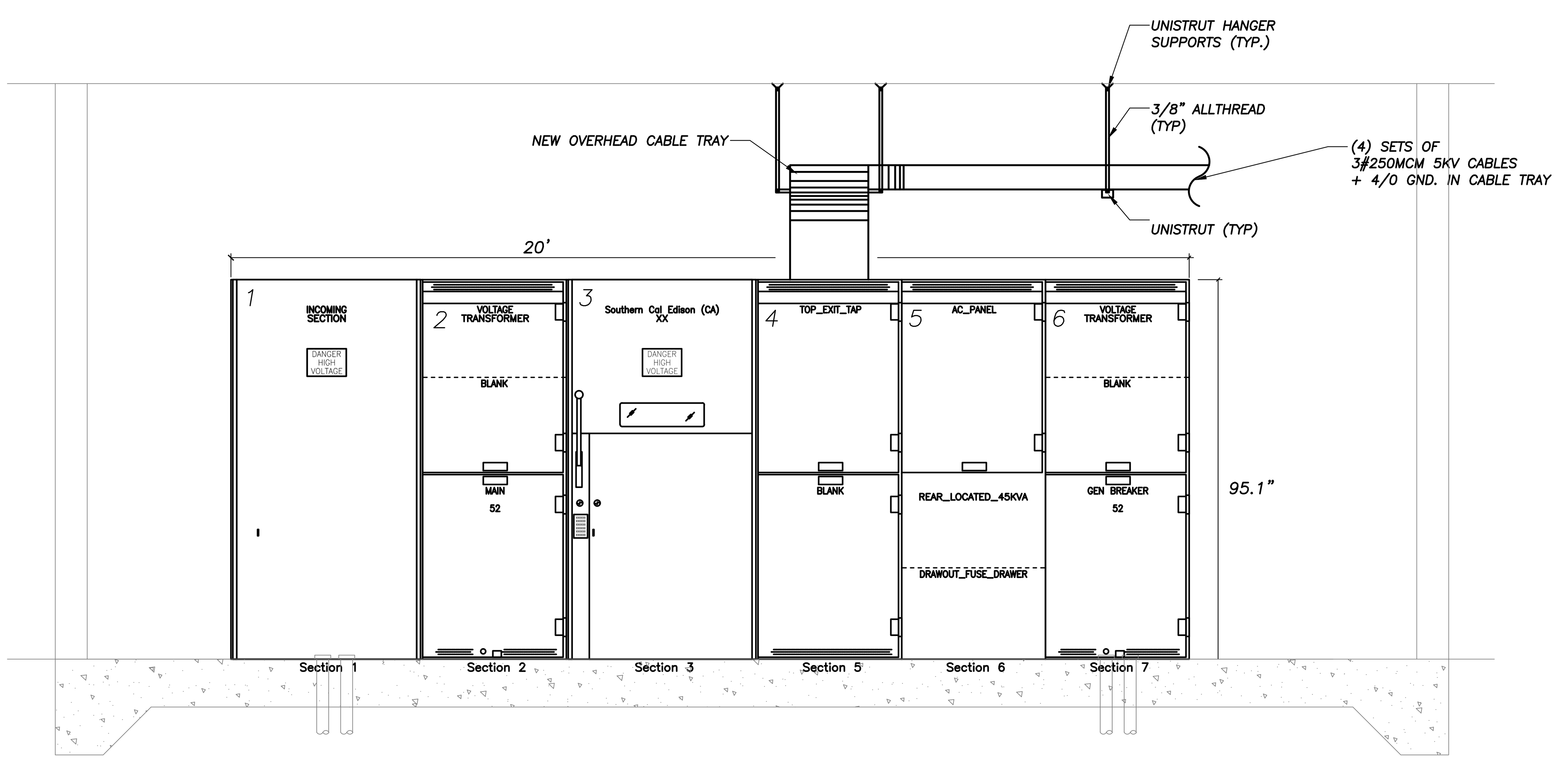
PROJECT NUMBER 17-397

DRAWING NUMBER E-2

SHEET NUMBER 15 OF 21



1 NEW SWITCHGEAR SINGLE LINE DIAGRAM
SCALE: NONE



2 ELEVATION OF NEW SWITCHGEAR AND TRANSITION SECTION
SCALE: 1/2" = 1'–0"

Automatic Transfer Scheme Specification – Utility Source – Generator Source

Dual Source, No Tie, Open Transition

The logic of the transfer system functions via a microprocessor. The set points are field adjustable without the use of special tools. Provide an HMI with min. 12" diagonal display which shows each option as it is function/status. Readouts display actual line–to–line voltage, line frequency and timers. When timers are functioning, the microprocessor displays the timer counting down. All set points can be re–programmed from the front of the logic panel when the transfer system is in the program mode. A test pushbutton is included as part of the microprocessor. The microprocessor is compatible with a Square D PowerLogic communications system.

The transfer system includes the following features:

1. Time delay normal to alternate, adjustable.
2. Time delay alternate to normal, adjustable.
3. Time delay neutral.
4. LED's to indicate normal and alternate position.
5. LED's marked "Source 1" and "Source 2" to indicate that respective source voltages are available.
6. LED's to show which source is preferred.
7. LED to show the load energized.
8. Historical transfer information via the front panel.
9. Two–position selector switch permitting two (2) modes of transfer system operation: AUTO (standard automatic operation), MANUAL (disconnects logic and allows manual operation of the main breakers with interlocking).

The alternate/emergency source is an engine generator, provide the following features:
1. Adjustable time delay engine start.
2. Adjustable time delay engine cool off.
3. Engine start contact.
4. Frequency/voltage relay for alternate source, frequency adjustable from 45 to 60 Hz and voltage fixed at 90% pickup, 70% dropout.
5. Delayed transition time delay, adjustable from 0 to 120 seconds, to allow disconnection of the load during transfer in either direction to prevent excessive inrush currents due to out–of–phase switching of large inductive loads.
6. Plant exerciser.

Sequence of operation

1. The transfer system shall automatically transfer its load circuit to an emergency or alternate power supply upon failure of its normal or preferred source.
2. Upon loss of phase–to–phase voltage of the normal source to 80% of nominal, and after a time delay, adjustable from 0.5 to 15 seconds, to override momentary dips and/or outages, a 10–ampere, 30–Vdc contact shall close to initiate starting of the emergency or standby source power plant. Transfer to the alternate source shall take place immediately upon attainment of 90% of rated voltage and frequency of that source. For schemes not involving engine generator sets as the alternate source, transfer shall occur after an adjustable time delay of 1 to 60 seconds to override momentary dips and outages.
3. When the normal source has been restored to 90% of rated voltage, and after a time delay, adjustable from 0.5 to 32 minutes (to ensure the integrity of the normal power source), the load shall be retransferred to the normal source.
4. A time delay, adjustable from 0.5 to 32 minutes, shall delay shutdown of the emergency or standby power source after retransfer to allow the generator to run unloaded for cool–down, after which the generator shall be automatically shut down.
5. If the emergency or standby power should fail while carrying the load, transfer to the normal power supply shall be made instantaneously upon restoration of the normal source to satisfactory conditions.

Manual Mode

1. Breakers may be opened and closed using control switches or pushbuttons on the transfer system display while in manual mode. Interlocking is in place to prevent the closing of both mains and the tie simultaneously.

3 AUTOMATIC TRANSFER SCHEME: UTILITY – GENERATOR
SCALE: NONE

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	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: XX
DRAWN: XX
CHECKED: XX
QA/QC: XX
CONSTRUCTABILITY: XX

CONSULTING WEST

PROJECT ENGINEER:
R.C.E. EXP.
DATE

REGISTERED PROFESSIONAL ENGINEER — ROD O. VASQUEZ — STATE OF CALIFORNIA

0 1/2 1 2
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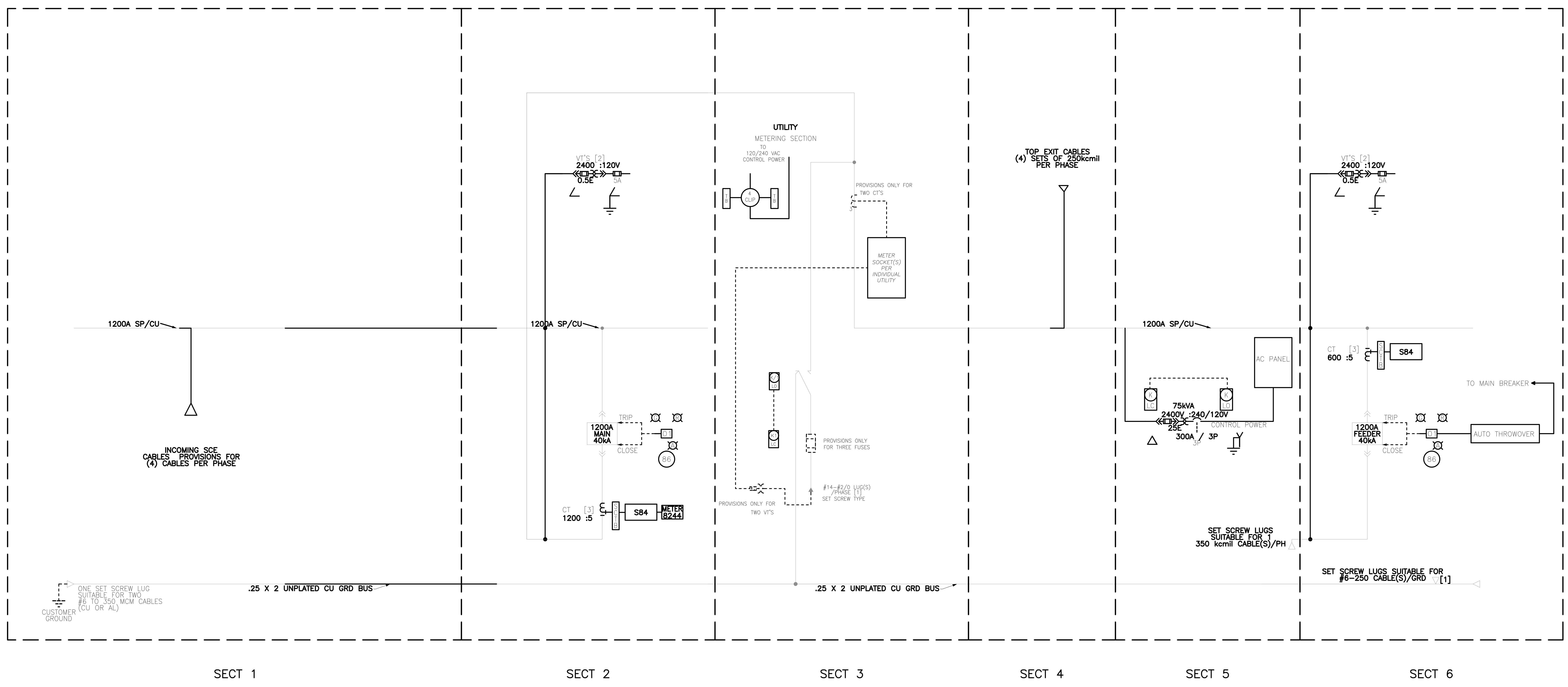
RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

SINGLE LINE DIAGRAM AND SWITCHGEAR ELEVATION

PROJECT NUMBER 17-397
DRAWING NUMBER E-3
SHEET NUMBER 16 OF 21



REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	XX
DRAWN:	XX
CHECKED:	XX
QA/QC:	XX
CONSTRUCTABILITY:	XX

CONSULTING WEST

PROJECT ENGINEER:
R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER ROD O. VASQUEZ Electrical STATE OF CALIFORNIA

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RINCON PUMP PLANT ELECTRICAL UPGRADE

CASITAS MUNICIPAL WATER DISTRICT

SWITCHGEAR MANUFACTURER - SINGLE LINE DIAGRAM

PROJECT NUMBER
17-397

DRAWING NUMBER
E-4

SHEET NUMBER
17 OF 21

Seq #	Qty	Product Description
1	1	**Designation :** Rincon New MV swgr N1 **Product Details:** 1-MetalClad Switchgear-Metal Clad Switchgear ---------- METAL CLAD Switchgear Assembly Consisting of the following: 6 Section Line-up SEPAM Software Modification Kit 1 Set of Certified Test Reports included with Final Drawings Indoor (Type 1) Label Requirements: UL With Front and Rear Access Required AC Panel - Branch Breakers per Plans and Spec If Customer Witness Testing Required, must add in separately from this Bill of Material and price in at Standard Square D daily rate. Equipment Ratings ---------- Nominal System Voltage: 2.4kV, 3 Phase, 3 Wire, Ungrounded Delta Maximum Bus Continuous Current: 1200A Maximum Short Circuit Current: 40kA (RMS Symmetrical) Maximum Voltage: 4.76KV One-Minute Withstand Voltage: 19kv RMS Impulse Withstand Voltage (BIL): 60kV Frequency: 60 Hertz Lineup Options ---------- 1 - Electric Racking Door Mount only 1 - Test Cabinet, 8 ft. cable 1 - Test Jumper, 14 ft. cable only Breaker Lift Truck Control wiring terminations: 9080G R6 Compression Type Structure Information ---------- 1200A Silver Plated Copper Main Bus Bus Bracing: 50kA (RMS Symmetrical) Bus Supports: Glass Polyester Glass Polyester Pass-Through Inserts in Glass Polyester Bus Barrier (between sections)(Std) Ground Bus: Copper, Unplated (Std) Aluminum Mechanical Lugs - AL/CU Cables Breaker Close Control Power: Square D Supplied 120VAC Breaker Trip Control Power: Square D Supplied 120VAC - 170 VDC Capacitor Trip Unit Provided Exterior Paint Color: ANSI #61, Light Gray (Std) Indication Lights - Resistor Type lamps Rear Access, Bolted Panel White Interior LV Panels Dimensions: Width of Lineup: 240.00" - 6096.00mm Height @ Highest Point: 95.10" 2416 mm Depth @ Base: 92.00" 2337 mm Special Features or TAG Items (per line-up) ---------- If Special Features are included in this

Bill of Material, they will NOT appear on the Front-Elev or One-line Drawing and may alter the final layout and dimensions.

Detailed Bill of Material

This Metal Clad Switchgear shall be depicted in the attached drawing and shall include the following:

1 - PM8244 POWER METER

Section 5 - 36W, Lower - Auxiliary
1 - 45kVA, Three Phase CPT

Section 1 - 48W, -
1 - Set Cable Termination Boots - Incoming Power Connection

Section 2 - 36W, Upper - Auxiliary
1 - VT Drawer with (2) VTs, (2) Primary Fuses per VT

Section 3 - 36W, Lower - Breaker_1200A
Catalog Number: V5D3155Y000
1 - TOC Switch Supplying 10 Additional Contacts (5a, 5b)
1 - 4.76kV Max. Voltage, 250MVA / 40KA, 1200A, Vacuum Breaker Type: VR-05025-12
1 - Breaker Control Switch 1t, 1c
1 - MOC Switch Supplying 10 Additional Contacts (5a, 5b)
1 - Capacitor-Trip Device, (20-Second Charge)
1 - Square D SEPAM Relay S84
1 - Lockout Relay - Distribution
3 - Single Ratio 1200A:5A CT - Standard Accuracy - Model 780 - Set#1
1 - Quantity Not Required Al Mech Lug for Al/Cu Cable Size Not Required
1 - 3kV Distribution Class Surge Arrester, 3 Phase Set

Section 3 - 48W, Full-height section, -
1 - 1200A Space Only for Metering Section (48"W)
Euserc Utility - Southern Cal Edison (CA)
Utility requires Ground Ball Studs
Utility does not require lugs to be provided

Section 4 - 36W, Upper – Top Exit Cable Tap

Section 6 - 36W, Upper - Auxiliary
1 - VT Drawer with (2) VTs, (2) Primary Fuses per VT

Section 6 - 36W, Lower - Breaker_1200A
Catalog Number: V5D3155Y000
1 - TOC Switch Supplying 10 Additional Contacts (5a, 5b)
1 - 4.76kV Max. Voltage, 250MVA / 40KA,

1200A, Vacuum Breaker Type: VR-05025-12
1 - Breaker Control Switch 1t, 1c
1 - MOC Switch Supplying 10 Additional Contacts (5a, 5b)
1 - Capacitor-Trip Device, (20-Second Charge)
1 - Square D SEPAM Relay S84
1 - Lockout Relay - Distribution
1 - Set Cable Termination Boots - Breaker Load
1 - Quantity 1 Al Mech Lug for Al/Cu Cable Size 350 kcmil
3 - Single Ratio 600A:5A CT - Standard Accuracy - Model 780 - Set#4

REV	DATE	BY	DESCRIPTION
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	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	XX
DRAWN:	XX
CHECKED:	XX
QA/QC:	XX
CONSTRUCTABILITY:	XX

SCHULTE-COLEMAN & WEST CONSULTING ENGINEERS
SCHULTE-COLEMAN WESTLAKE VILLAGE TEL 818/889-1383
SCOTT-WEST CA 91362 FAX 818/889-4927

PROJECT ENGINEER:
R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER — ROD O. VASQUEZ — Electrical — STATE OF CALIFORNIA

0 1/2 1 2

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SCALE:

AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE

CASITAS MUNICIPAL WATER DISTRICT

SWITCHGEAR MANUFACTURER - SPECIFICATIONS

PROJECT NUMBER **17-397**

DRAWING NUMBER **E-5**

SHEET NUMBER **18** OF **21**

NEW PANEL 'NP' IN SWITCHGEAR

120/208V–3ø–4W–GND.

PANEL 'NP' — ☒ MAIN BRKR. 300 AMPS
300 AMP
LOCATION SWITCHGEAR
MAKE/MODEL — DIMENSIONS

QUANTITY LTS	QUANTITY REC	QUANTITY MIS	LOAD NAME	CIR NO.	LOAD WATTS	BRK AMP	ø	T	LOAD/POLE A	LOAD/POLE B	LOAD/POLE C	ø	T	BRK AMP	LOAD WATTS	CIR NO.	LOAD NAME	QUANTITY MIS	QUANTITY REC	QUANTITY LTS
			SUB PANEL 'LP'	1	11220	200			11220			1		20		2	SPARE			
			–	3	11420					11420		1		20		4	SPARE			
			–	5	10952		3				10952	1		20		6	SPARE			
			SPARE	7		20	1					1		20		8	SPARE			
			SPARE	9		20	1					1		20		10	SPARE			
			SPARE	11		20	1					1		20		12	SPARE			
			SPARE	13		20	1					1		20		14	SPARE			
			SPARE	15		20	1					1		20		16	SPARE			
			SPARE	17		20	1					1		20		18	SPARE			
			SPARE	19		20	1					1		20		20	SPARE			
			SPARE	21		20	1					1		20		22	SPARE			
			SPARE	23		20	1					1		20		24	SPARE			

TOTAL LOAD/PHASE — WATTS 11220 11420 10952 — AMPS 94 95 91 — S.C. INT CAP/BKR. _____ AMPS.

L.C.L. X 125% = _____ W = _____ W
OTHER LOAD = _____ W
TOTAL = _____ 33,592 W
93 A

FEEDER CONDUCTOR SIZE: _____
CONDUIT SIZE _____

REMARKS: _____

120/208V–3ø–4W

PANEL 'LPA' (NEW) — ☐ MAIN BRKR. ____ AMPS ☐ FEED BOTTOM ☒ SURFACE
100 AMP — ☒ MAIN LUGS ONLY 100A ☒ FEED TOP ☐ FLUSH
LOCATION ELECT. ROOM — ☐ MAIN SW. ____ AMPS DIMENSIONS
MAKE/MODEL

RECONNECTED LOADS FROM PANEL 'L'

QUANTITY LTS	QUANTITY REC	QUANTITY MIS	LOAD NAME	CIR NO.	LOAD WATTS	BRK AMP	ø	T	LOAD/POLE A	LOAD/POLE B	LOAD/POLE C	ø	T	BRK AMP	LOAD WATTS	CIR NO.	LOAD NAME	QUANTITY MIS	QUANTITY REC	QUANTITY LTS
			SURGE TANK	1	1000	15	1		2500			1		20	1500	2	EXTERIOR RECEPTACLES			
			INTERIOR RECEPTACLES	3	1500	20	1			1900		1		15	400	4	SCADA PANEL CP–6			
			INTERIOR RECEPTACLES	5	1500	20	1				1900	1		20	400	6	COMPRESSOR REC,LITE,FAN			
			EXTERIOR LITES	7	500	15	1		3500			2			3000	8	COMPRESSOR			
			EDISON TOV	9	1000	20	1			4000				40	3000	10	208V–1ø–5HP			
			SPARE	11		20	1				1000	1		20	1000	12	S. INTERIOR RECEPTACLES			
			SPARE	13		20	1					1		20		14	SPARE			
			SPARE	15		20	1					1		20		16	SPARE			
			SPARE	17		20	1					1		20		18	SPARE			
			SPACE	19												20	SPACE			
			SPACE	21												22	SPACE			
			SPACE	23												24	SPACE			

RECONNECTED LOADS FROM PANEL 'L'

TOTAL LOAD/PHASE — WATTS 6000 5900 2900 — AMPS 50 49 24 — S.C. INT CAP/BKR. _____ AMPS.

L.M.L. X 125% = 6000 W = 7500 W
OTHER LOAD = _____ 8800 W
TOTAL = _____ 16300 W
45 A

FEEDER CONDUCTOR SIZE: _____
CONDUIT SIZE _____

REMARKS: _____

120/208V–3ø–4W

PANEL 'LP' (NEW) — ☐ MAIN BRKR. ____ AMPS ☐ FEED BOTTOM ☒ SURFACE
200 AMP — ☒ MAIN LUGS ONLY 200A ☒ FEED TOP ☐ FLUSH
LOCATION ELECT. ROOM — ☐ MAIN SW. ____ AMPS DIMENSIONS
MAKE/MODEL

QUANTITY LTS	QUANTITY REC	QUANTITY MIS	LOAD NAME	CIR NO.	LOAD WATTS	BRK AMP	ø	T	LOAD/POLE A	LOAD/POLE B	LOAD/POLE C	ø	T	BRK AMP	LOAD WATTS	CIR NO.	LOAD NAME	QUANTITY MIS	QUANTITY REC	QUANTITY LTS
			INTERIOR RECEPTACLES	1	720	20	1		1720			1		20	1000	2	INTERIOR/ENTRY LITES			
			EXIT SIGNAGE	3	20	20	1			3020		3		3000	4	COMPRESSOR			
			INTERIOR LIGHTING	5	1332	20	1				4332			3000	6	10HP			
			SPACE	7					3000					50	3000	8	208V–3ø			
			SPACE	9								1		20		10	SPARE			
			SPACE	11							720	1		20	720	12	INTERIOR RECEPTACLES			
			SPACE	13												14	SPACE			
			SPACE	15												16	SPACE			
			SPACE	17												18	SPACE			
			SPACE	19												20	SPACE			
			SPACE	21												22	SPACE			
			SPACE	23												24	SPACE			
			SPACE	25												26	SPACE			
			SPACE	27												28	SPACE			
			SPACE	29												30	SPACE			
			SPACE	31												32	SPACE			
			SPACE	33												34	SPACE			
			SPACE	35							500	2			500	36	FC–1			
			SUB PANEL 'LPA'	37	6000	100			6500					15	500	38	208V–1ø–1HP			
			–	39	5900					8400		2			2500	40	CU–1			
			–	41	2900		3				5400			50	2500	42	208V–1ø–25FLA			

TOTAL LOAD/PHASE — WATTS 11220 11420 10952 — AMPS 94 95 91 — S.C. INT CAP/BKR. _____ AMPS.

L.M.L. X 125% = 9000 W = 11250 W
OTHER LOAD = _____ 24592 W
TOTAL = _____ 35842 W
100 A

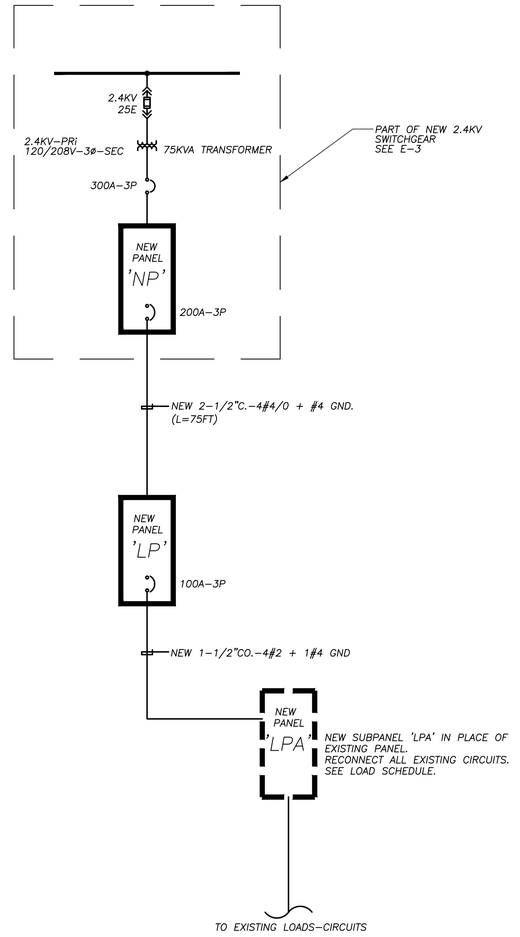
FEEDER CONDUCTOR SIZE: _____
CONDUIT SIZE _____

REMARKS: _____

1 120/208 PANEL LOAD SCHEDULES
SCALE: NONE

TYPE	SYMBOL	LAMP	DESCRIPTION	MANUFACTURER & CAT. #
A		125W LED	1X2 CEILING FIXTURE	LITHONIA # IBH–12L–MVOLT OR EQUAL
B		41W LED	EXTERIOR WALL SCONCE	HUBBEL # LNC3–24L–3K–050–U–SCP–E WITH PHOTOCELL OR EQUAL
C		5W LED	EMERGENCY EXIT SIGN	COMPASS # CCR OR EQUAL

2 LIGHTING FIXTURE SCHEDULE
SCALE: NONE



3 120/208V SINGLE LINE DIAGRAM
SCALE: NONE

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
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CASITAS Municipal Water District

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DRAWN: XX
CHECKED: XX
QA/QC: XX
CONSTRUCTABILITY: XX

CONSULTING WEST ENGINEERS
31340 VIA COLINAS, SUITE 102, WESTLAKE VILLAGE, CA 91362
TEL 818/889-3383 FAX 818/889-4927

PROJECT ENGINEER: _____ DATE _____
R.C.E. EXP.

ROD O. VASQUEZ — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

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RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

120/208V - SINGLE LINE, LOAD AND FIXTURE SCHEDULE

PROJECT NUMBER 17-397
DRAWING NUMBER E-6
SHEET NUMBER 19 OF 21

GENERAL NOTES:

1. ALL CONDUITS, OUTLETS, SWITCH BOXES, AND DEVICES TO BE SURFACE MOUNTED.

PLAN NOTES:

(1) 120V–1ø RECEPTACLE TO BE CEILING MOUNTED FOR PLUG AND CORD LIGHTING PURPOSES. COORDINATE WITH CASITAS MUNICIPAL REPRESENTATIVE.

(2) CEILING FIXTURE TO BE PLUG AND CORD CAPABLE. COORDINATE WITH CASITAS MUNICIPAL REPRESENTATIVE.

(3) SURFACE MOUNT RECEPTACLES NEAR CURRENT EXISTING DEVICES. COORDINATE WITH CMWD.

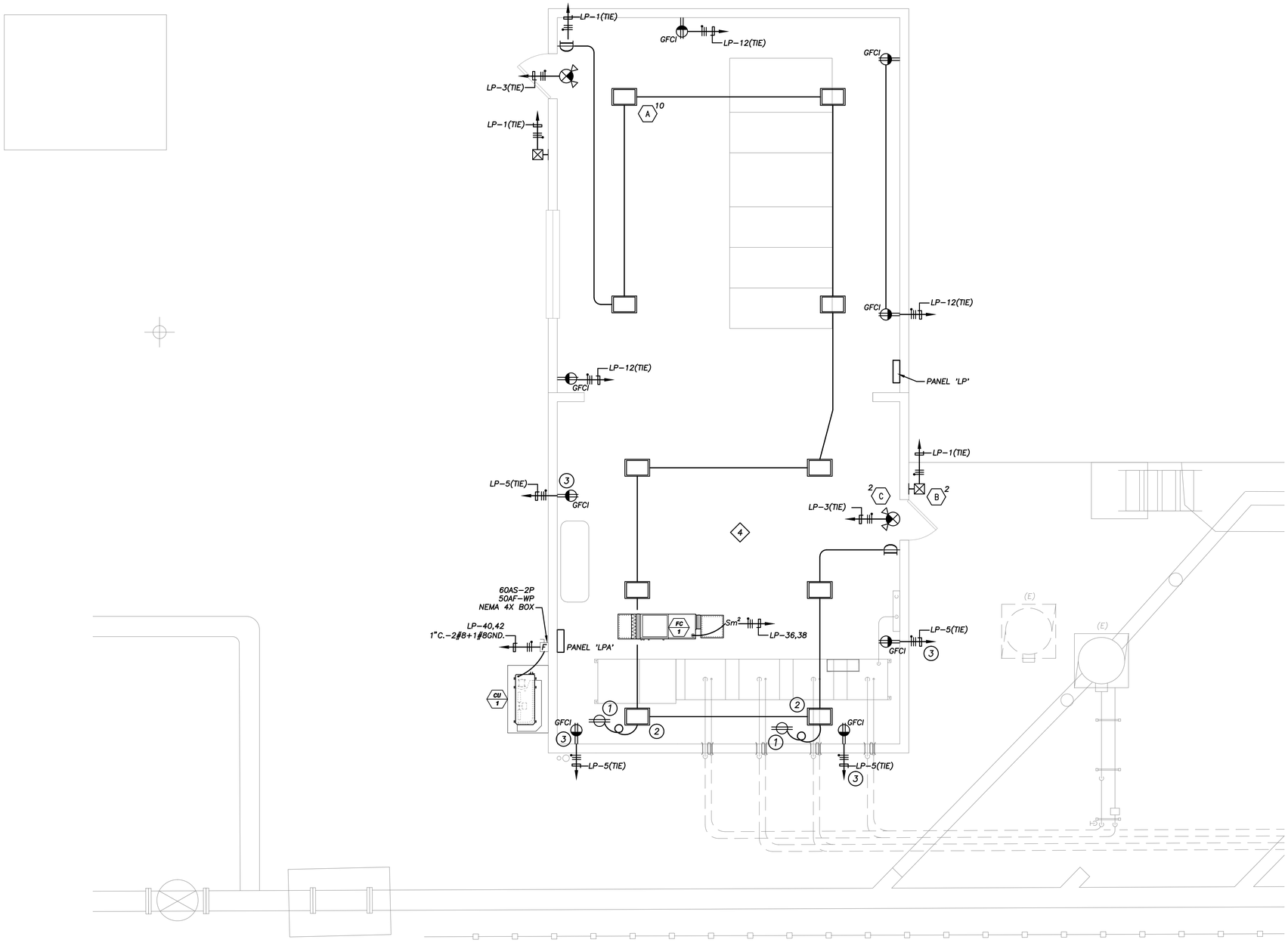
(4) DISCONNECT AND REMOVE ALL EXISTING INTERIOR LIGHTING FIXTURES, INCLUDING SWITCHES, SENSORS, AND ASSOCIATED CONDUIT AND WIRE, BACK TO SOURCE.

SYMBOL LEGEND:

120V–1ø GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE OUTLET PER TITLE 24.

TYPICAL DIMMER SWITCH.

10 A (10) FIXTURES TYPE 'A' PER LIGHTING FIXTURE SCHEDULE.



NEW ELECTRICAL PLAN

SCALE: 1/4" = 1'–0"

NORTH

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED:	XX
DRAWN:	XX
CHECKED:	XX
QA/QC:	XX
CONSTRUCTABILITY:	XX

CONSULTING WEST ENGINEERS
31340 VIA COLINAS SUITE 102
WESTLAKE VILLAGE CA 91362
TEL 818/889-5301 FAX 818/889-4927

PROJECT ENGINEER:
R.C.E. EXP.

DATE

REGISTERED PROFESSIONAL ENGINEER
ROD O. VASQUEZ
No. 72242
STATE OF CALIFORNIA

0 1/2 1 2

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RINCON PUMP PLANT ELECTRICAL UPGRADE

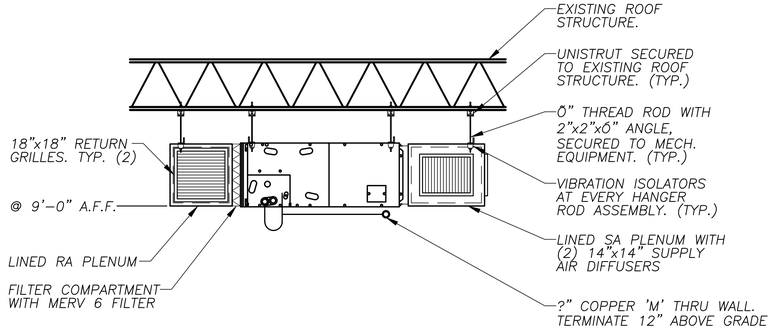
CASITAS MUNICIPAL WATER DISTRICT

NEW ELECTRICAL FLOOR PLAN

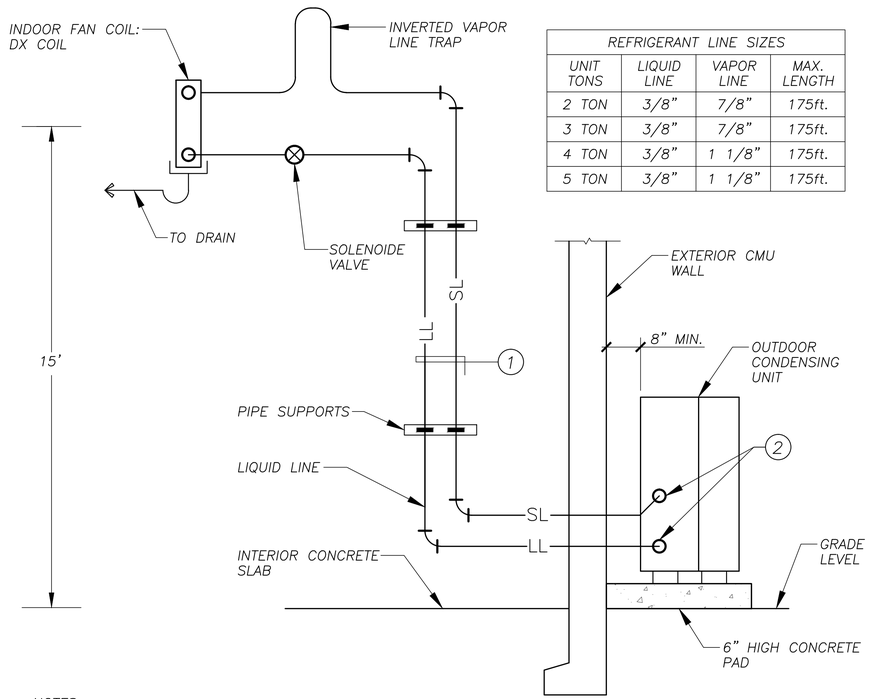
PROJECT NUMBER
17-397

DRAWING NUMBER
E-7

SHEET NUMBER
20 OF 21



2 INDOOR FAN COIL UNIT DETAIL — FC 1
SCALE: N.T.S.



REFRIGERANT LINE SIZES			
UNIT TONS	LIQUID LINE	VAPOR LINE	MAX. LENGTH
2 TON	3/8"	7/8"	175ft.
3 TON	3/8"	7/8"	175ft.
4 TON	3/8"	1 1/8"	175ft.
5 TON	3/8"	1 1/8"	175ft.

NOTES:
1. CONTRACTOR SHALL MEASURE EXACT LENGTH OF REFRIGERATION PIPING.
2. REFRIGERANT SERVICE PORTS LOCATED OUTDOORS SHALL BE FITTED WITH LOCKING TYPE TAMPER RESISTANT CAPS.

3 DX COOLING PIPING DIAGRAM
SCALE: N.T.S.

DIFFUSER / GRILLE SCHEDULE

SUPPLY AIR LEGEND

DIFFUSER TYPE	CFM	DIFFUSER SIZE
SD-1: 'TITUS' 301FS SUPPLY DIFFUSER	200cfm	12"x6"
SD-2: 'TITUS' 301FS SUPPLY DIFFUSER	600cfm	14"x14"

RETURN AIR LEGEND

GRILLE TYPE	CFM	GRILLE SIZE
RG-1: 'TITUS' 350ZRL RETURN GRILLE	900cfm	18"x18"

SPLIT AIR CONDITIONING SYSTEM SCHEDULE

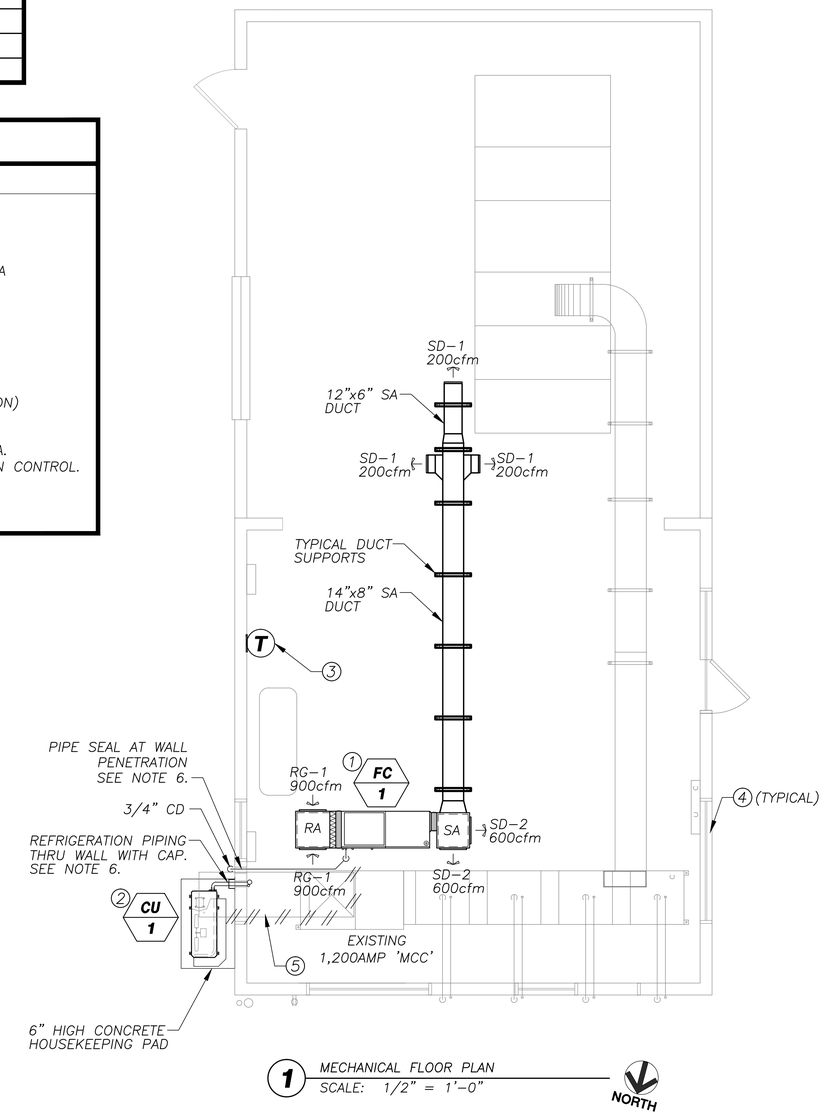
TAG	INDOOR UNIT
FC 1	INDOOR FAN COIL UNIT WITH TXV: **CARRIER FV4CNF006** HORIZONTAL MOUNT WITH FACTORY-INSTALLED TXV RATED AIR DELIVERY=1,800 CFM, MOTOR: 208V-1ø-3/4 HP. FLA=6.8, MCA=8.5, MAX FUSE=15A WEIGHT=250 LBS. PROVIDE UNIT WITH: - FILTER COMPARTMENT & MERV 6 R.A. FILTER. - PROGRAMMABLE ELECTRONIC THERMOSTAT - VIBRATION ISOLATION SUPPORTS
CU 1	OUTDOOR CONDENSING UNIT: **CARRIER 24AHA460A0030** (5 TON) WITH OEM HARD START KIT COOLING CAPACITY= 57,000 BTUH, SEER=14.5 ELECTRICAL: 208V-1ø- FLA=25.15, MCA=31.1, MAX FUSE=50A. MOUNT UNIT ON 1/2" THICK NEOPRENE MOUNT FOR VIBRATION CONTROL. UNIT WEIGHT=250 LBS. - PROVIDE UNIT WITH CORROSION RESISTIVE COATING.

PLAN NOTES:

1. NEW INDOOR FAN COIL UNIT SUSPENDED FROM CEILING STRUCTURE. SEE DETAIL 1 M-1.
2. NEW OUTDOOR CONDENSING UNIT MOUNTED ON 6" CONCRETE PAD.
3. NEW PROGRAMMABLE ROOM THERMOSTAT SET @ 75°F. PROVIDE WITH PLASTIC BACK PLATE.
4. EXISTING WINDOWS TO BE REPLACED WITH NEW DUAL PANEL, METAL FRAME WINDOWS.
5. REMOVE EXISTING EXHAUST DUCT INCLUDING THE HIGH WALL LOUVER. INFILL OPENING WITH REINFORCED CEMENT BLOCKS, AND FINISH WALL TO MATCH ADJACENT SURFACES.
6. RODENT PROOF INSTALLATION IS REQUIRED AT ALL PENETRATIONS THRU EXTERIOR WALLS. PROVIDE ADEQUATE PIPE SEALING.

NOTE: BUILDING LAYOUT/DIMENSIONS ARE FOR REFERENCE ONLY AND ARE SUBJECT TO CHANGE. COORDINATE WITH CASITAS MUNICIPAL WATER DISTRICT.

NEW ELECTRICAL ROOM
WALL INSULATION:
POLYURETHANE FOAMED-IN-PLACE INSULATION= R-8.58
ROOF INSULATION:
FIBERGLASS BATT INSULATION= R-30



1 MECHANICAL FLOOR PLAN
SCALE: 1/2" = 1'-0"

NORTH

REV	DATE	BY	DESCRIPTION
	09/14/18	CW	ISSUED FOR REVIEW
	01/29/19	CW	ISSUED FOR FINAL REVIEW
	02/04/19	CW	ISSUED FOR BIDDING

CASITAS Municipal Water District

DESIGNED: XX
DRAWN: XX
CHECKED: XX
QA/QC: XX
CONSTRUCTABILITY: XX

NEWMAN & ELECTRICAL ENGINEERS CONSULTING WEST
31340 VIA COLINAS, SUITE 102
WESTLAKE VILLAGE, CA 91362
TEL 818/889-3383 FAX 818/889-4927

PROJECT ENGINEER: R.C.E. EXP.
DATE

ROD O. VASQUEZ — REGISTERED PROFESSIONAL ENGINEER — STATE OF CALIFORNIA

0 1/2 1 2
THIS BAR IS 2 INCHES AT FULL SCALE. IF NOT 2 INCHES, THEN SCALE ACCORDINGLY.

SCALE: AS INDICATED

RINCON PUMP PLANT ELECTRICAL UPGRADE
CASITAS MUNICIPAL WATER DISTRICT

MECHANICAL FLOOR PLAN

PROJECT NUMBER 17-397
DRAWING NUMBER M-1
SHEET NUMBER 21 OF 21

APPENDIX A

STRUCTURAL CALCULATIONS

FOR

RINCON PUMP PLANT ELECTRICAL UPGRADE

VINCI & ASSOCIATES

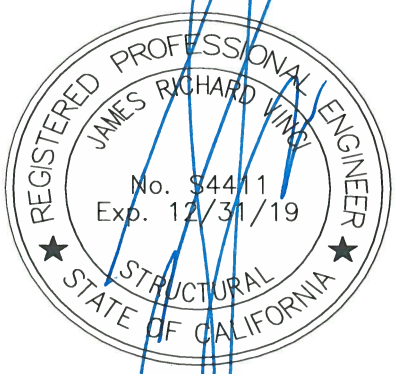
Structural Engineers

STRUCTURAL CALCULATIONS

FOR

RINCON PUMP STATION

1890 Casitas Vista Road
Ventura, California



ARCHITECT: Mainstreet Architects

PROJECT NO: 18-5564

175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360

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Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

GENERAL NOTES:

1. Workmanship and materials shall conform with the latest edition of the California Building Code as amended by the City of Ventura, California

2. General Contractor and Subcontractors shall verify all dimensions and conditions shown on the plans, prior to commencing work.

3. Foundation design is based upon geotechnical report by:
Fugro West, Inc Report No: 3310.001 Dated: Sep-03

Allowable Soil Bearing: **1000** psf

4. Material Requirements:

A.	Concrete:	f'c = 2500 psi at 28 days **No special Inspection Required**
B.	Reinforcing Steel:	ASTM A615, #4 & smaller - Grade 40, #5 & larger - Grade 60
C.	Machine Bolts:	ASTM A307
D.	Timber Fasteners:	Simpson Strongtie Inc. or approved equal.
E.	Sawn Timber:	All lumber shall be Grade Marked, No. 2 Douglas Fir or better, except as noted on plans.
F.	Glu-laminated Bms:	All Glu-laminated members shall be fabricated in accordance with Building Department Standards. A certificate of inspection is to be submitted to the Building Department prior to erection. All glu-laminated beams shall be 24F.
G.	Paralams	Fb = 2800 psi, Fv = 285 psi, E = 2,000,000 psi min
H.	Wood Sheathing:	U.S. Product Standard PS 1-09, APA Wall: APA Structural 1 rated shtg, Exposure 1 Roof: 15/32" CDX shtg, PSR 24/0, Exposure 1 Floor: 3/4" T&G underlayment shtg, PSR 32/
I.	Hardy Frame	ICBO No. PFC-5342
J.	Mech. Anchors:	Hilti HUS-H (ICC ESR-1423), Simpson Titen HD (ICC ESR-1059), Hilti Kwik Bolt TZ (ICC ESR-1917) ITW Ramset Trubolt (ICC ESR-2251) or equal.
K.	Epoxy Anchors:	Hilti HIT-RE-500-SD (ICC ESR-2322) or Simpson SET-XP (ICC ESR-2508) or equal.

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DESIGN DATA:

ROOF DESIGN LOAD:

ROOFING (Composition)	=	4	psf	
Sheathing	=	1.5		
Insulation	=	2		
B36 Deck	=	3		
Steel Purlins	=	2		
MISCELLANEOUS	=	1		
DESIGN DEAD LOAD	=	**14**	psf	
DESIGN LIVE LOAD	=	**20**	psf	reducable

WALL DEAD LOAD:

8" Solid Grouted CMU	=	84	psf	

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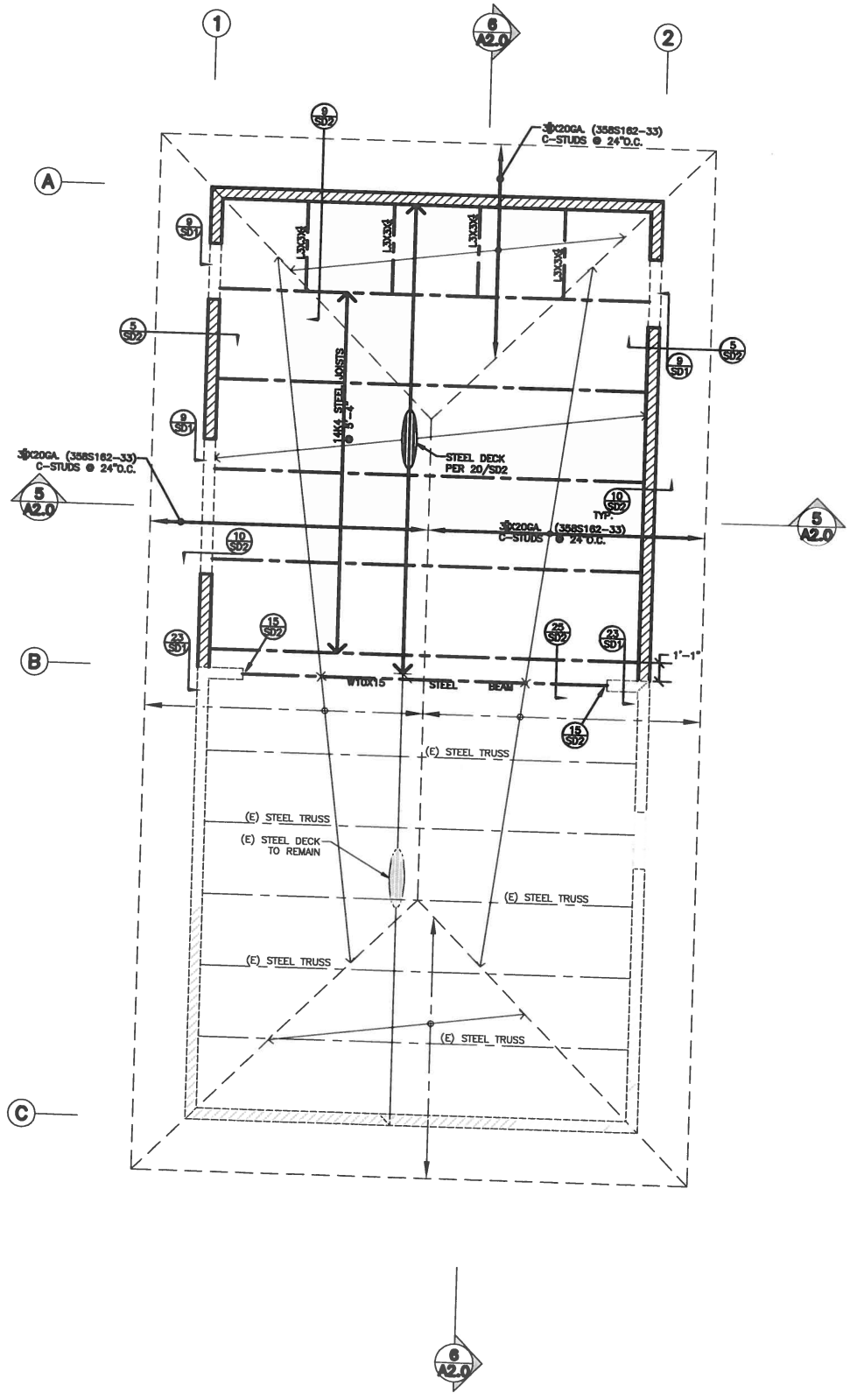


ROOF FRAMING KEY PLAN

VINCI & ASSOCIATES
Structural Engineers
31324 VIA COLINAS STE 101, WESTLAKE VILLAGE, CA 91362
p - 818.575-9531 f - 818.575-9581 e - vinci@vinciSE.com

ROOF FRAMING LOADING:

FROM PREVIOUS:	ROOF DEAD LOAD:	14	PSF
	ROOF LIVE LOAD:	20	PSF REDUCABLE

PURLIN LOADING:

TYPICAL PURLIN SPACING: 5.33 FT

PURLIN 1:

SPAN:	25.25	FT
TRIBUTARY ROOF AREA:	134.583	SQ FT
PURLIN 1 DEAD LOAD:	74.62	lb/ft
PURLIN 1 LIVE LOAD:	106.6	
PURLIN 1 TOTAL LOAD:	181.22	lb/ft

>>> USE: 14K 187 / 110 STEEL PURLIN JOISTS @ 5'-4" O.C.

14K4 STEEL PURLIN JOISTS @ 5'-4" O.C.

Description : Beam at existing wall

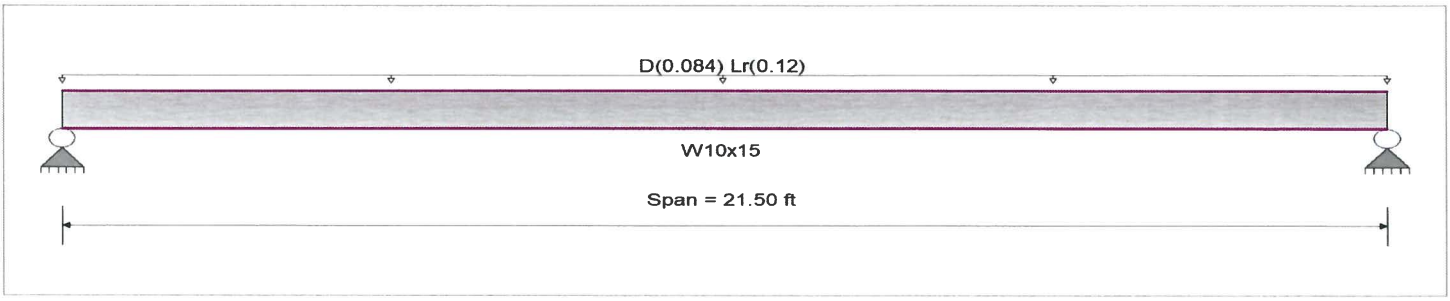
CODE REFERENCES

Calculations per AISC 360-10, IBC 2015, ASCE 7-10
Load Combination Set : IBC 2015

Material Properties

Analysis Method : Allowable Strength Design
Beam Bracing : Beam is Fully Braced against lateral-torsional buckling
Bending Axis : Major Axis Bending

Fy : Steel Yield : 36 ksi
E: Modulus : 29,000.0 ksi



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.0140, Lr = 0.020 ksf, Tributary Width = 6.0 ft, (Roof Load)

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.440 : 1	Maximum Shear Stress Ratio =	0.071 : 1
Section used for this span	W10x15	Section used for this span	W10x15
Ma : Applied	12.655 k-ft	Va : Applied	2.354 k
Mn / Omega : Allowable	28.743 k-ft	Vn/Omega : Allowable	33.120 k
Load Combination	+D+Lr+H	Load Combination	+D+Lr+H
Location of maximum on span	10.750ft	Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.290 in	Ratio =	889 >=360
Max Upward Transient Deflection	0.290 in	Ratio =	889 >=360
Max Downward Total Deflection	0.529 in	Ratio =	487 >=240
Max Upward Total Deflection	0.000 in	Ratio =	0 <240

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+D+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+L+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+Lr+H													
Dsgn. L = 21.50 ft	1	0.440	0.071	12.65		12.65	48.00	28.74	1.00	1.00	2.35	49.68	33.12
+D+S+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+0.750Lr+0.750L+H													
Dsgn. L = 21.50 ft	1	0.380	0.061	10.92		10.92	48.00	28.74	1.00	1.00	2.03	49.68	33.12
+D+0.750L+0.750S+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+0.60W+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+0.70E+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+0.750Lr+0.750L+0.450W+H													
Dsgn. L = 21.50 ft	1	0.380	0.061	10.92		10.92	48.00	28.74	1.00	1.00	2.03	49.68	33.12
+D+0.750L+0.750S+0.450W+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+D+0.750L+0.750S+0.5250E+H													
Dsgn. L = 21.50 ft	1	0.199	0.032	5.72		5.72	48.00	28.74	1.00	1.00	1.06	49.68	33.12
+0.60D+0.60W+0.60H													
Dsgn. L = 21.50 ft	1	0.119	0.019	3.43		3.43	48.00	28.74	1.00	1.00	0.64	49.68	33.12

Description : Beam at existing wall

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
+0.60D+0.70E+0.60H													
Dsgn. L = 21.50 ft	1	0.119	0.019	3.43		3.43	48.00	28.74	1.00	1.00	0.64	49.68	33.12

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr+H	1	0.5294	10.811		0.0000	0.000

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2
Overall MAXimum	2.354	2.354
Overall MINimum	0.639	0.639
+D+H	1.064	1.064
+D+L+H	1.064	1.064
+D+Lr+H	2.354	2.354
+D+S+H	1.064	1.064
+D+0.750Lr+0.750L+H	2.032	2.032
+D+0.750L+0.750S+H	1.064	1.064
+D+0.60W+H	1.064	1.064
+D+0.70E+H	1.064	1.064
+D+0.750Lr+0.750L+0.450W+H	2.032	2.032
+D+0.750L+0.750S+0.450W+H	1.064	1.064
+D+0.750L+0.750S+0.5250E+H	1.064	1.064
+0.60D+0.60W+0.60H	0.639	0.639
+0.60D+0.70E+0.60H	0.639	0.639
D Only	1.064	1.064
Lr Only	1.290	1.290
L Only		
S Only		
W Only		
E Only		
H Only		

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Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

FOUNDATION DESIGN

ALLOWABLE SOIL BEARING = 1000 psf

TYPICAL PERIMETER FOOTING @ GRIDS A

Wall Height = 13.00 ft

Dead + Live load of Roof + Tributary Dead Load of Panel

Roof: ((	5.0 ft	) x (	34.0 psf	) =	170 lb/ft
Wall: (	13 ft	) x (	84.0 psf	) =	1092
			TOTAL =		1262 lb/ft

Footing width required: 1262 plf / 1000 psf = 1.26 foot

>>>> USE: 2'-0" WIDE FOOTING AT GRIDS A

TYPICAL PERIMETER FOOTING @ GRIDS 1 & 2

Wall Height = 13.00 ft

Dead + Live load of Roof + Tributary Dead Load of Panel

Roof: ((	16 ft	) x (	34.0 psf	) =	544 lb/ft
Panels: (	13 ft	) x (	84.0 psf	) =	1092
			TOTAL =		1636 lb/ft

Footing width required: 1636 plf / 1000 psf = 1.64 foot

>>>> USE: 2'-0" WIDE FOOTING AT GRIDS 1 & 2

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LATERAL FORCES: (Base Shear Calculations - 2016 CBC)

SEISMIC:

Site Class: D (Use D if unknown)

S_1= 0.874 (Geotech Report) S_S= 2.381 (Geotech Report)

F_v = 1.5 (Table 1613.3.3(2)) F_a = 1.0 (Table 1613.3.3(1))

I = 1.0 (Table 11.5-1 ASCE 7-10)

R = 5.0 (Table 12.2-1 ASCE 7-10)

$S_{MS} = F_a * S_S$ = 2.381 (Eq. 16-37) $S_{DS} = {}^2/_3 * S_{MS}$ = 1.59 (Eq. 16-39)

$S_{M1} = F_v * S_1$ = 1.311 (Eq. 16-38) $S_{D1} = {}^2/_3 * S_{M1}$ = 0.87 (Eq. 16-40)

T_L = 8 s (Figure 22-12 ASCE 7-10)

$T = C_t * (h_n)^x$ = 0.137 s (Eq. 12.8-7) C_t = 0.02 (Table 12.8-2 ASCE 7-10)

h_n = 13.0 ft x = 0.75 (Table 12.8-2 ASCE 7-10)

****GOVERNS****

$V_{MIN} = (S_{DS}) / (R / I)$ = **0.32 W** (Eq. 12.8-2 ASCE 7-10)

NEED NOT EXCEED:

IF $T \leq T_L$ USE:

$V = (S_{D1}) / T * (R / I)$ = **1.28 W** (Eq. 12.8-3 ASCE 7-10)

IF $T > T_L$ USE:

$V = (S_{D1}) * (T_L) / T^2 * (R / I)$ = **74.59 W** (Eq. 12.8-4 ASCE 7-10)

SHALL NOT BE LESS THAN:

V = **0.01 W** (Eq. 12.8-5 ASCE 7-10)

USGS Design Maps Summary Report

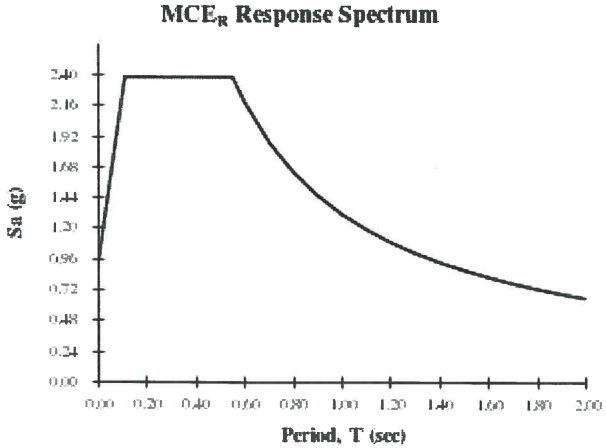
User–Specified Input

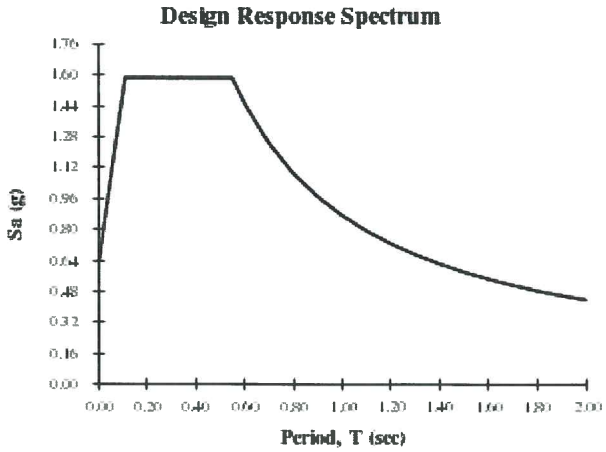
Report Title	1890 Casitas Vista Road, Ventura, Ca Thu September 13, 2018 00:05:18 UTC
Building Code Reference Document	2012/2015 International Building Code (which utilizes USGS hazard data available in 2008)
Site Coordinates	34.36855°N, 119.33784°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

S_S =	2.381 g	S_{MS} =	2.381 g	S_{DS} =	1.587 g
S_1 =	0.874 g	S_{M1} =	1.310 g	S_{D1} =	0.874 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





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Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

LATERAL FORCES: (Wall & Anchorage Forces - 2016 CBC)

SEISMIC:

Site Class: D (Use D if unknown)

S_1 = 0.874 (USGS Zipcode Tables) S_S = 2.381 (USGS Zipcode Tables)

F_v = 1.5 (Table 1613.3.3(2)) F_a = 1.0 (Table 1613.3.3(1))

I = 1.0 (Table 11.5-1 ASCE 7-10)

R = 5.0 (Table 12.2-1 ASCE 7-10)

$S_{MS} = F_a * S_S$ = 2.381 (Eq. 16-37) $S_{DS} = {}^2/_3 * S_{MS}$ = 1.59 (Eq. 16-39)

$S_{M1} = F_v * S_1$ = 1.311 (Eq. 16-38) $S_{D1} = {}^2/_3 * S_{M1}$ = 0.87 (Eq. 16-40)

T_L = 8 s (Figure 22-12 ASCE 7-10)

$T = C_t * (h_n)^x$ = 0.137 s (Eq. 12.8-7) C_t = 0.02 (Table 12.8-2 ASCE 7-10)

h_n = 13.0 ft x = 0.75 (Table 12.8-2 ASCE 7-10)

WALL DESIGN:

$F_p = .4\ S_{DS}\ I\ W$ = 0.63 W

WALL ANCHORAGE:

Per ASCE 7-10 Section 12.11.1 & 12.11.2

$F_p = .4\ S_{DS}\ k_a\ I\ W$ **W_{wall}: 84 psf**

$k_a = 1.0 + (L_f / 100)$ k_{a1} = 1.55 k_{a2} = 1.27 k_{aMAX} = 2

L_{f1} = 55.1 ft (span of diaphragm perpendicular to anchor)

L_{f2} = 26.7 ft

$F_{p1} = .4\ S_{DS}\ k_{a1}\ I\ W$ = 0.98 W*

$F_{p2} = .4\ S_{DS}\ k_{a2}\ I\ W$ = 0.80 W*

W* = The weight of the wall tributary to the anchor

$F_{pMIN1} = .2\ k_{a1}\ I\ W$ = 0.31 W*

$F_{pMIN2} = .2\ k_{a2}\ I\ W$ = 0.25 W*

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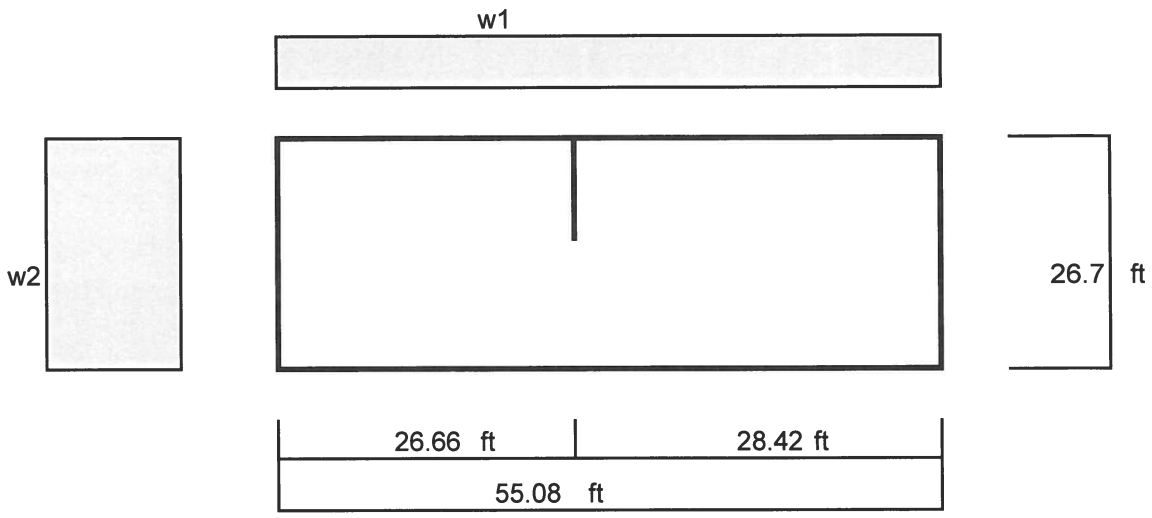
LATERAL FORCES: DIAPHRAGM ANALYSIS

V = 0.317 W



includes 5 psf part

wall height = 13.00 ft
parapet height = 0.00 ft

Roof dead load = 18.50 psf
Wall dead load = 84.00 psf

SEISMIC LOADS:

w_1 = 0.317 ((26.67 ft x 18.5 psf) + (2 x (0 ft + 6.5 ft) x 84 psf))

w_1 = 503 #/ft

w_2 = 0.317 ((55.08 ft x 18.5 psf) + (2 x (0 ft + 6.5 ft) x 84 psf))

w_2 = 670 #/ft

WIND LOADS: P = 20 psf (See other Pages)

$w_1 = w_2$ = ((0 ft x 20 psf) + (6.5 ft x 20 psf))

w_1 = 130 #/ft

w_2 = 130 #/ft

w_1 = 503 #/ft SEISMIC GOVERNS

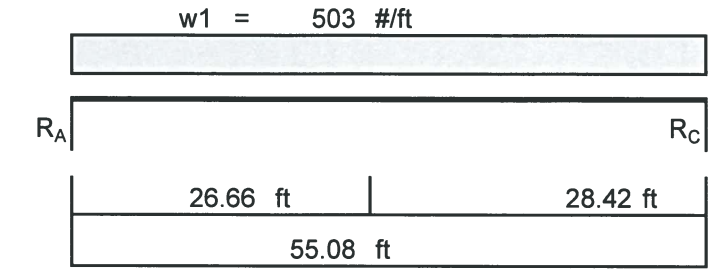
w_2 = 670 #/ft SEISMIC GOVERNS

DATE: 9/12/2018
PROJECT: Rincon Pump Station
1890 Casitas Vista Road
Ventura, California

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

DIAPHRAGM ANALYSIS:

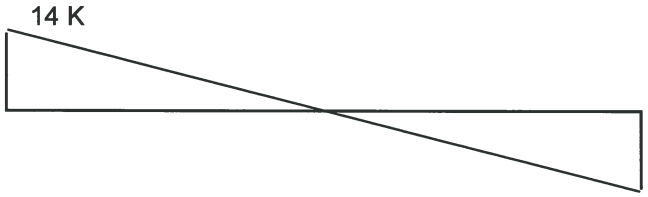
DIAPHRAGM ANALYSIS



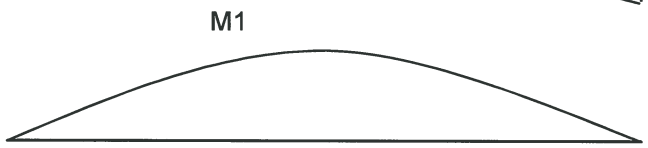
R_1 = 13861 lbs / 26.7 ft = 520 plf

R_9 = 13861 lbs / 26.7 ft = 520 plf

SHEAR (K)



MOMENT (K*FT)



M1 = 92 k-ft

DIAPHRAGM SHEAR

DISTANCE FROM GRID (ft)	DIAPHRAGM UNIT SHEAR (lb/ft)	ASD FACTOR	DIAPH DESIGN SHEAR (lb/ft)		ALLOW SHEAR (lb/ft)	DIAPHRAGM MATERIAL
0 ft	520 lb/ft	0.7	364 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
5.33 ft	419 lb/ft	0.7	293 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
10.66 ft	319 lb/ft	0.7	223 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
15.99 ft	218 lb/ft	0.7	153 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
21.32 ft	117 lb/ft	0.7	82 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
26.65 ft	17 lb/ft	0.7	12 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.

CHORD FORCES

DISTANCE FROM CENTER (ft)	CHORD FORCE (lbs)	ASD FACTOR	DIAPH DESIGN SHEAR (lb/ft)	STEEL AREA REQ'D (in^2)	ACTUAL STEEL AREA (in^2)	Description
0 ft	3464 lbs	0.7	2425 lbs	0.10	0.20	(1) #4 Bars
5.33 ft	3196 lbs	0.7	2237 lbs	0.09	0.20	(1) #4 Bars
10.66 ft	2392 lbs	0.7	1674 lbs	0.07	0.20	(1) #4 Bars

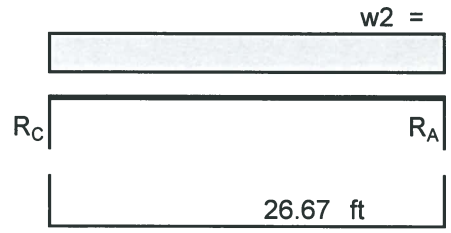
DATE: 9/12/2018
PROJECT: Rincon Pump Station
1890 Casitas Vista Road
Ventura, California

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

SHEET:
JOB NO.: 18-5564
ENGR.: JRV

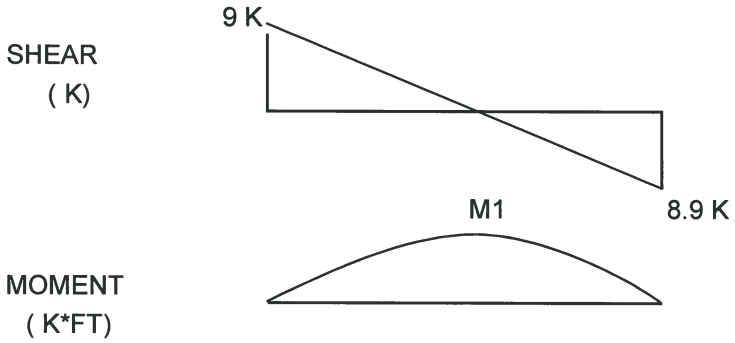
DIAPHRAGM ANALYSIS:

DIAPHRAGM ANALYSIS



RC = 8936.66 lbs / 28.4 ft = 314 plf
(use only new wall length)

RA = 8936.66 lbs / 28.4 ft = 314 plf
(use only new wall length)



M1 = 60 k-ft

DIAPHRAGM SHEAR

DISTANCE FROM GRID (ft)	DIAPHRAGM UNIT SHEAR (lb/ft)	ASD FACTOR	DIAPH DESIGN SHEAR (lb/ft)		ALLOW SHEAR (lb/ft)	SHEATHING THICKNESS & NAILING PER CBC TABLE 2306.3.1
0 ft	162 lb/ft	0.7	114 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
4 ft	114 lb/ft	0.7	80 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
8 ft	65 lb/ft	0.7	45 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.
12 ft	16 lb/ft	0.7	11 lb/ft	<	494 lb/ft	20 ga B36 Deck w/ SS Weld @ 24" o.c.

CHORD FORCES

DISTANCE FROM CENTER (ft)	CHORD FORCE (lbs)	ASD FACTOR	DIAPH DESIGN SHEAR (lb/ft)	STEEL AREA REQ'D (in^2)	ACTUAL STEEL AREA (in^2)	SHEATHING THICKNESS & NAILING PER CBC TABLE 2306.3.1
0 ft	1082 lbs	0.7	757 lbs	0.03	0.20	(1) #4 Bars
4 ft	984 lbs	0.7	689 lbs	0.03	0.20	(1) #4 Bars
8 ft	692 lbs	0.7	485 lbs	0.02	0.20	(1) #4 Bars

Bentley VINCI & ASSOCIATES

Current Date: 9/12/2018 6:28 PM
Units system: English
File name: F:\VA-MAIN\Jobs\18-5500's\18-5564 - Rincon Pump Station\CMU Bldg\Grid 1 (East Wall).msw\

Check Grid 1: East Wall – NEW ONLY

Masonry wall

GENERAL INFORMATION:

Global status : OK

Design code	:	TMS 402-13 ASD

Geometry:

Total height	:	13.00 [ft]
Total length	:	28.42 [ft]
Base support type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Materials:

Material	:	CMU 1.5-40
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	40 [Kip/in2]
Steel allowable tension strength (Fs)	:	20 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	13.00	7.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower left	3.33	0.00	3.33	7.33
Lower left	14.92	0.00	8.00	9.33

Load conditions:

ID	Comb.	Category	Description
DL	No	DL	Dead Load
LLR	No	LLR	Roof Live Load
EQ	No	EQ	Seismic
D1	Yes		DL
D2	Yes		DL+LLR
D3	Yes		DL+0.75LLR
D4	Yes		DL+0.7EQ
D5	Yes		DL+0.525EQ

D6	Yes	0.6DL+0.7EQ
S1	Yes	DL
S2	Yes	DL+LLR
S3	Yes	DL+0.75LLR
S4	Yes	DL+0.7EQ
S5	Yes	DL+0.525EQ
S6	Yes	0.6DL+0.7EQ

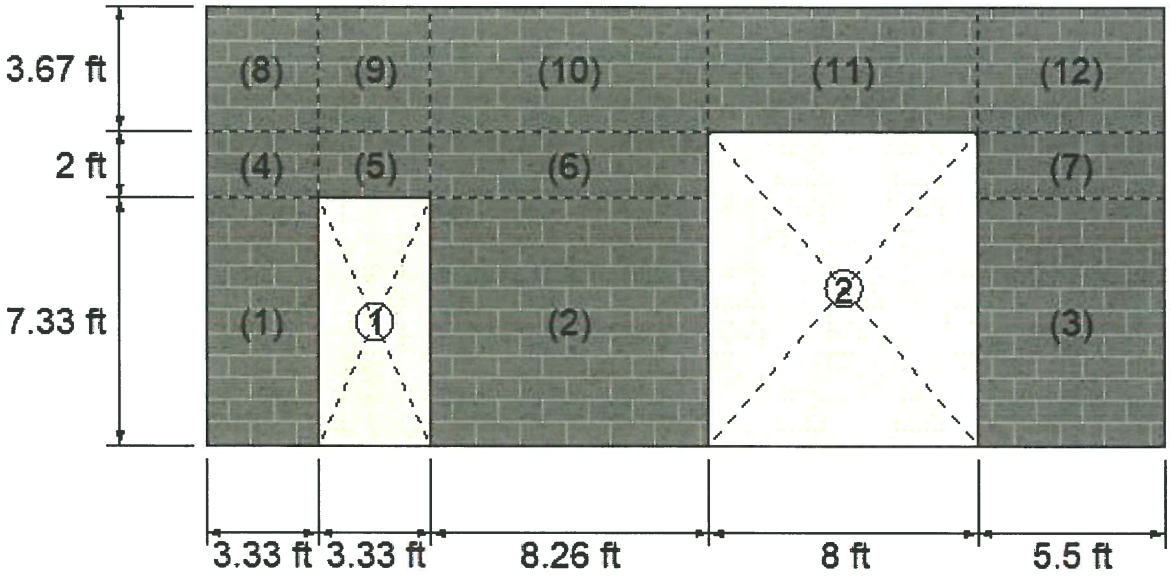
Distributed loads:

Consider self weight : DL

Story	Condition	Direction	Magnitude [Kip/ft]	Eccentricity [ft]
1	DL	Vertical	0.22	0.30
1	LLR	Vertical	0.32	0.30
1	EQ	Horizontal	0.31	0.00

BEARING WALL DESIGN:

Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	3.33	7.33
2	6.66	0.00	8.26	7.33
3	22.92	0.00	5.50	7.33
4	0.00	7.33	3.33	2.00
5	3.33	7.33	3.33	2.00
6	6.66	7.33	8.26	2.00
7	22.92	7.33	5.50	2.00
8	0.00	9.33	3.33	3.67
9	3.33	9.33	3.33	3.67
10	6.66	9.33	8.26	3.67
11	14.92	9.33	8.00	3.67
12	22.92	9.33	5.50	3.67

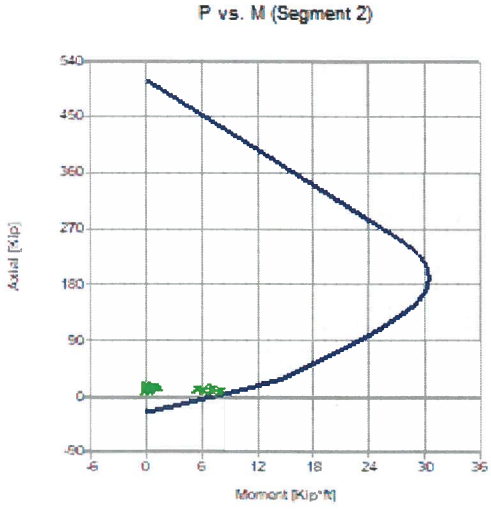
Vertical reinforcement:

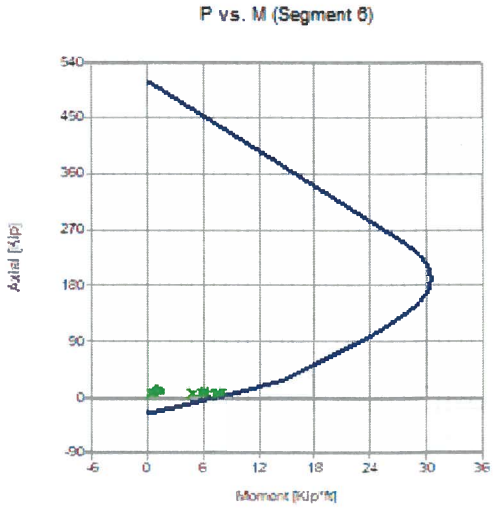
Segment	Bars	Spacing [in]	Ld [in]
1	3-#5	16.00	26.22
2	4-#5	24.00	26.22
3	3-#5	24.00	26.22
4	3-#5	16.00	26.22
5	2-#5	24.00	26.22
6	4-#5	24.00	26.22
7	3-#5	24.00	26.22
8	3-#5	16.00	26.22
9	2-#5	24.00	26.22
10	4-#5	24.00	26.22
11	4-#5	24.00	26.22
12	3-#5	24.00	26.22

Results: Combined axial flexure

Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Top)	-0.70	-3.36	4.13	0.81
2	D6(Top)	5.89	-7.86	8.87	0.89
3	D6(Top)	6.27	-5.11	6.53	0.78
4	D6(Bottom)	-0.70	-3.36	4.13	0.81
5	D6(Max)	0.66	-1.73	3.12	0.56
6	D6(Bottom)	5.89	-7.86	8.87	0.89
7	D6(Max)	5.71	-5.08	6.38	0.80
8	D6(Bottom)	-0.42	-2.07	4.20	0.49
9	D6(Bottom)	0.48	-1.70	3.07	0.55
10	D6(Bottom)	4.88	-6.11	8.60	0.71
11	D4(Max)	2.44	-1.70	7.71	0.22
12	D6(Bottom)	3.66	-4.57	5.83	0.78

Interaction diagrams, P vs. M:





Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	D2(Bottom)	6.80	84.86	0.08
2	D2(Bottom)	18.76	210.67	0.09
3	D2(Bottom)	12.08	140.27	0.09
4	D2(Bottom)	4.63	84.86	0.05
5	D2(Top)	1.85	84.93	0.02
6	D2(Bottom)	13.77	210.67	0.07
7	D2(Bottom)	9.48	140.27	0.07
8	D2(Bottom)	3.07	84.86	0.04
9	D2(Top)	1.98	84.93	0.02
10	D2(Bottom)	10.36	210.67	0.05
11	D2(Top)	4.74	204.03	0.02
12	D2(Bottom)	7.27	140.27	0.05

Results: Axial tension

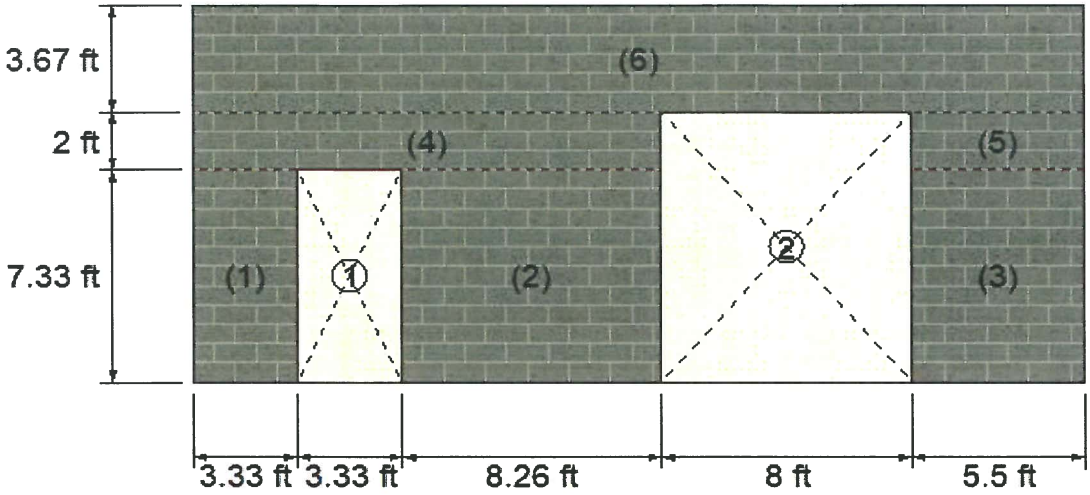
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D6(Max)	1.54	20.00	0.08
2	D1(Top)	0.00	20.00	0.00
3	D1(Top)	0.00	20.00	0.00
4	D6(Bottom)	0.90	20.00	0.05
5	D1(Top)	0.00	20.00	0.00
6	D1(Top)	0.00	20.00	0.00
7	D1(Top)	0.00	20.00	0.00
8	D6(Bottom)	0.54	20.00	0.03
9	D1(Top)	0.00	20.00	0.00
10	D1(Top)	0.00	20.00	0.00
11	D1(Top)	0.00	20.00	0.00
12	D1(Top)	0.00	20.00	0.00

Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Max)	0.005	0.044	0.11
2	D6(Max)	0.005	0.049	0.09
3	D6(Max)	0.005	0.050	0.09
4	D6(Max)	0.003	0.044	0.07
5	D4(Bottom)	0.004	0.044	0.10
6	D6(Max)	0.002	0.047	0.04
7	D6(Top)	0.001	0.047	0.03
8	D6(Max)	0.004	0.044	0.10
9	D6(Max)	0.004	0.044	0.09
10	D6(Max)	0.005	0.046	0.10
11	D6(Max)	0.002	0.045	0.04
12	D4(Top)	0.004	0.045	0.10

SHEAR WALL DESIGN:

Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	3.33	7.33
2	6.66	0.00	8.26	7.33
3	22.92	0.00	5.50	7.33
4	0.00	7.33	14.92	2.00
5	22.92	7.33	5.50	2.00
6	0.00	9.33	28.42	3.67

Reinforcement:

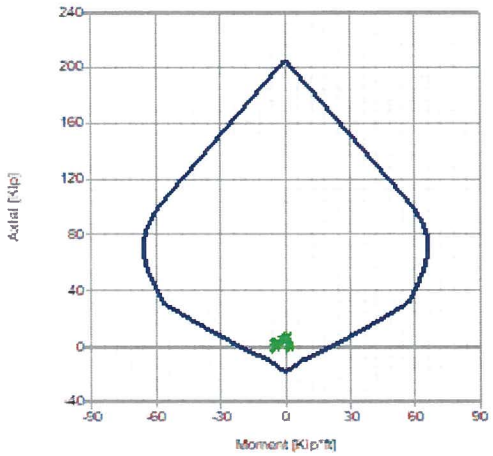
	Vertical reinforcement			Horizontal reinforcement		
Segment	Bars	Spacing [in]	Ld [in]	Bars	Spacing [in]	Ld [in]
1	3-#5	16.00	0.00	--	0.00	0.00
2	4-#5	24.00	0.00	--	0.00	0.00
3	3-#5	24.00	0.00	--	0.00	0.00
4	3-#5	16.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
5	3-#5	24.00	0.00	--	0.00	0.00
6	3-#5	16.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	3-#5	24.00	0.00	--	0.00	0.00

Results: Combined axial flexure

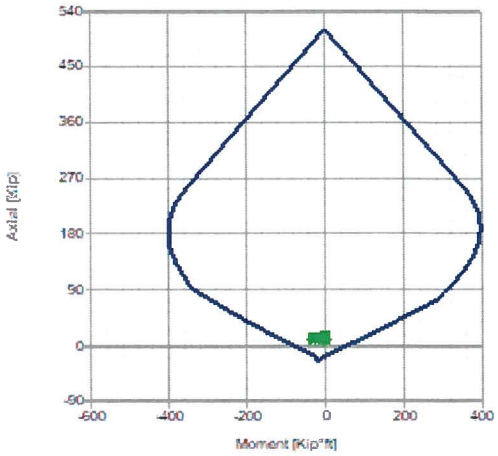
Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Bottom)	-0.21	-5.07	20.63	0.25
2	D6(Bottom)	10.20	-33.48	110.86	0.30
3	D6(Bottom)	7.16	-15.25	54.65	0.28
4	D4(Bottom)	10.04	-25.58	363.69	0.07
5	D4(Max)	7.71	8.71	47.55	0.18
6	D6(Bottom)	9.20	-27.77	1061.94	0.03

Interaction diagrams, P vs. M:

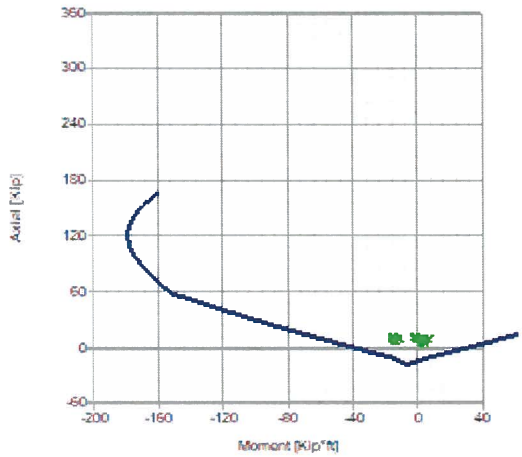
P vs. M (Segment 1)



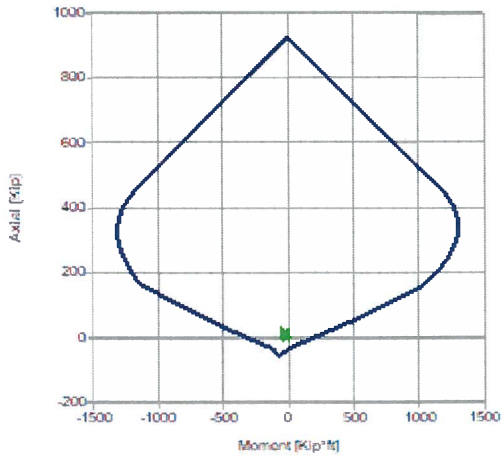
P vs. M (Segment 2)



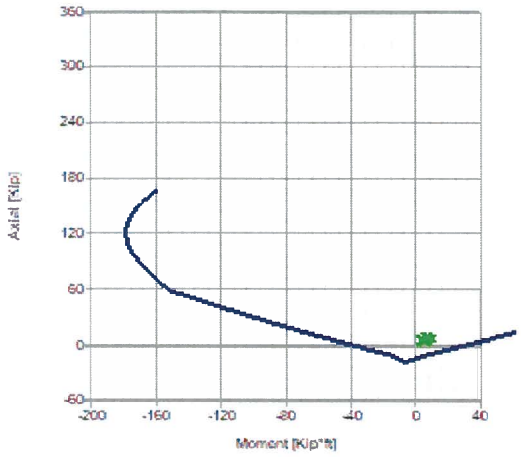
P vs. M (Segment 3)



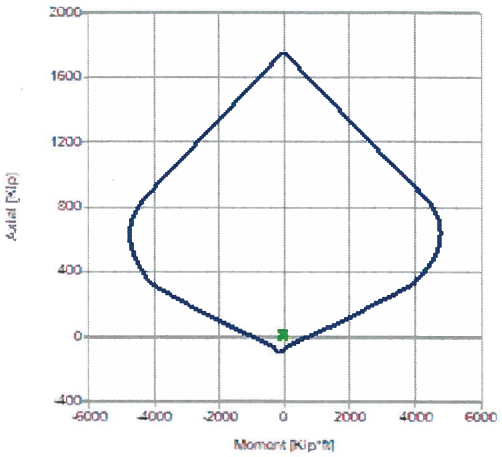
P vs. M (Segment 4)



P vs. M (Segment 5)



P vs. M (Segment 6)



Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	D2(Max)	6.83	84.81	0.08
2	D2(Bottom)	18.76	210.68	0.09
3	D2(Bottom)	12.08	140.25	0.09
4	D2(Bottom)	18.83	380.39	0.05
5	D2(Bottom)	9.45	140.25	0.07
6	D2(Bottom)	24.78	724.68	0.03

Results: Axial tension

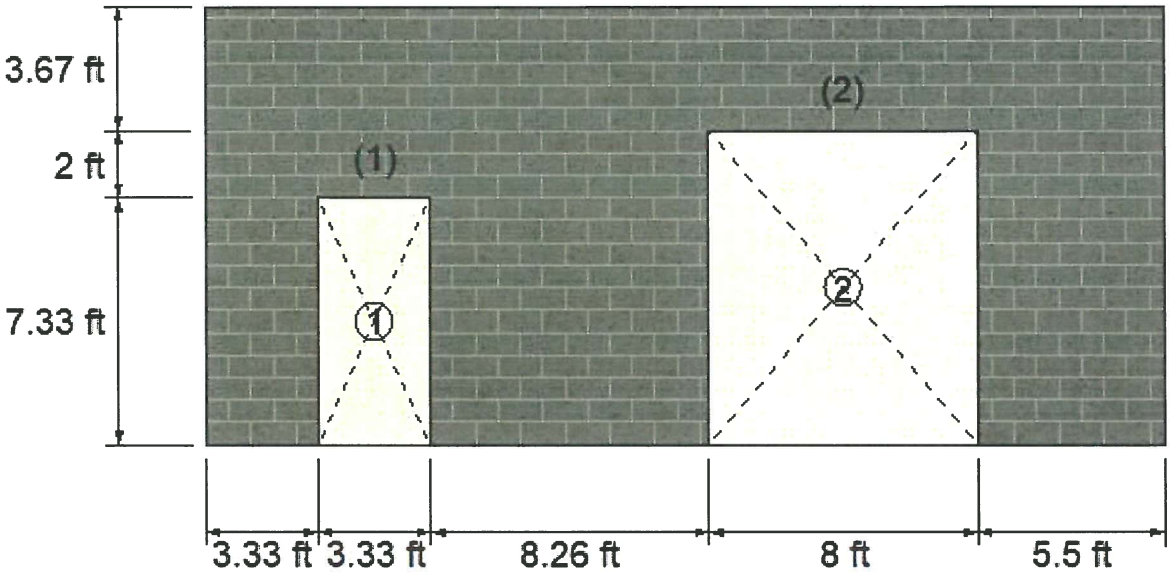
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D6(Max)	0.83	20.00	0.04
2	D1(Top)	0.00	20.00	0.00
3	D1(Top)	0.00	20.00	0.00
4	D1(Top)	0.00	20.00	0.00
5	D1(Top)	0.00	20.00	0.00
6	D1(Top)	0.00	20.00	0.00

Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Max)	0.006	0.044	0.14
2	D6(Bottom)	0.010	0.059	0.16
3	D4(Bottom)	0.008	0.053	0.15
4	D6(Max)	0.005	0.072	0.07
5	D4(Max)	0.007	0.063	0.11
6	D6(Max)	0.003	0.075	0.04

LINTEL DESIGN:

Status : OK



Geometry:

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	3.33	0.00	3.33	24.00
2	14.92	0.00	8.00	24.00

Reinforcement:

Lintel	Top long. reinforcement Bars	Top long. reinforcement Extent [in]	Bottom long. reinforcement Bars	Bottom long. reinforcement Extent [in]	Transverse reinforcement Bars	Transverse reinforcement Spacing [in]	Ld [in]
1	1-#4	0.50	1-#4	0.00	--	0.00	0.00
2	1-#4	15.00	1-#4	0.00	--	0.00	0.00

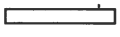
Results: Bending

Lintel	Condition	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Bottom)	-0.39	6.76	0.06
2	D4(Top)	4.78	6.76	0.71

Results: Shear

Lintel	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D4(Bottom)	0.010	0.044	0.22
2	D4(Top)	0.021	0.044	0.48

Results: Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio	
1		0.00	0.00	0.00	
2		0.00	0.00	0.00	

Notes:

* P = Axial load
* Pa = Allowable compressive force due to axial load.
* M = Moment at the section under consideration.
* Ma = Wall allowable moment due to axial force or lintel pure flexure allowable moment
* fa = Calculated compressive stress due to axial load only
* fb = Calculated compressive stress due to axial flexure only
* ft = Calculated axial tension
* Fa = Allowable compressive stress due to axial load only
* Fb = Allowable compressive stress due to axial flexure only
* fv = Calculated shear stress
* Fs = Allowable tensile or compressive stress
* Fv = Allowable shear stress
* ld = Embedment length
* As = Effective cross sectional area of reinforcement
* δs = Calculated deflection
* δmax = Maximum allowable deflection

Bentley

Current Date: 11/5/2018 11:47 AM
Units system: English
File name: F:\VA-MAIN\Jobs\18-5500's\18-5564 - Rincon Pump Station\CMU Bldg\Grid 2 (West Wall).msw\

Check Grid 2: West Wall – NEW ONLY

Masonry wall

GENERAL INFORMATION:

Global status : OK

Design code	:	TMS 402-13 ASD

Geometry:

Total height	:	13.00 [ft]
Total length	:	28.42 [ft]
Base support type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Materials:

Material	:	CMU 1.5-40
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	40 [Kip/in2]
Steel allowable tension strength (Fs)	:	20 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	13.00	9.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Lower right	4.00	9.25	7.00	2.75
Lower left	5.75	9.25	7.00	2.75

Load conditions:

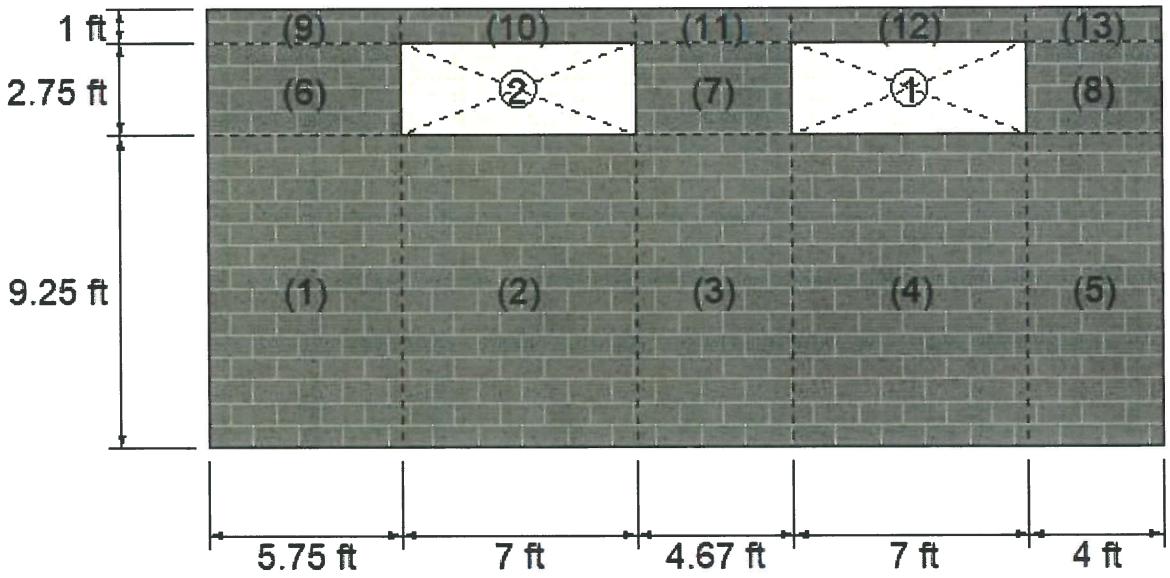
ID	Comb.	Category	Description
DL	No	DL	Dead Load
LLR	No	LLR	Roof Live Load
EQ	No	EQ	Seismic
D1	Yes		DL
D2	Yes		DL+LLR
D3	Yes		DL+0.75LLR
D4	Yes		DL+0.7EQ
D5	Yes		DL+0.525EQ
D6	Yes		0.6DL+0.7EQ
S1	Yes		DL
S2	Yes		DL+LLR

S3	Yes	DL+0.75LLR
S4	Yes	DL+0.7EQ
S5	Yes	DL+0.525EQ
S6	Yes	0.6DL+0.7EQ

Distributed loads:
Consider self weight : DL

Story	Condition	Direction	Magnitude [Kip/ft]	Eccentricity [ft]
1	DL	Vertical	0.22	0.30
1	LLR	Vertical	0.32	0.30
1	EQ	Horizontal	0.31	0.00

BEARING WALL DESIGN:
Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	5.75	9.25
2	5.75	0.00	7.00	9.25
3	12.75	0.00	4.67	9.25
4	17.42	0.00	7.00	9.25
5	24.42	0.00	4.00	9.25
6	0.00	9.25	5.75	2.75
7	12.75	9.25	4.67	2.75
8	24.42	9.25	4.00	2.75
9	0.00	12.00	5.75	1.00
10	5.75	12.00	7.00	1.00
11	12.75	12.00	4.67	1.00
12	17.42	12.00	7.00	1.00
13	24.42	12.00	4.00	1.00

Vertical reinforcement:

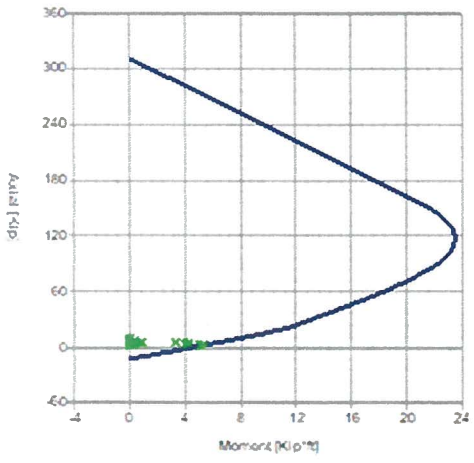
Segment	Bars	Spacing [in]	Ld [in]
1	5-#5	16.00	26.22
2	4-#5	24.00	26.22
3	4-#5	16.00	26.22
4	4-#5	24.00	26.22
5	2-#5	24.00	26.22
6	5-#5	16.00	26.22
7	4-#5	16.00	26.22
8	2-#5	24.00	26.22
9	5-#5	16.00	26.22
10	4-#5	24.00	26.22
11	4-#5	16.00	26.22
12	4-#5	24.00	26.22
13	2-#5	24.00	26.22

Results: Combined axial flexure

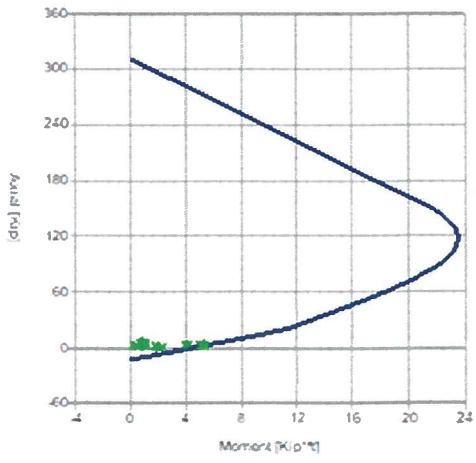
Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Top)	1.88	-7.33	10.15	0.72
2	D6(Max)	2.22	-5.92	8.64	0.68
3	D6(Top)	2.87	-8.18	8.70	0.94
4	D6(Max)	3.25	-6.00	9.00	0.67
5	D6(Top)	2.50	-5.16	5.36	0.96
6	D6(Bottom)	1.88	-7.33	10.15	0.72
7	D6(Bottom)	2.87	-8.18	8.70	0.94
8	D6(Max)	2.59	-5.35	5.39	0.99
9	D4(Bottom)	1.59	-2.81	10.05	0.28
10	D2(Top)	5.44	-1.14	9.75	0.12
11	D4(Bottom)	1.81	-3.06	8.34	0.37
12	D2(Top)	3.55	-1.14	9.10	0.13
13	D4(Bottom)	1.64	-2.28	5.07	0.45

Interaction diagrams, P vs. M:

P vs. M (Segment 5)



P vs. M (Segment 8)



Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	D2(Bottom)	11.26	208.72	0.05
2	D2(Bottom)	10.98	254.27	0.04
3	D2(Top)	8.48	169.52	0.05
4	D2(Bottom)	11.13	254.27	0.04
5	D4(Bottom)	10.18	145.30	0.07
6	D2(Bottom)	7.71	208.72	0.04
7	D2(Bottom)	8.48	169.52	0.05
8	D2(Max)	6.30	145.30	0.04
9	D2(Max)	3.03	208.72	0.01
10	D2(Bottom)	5.76	254.27	0.02
11	D2(Top)	3.38	169.52	0.02
12	D2(Bottom)	7.07	254.27	0.03
13	D2(Bottom)	3.52	145.30	0.02

Results: Axial tension

Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D1(Top)	0.00	20.00	0.00
2	D1(Top)	0.00	20.00	0.00
3	D1(Top)	0.00	20.00	0.00
4	D1(Top)	0.00	20.00	0.00
5	D1(Top)	0.00	20.00	0.00
6	D1(Top)	0.00	20.00	0.00
7	D1(Top)	0.00	20.00	0.00
8	D1(Top)	0.00	20.00	0.00
9	D1(Top)	0.00	20.00	0.00
10	D1(Top)	0.00	20.00	0.00
11	D1(Top)	0.00	20.00	0.00
12	D1(Top)	0.00	20.00	0.00
13	D1(Top)	0.00	20.00	0.00

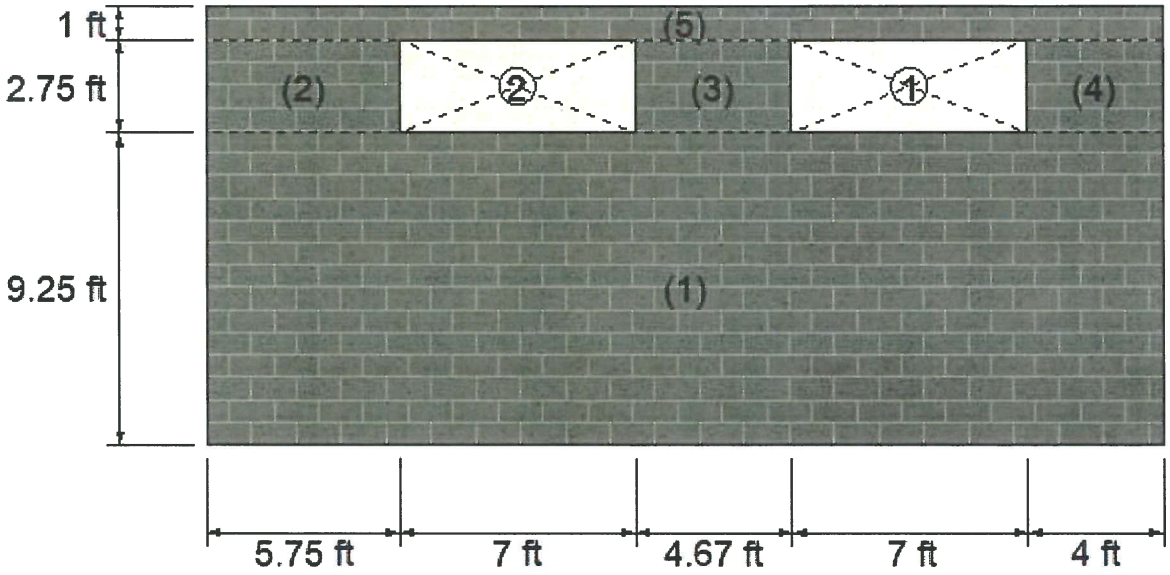
Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Top)	0.004	0.045	0.09
2	D4(Top)	0.005	0.044	0.12
3	D6(Top)	0.006	0.046	0.14
4	D4(Top)	0.006	0.045	0.12
5	D6(Max)	0.004	0.048	0.07
6	D4(Top)	0.006	0.045	0.13
7	D4(Top)	0.007	0.045	0.16
8	D6(Top)	0.005	0.045	0.11
9	D4(Max)	0.006	0.044	0.14
10	D6(Bottom)	0.003	0.046	0.06

11	D4(Max)	0.011	0.045	0.25
12	D2(Max)	0.002	0.045	0.05
13	D4(Max)	0.007	0.045	0.16

SHEAR WALL DESIGN:

Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	28.42	9.25
2	0.00	9.25	5.75	2.75
3	12.75	9.25	4.67	2.75
4	24.42	9.25	4.00	2.75
5	0.00	12.00	28.42	1.00

Reinforcement:

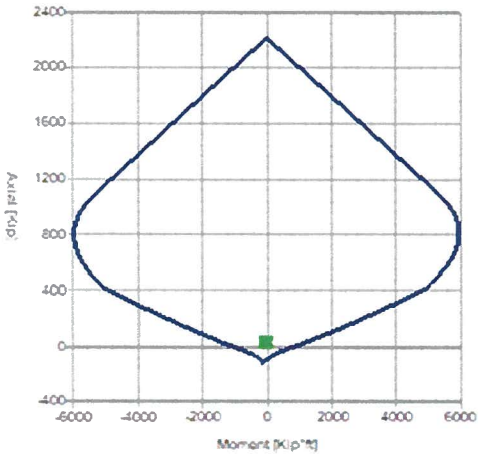
	Vertical reinforcement			Horizontal reinforcement		
Segment	**Bars**	**Spacing** [in]	**Ld** [in]	**Bars**	**Spacing** [in]	**Ld** [in]
1	5-#5	16.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	4-#5	16.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00
2	5-#5	16.00	0.00	--	0.00	0.00
3	4-#5	16.00	0.00	--	0.00	0.00
4	2-#5	24.00	0.00	--	0.00	0.00
5	5-#5	16.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	4-#5	16.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00

Results: Combined axial flexure

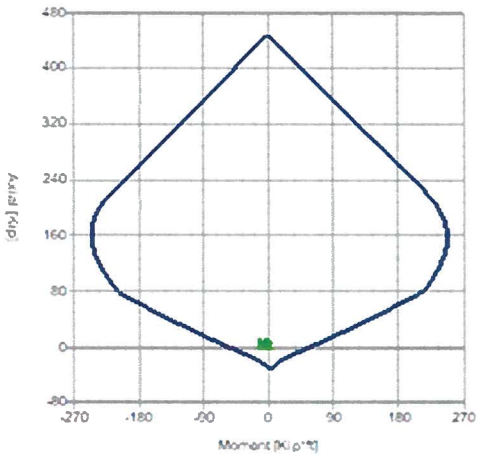
Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Bottom)	24.09	-118.15	1331.57	0.09
2	D4(Max)	3.83	-9.13	62.32	0.15
3	D6(Max)	2.90	-7.06	42.70	0.17
4	D2(Max)	6.30	6.82	24.44	0.28
5	D2(Max)	14.73	36.81	1017.76	0.04

Interaction diagrams, P vs. M:

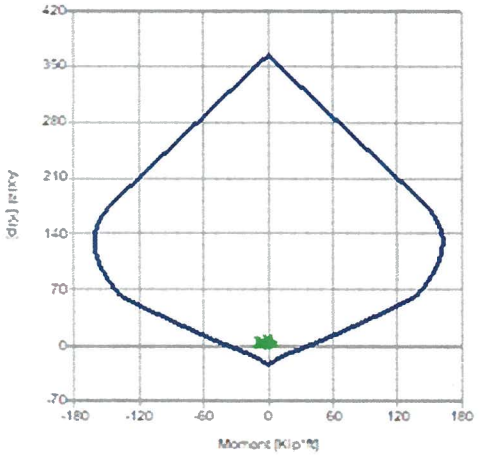
P vs. M (Segment 1)



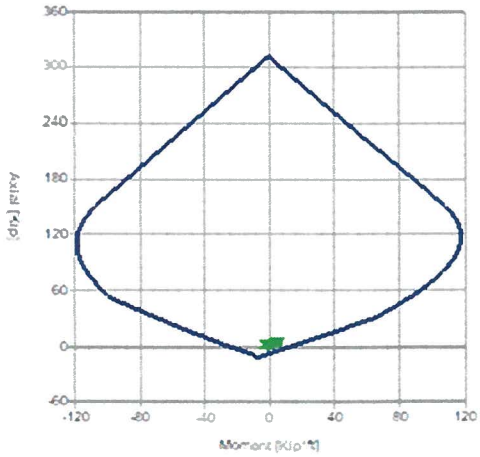
P vs. M (Segment 2)

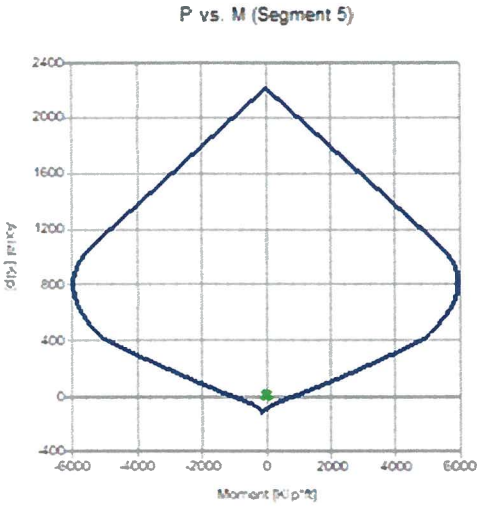


P vs. M (Segment 3)



P vs. M (Segment 4)





Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	D2(Bottom)	49.10	1031.85	0.05
2	D2(Bottom)	7.72	208.65	0.04
3	D2(Bottom)	8.49	169.47	0.05
4	D2(Max)	6.30	145.30	0.04
5	D2(Bottom)	22.03	1031.85	0.02

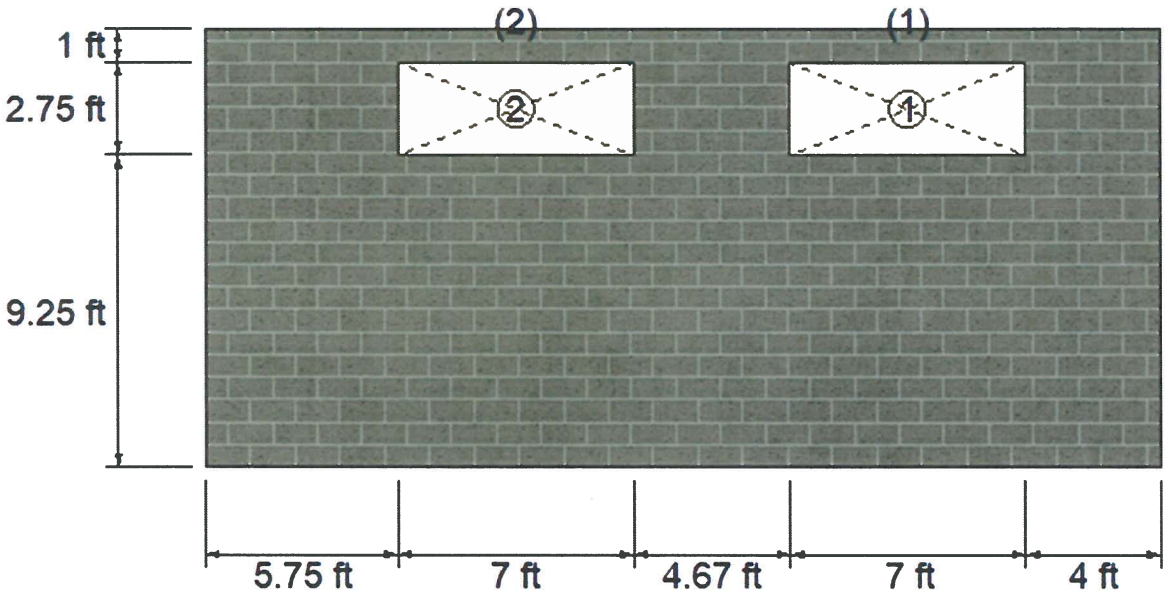
Results: Axial tension

Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D1(Top)	0.00	20.00	0.00
2	D1(Top)	0.00	20.00	0.00
3	D1(Top)	0.00	20.00	0.00
4	D1(Top)	0.00	20.00	0.00
5	D1(Top)	0.00	20.00	0.00

Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Bottom)	0.004	0.069	0.06
2	D4(Max)	0.004	0.054	0.07
3	D6(Max)	0.008	0.064	0.13
4	D4(Max)	0.006	0.072	0.09
5	D4(Max)	0.003	0.076	0.03

LINTEL DESIGN:
Status : OK



Geometry:

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	17.42	9.25	7.00	12.00
2	5.75	9.25	7.00	12.00

Reinforcement:

Lintel	Top long. reinforcement Bars	Top long. reinforcement Extent [in]	Bottom long. reinforcement Bars	Bottom long. reinforcement Extent [in]	Transverse reinforcement Bars	Transverse reinforcement Spacing [in]	Ld [in]
1	1-#4	0.00	1-#4	0.00	--	0.00	0.00
2	1-#4	0.00	1-#4	0.00	--	0.00	0.00

Results: Bending

Lintel	Condition	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D2(Top)	1.55	2.97	0.52
2	D2(Top)	1.54	2.97	0.52

Results: Shear

Lintel	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D2(Bottom)	0.022	0.044	0.50
2	D2(Top)	0.021	0.044	0.49

Results: Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1	S2(Top)	0.02	0.14	0.16
2	S2(Top)	0.02	0.14	0.16

Bentley **VINCI & ASSOCIATES**

Current Date: 9/12/2018 6:20 PM
Units system: English
File name: F:\VA-MAIN\Jobs\18-5500's\18-5564 - Rincon Pump Station\CMU Bldg\Grid C (Existing North Wall).msw\

Check Grid C: Existing North Wall

Masonry wall

GENERAL INFORMATION:

Global status : OK

Design code	:	TMS 402-13 ASD

Geometry:

Total height	:	13.00 [ft]
Total length	:	26.67 [ft]
Base support type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Materials:

Material	:	CMU 1.5-40
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	40 [Kip/in2]
Steel allowable tension strength (Fs)	:	20 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	13.00	7.63	0.14

Openings:

Reference	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
Upper left	4.00	1.00	7.08	2.75
Upper right	4.00	1.00	7.08	2.75

Load conditions:

ID	Comb.	Category	Description
DL	No	DL	Dead Load
LLR	No	LLR	Roof Live Load
EQ	No	EQ	Seismic
D1	Yes		DL
D2	Yes		DL+LLR
D3	Yes		DL+0.75LLR
D4	Yes		DL+0.7EQ
D5	Yes		DL+0.525EQ
D6	Yes		0.6DL+0.7EQ
S1	Yes		DL
S2	Yes		DL+LLR

S3	Yes	DL+0.75LLR
S4	Yes	DL+0.7EQ
S5	Yes	DL+0.525EQ
S6	Yes	0.6DL+0.7EQ

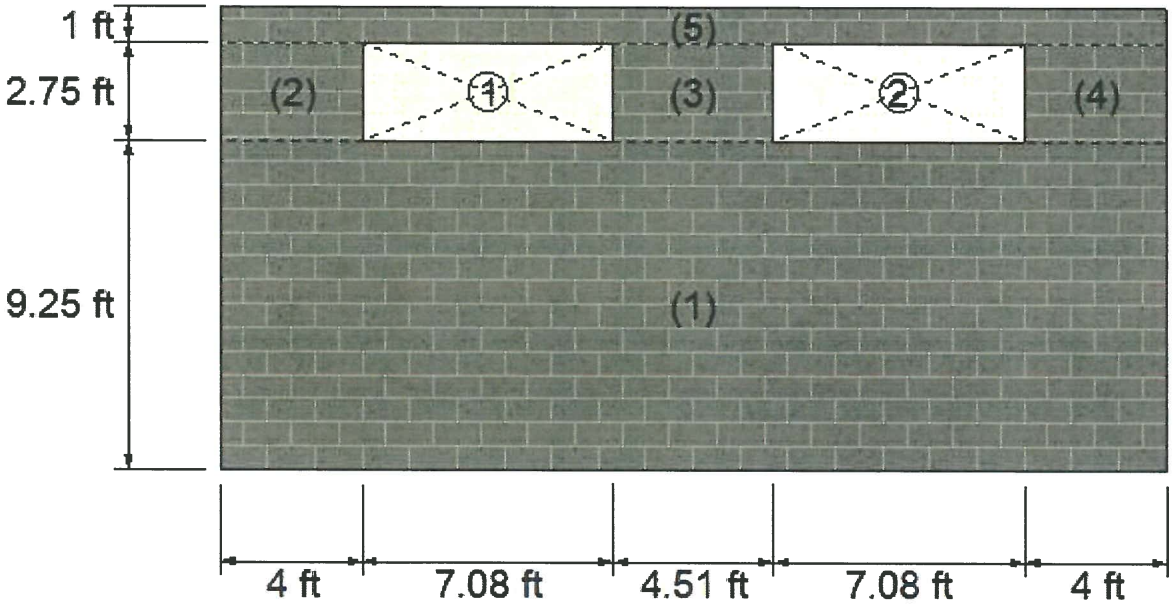
Distributed loads:

Consider self weight : DL

Story	Condition	Direction	Magnitude [Kip/ft]	Eccentricity [ft]
1	DL	Vertical	0.07	0.30
1	LLR	Vertical	0.10	0.30
1	EQ	Horizontal	0.52	0.00

SHEAR WALL DESIGN:

Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	26.67	9.25
2	0.00	9.25	4.00	2.75
3	11.08	9.25	4.51	2.75
4	22.67	9.25	4.00	2.75
5	0.00	12.00	26.67	1.00

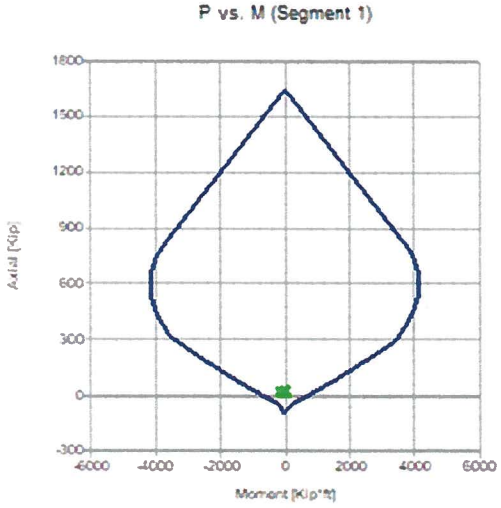
Reinforcement:

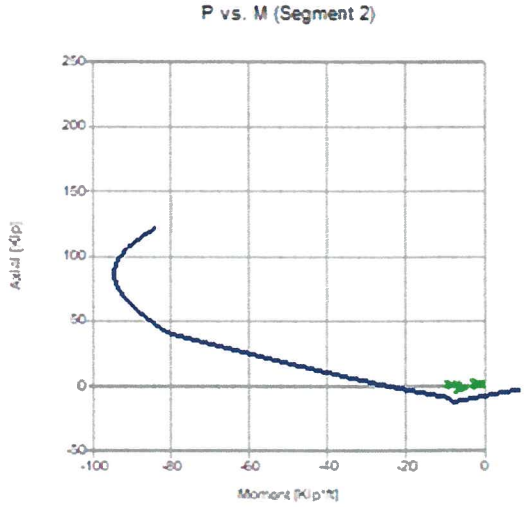
Segment	Vertical reinforcement Bars	Spacing [in]	Ld [in]	Horizontal reinforcement Bars	Spacing [in]	Ld [in]
1	2-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	3-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00
2	2-#5	24.00	0.00	--	0.00	0.00
3	3-#5	24.00	0.00	--	0.00	0.00
4	2-#5	24.00	0.00	--	0.00	0.00
5	2-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	3-#5	24.00	0.00	--	0.00	0.00
	4-#5	24.00	0.00	--	0.00	0.00
	2-#5	24.00	0.00	--	0.00	0.00

Results: Combined axial flexure

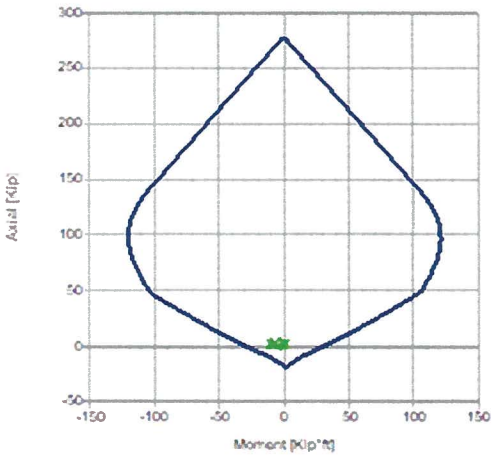
Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Bottom)	16.04	-151.12	871.43	0.17
2	D4(Bottom)	1.47	-9.04	26.24	0.34
3	D6(Max)	1.76	-9.70	32.05	0.30
4	D6(Bottom)	2.36	-5.71	27.62	0.21
5	D6(Top)	-0.24	-24.82	704.49	0.04

Interaction diagrams, P vs. M:

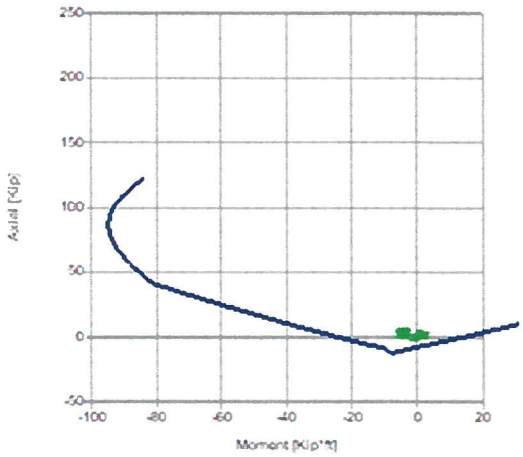




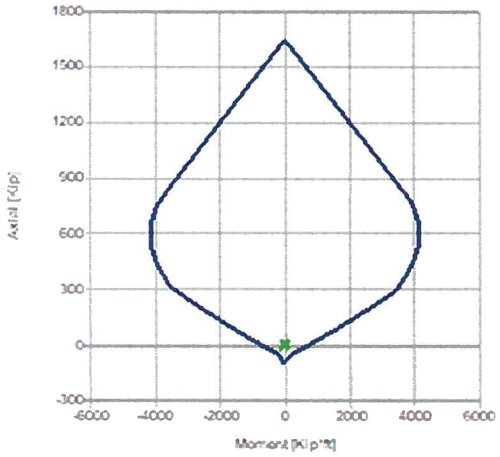
P vs. M (Segment 3)



P vs. M (Segment 4)



P vs. M (Segment 5)



Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio	
1	D2(Bottom)	29.39	680.06	0.04	
2	D2(Max)	2.63	102.02	0.03	
3	D2(Bottom)	3.91	114.96	0.03	
4	D4(Max)	4.49	102.02	0.04	
5	D2(Bottom)	11.26	680.06	0.02	

Results: Axial tension

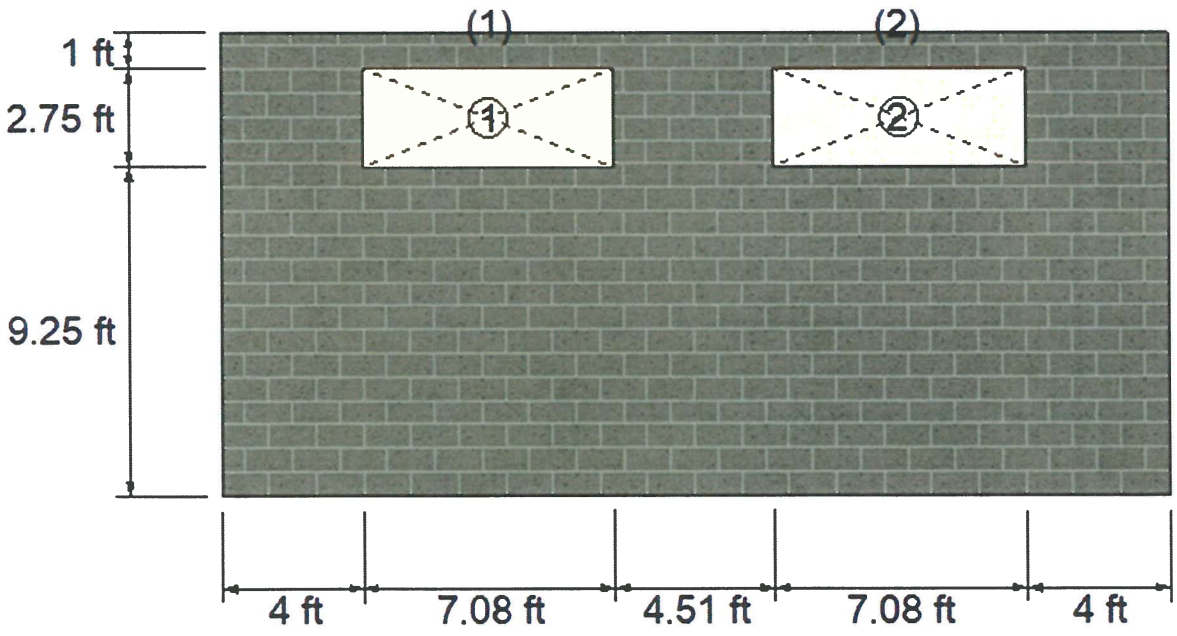
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D1(Top)	0.00	20.00	0.00
2	D6(Max)	3.67	20.00	0.18
3	D1(Top)	0.00	20.00	0.00
4	D6(Top)	0.25	20.00	0.01
5	D4(Top)	0.06	20.00	0.00

Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Bottom)	0.006	0.066	0.10
2	D4(Bottom)	0.011	0.053	0.21
3	D6(Max)	0.017	0.065	0.26
4	D6(Bottom)	0.010	0.062	0.17
5	D4(Max)	0.005	0.075	0.07

LINTEL DESIGN:

Status : OK



Geometry:

Lintel	X Coordinate [ft]	Y Coordinate [ft]	Length [ft]	Depth [in]
1	4.00	9.25	7.08	12.00
2	15.59	9.25	7.08	12.00

Reinforcement:

Lintel	Top long. reinforcement Bars	Extent [in]	Bottom long. reinforcement Bars	Extent [in]	Transverse reinforcement Bars	Spacing [in]	Ld [in]
1	1-#4	3.00	1-#4	0.00	--	0.00	0.00
2	1-#4	3.00	1-#4	0.00	--	0.00	0.00

Results: Bending

Lintel	Condition	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D4(Bottom)	-0.70	2.94	0.24
2	D4(Bottom)	-0.80	2.94	0.27

Results: Shear

Lintel	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D2(Bottom)	0.012	0.044	0.27
2	D4(Bottom)	0.014	0.044	0.33

Results: Deflection

Lintel	Condition	δs [in]	δmax [in]	Ratio
1	S4(Bottom)	-0.01	0.14	0.10
2	S4(Bottom)	-0.02	0.14	0.11

Notes:

* P = Axial load
* Pa = Allowable compressive force due to axial load.
* M = Moment at the section under consideration.
* Ma = Wall allowable moment due to axial force or lintel pure flexure allowable moment
* fa = Calculated compressive stress due to axial load only
* fb = Calculated compressive stress due to axial flexure only
* ft = Calculated axial tension
* Fa = Allowable compressive stress due to axial load only
* Fb = Allowable compressive stress due to axial flexure only
* fv = Calculated shear stress
* Fs = Allowable tensile or compressive stress
* Fv = Allowable shear stress
* ld = Embedment length
* As = Effective cross sectional area of reinforcement
* δs = Calculated deflection
* δmax = Maximum allowable deflection

Bentley VINCI & ASSOCIATES

Current Date: 9/12/2018 6:07 PM
Units system: English

Check Grid A: South Elevation

Masonry wall

GENERAL INFORMATION:

Global status : OK

Design code	:	TMS 402-13 ASD

Geometry:

Total height	:	13.00 [ft]
Total length	:	26.67 [ft]
Base support type	:	Continuous
Wall bottom restraint	:	Pinned
Column bottom restraint	:	Fixed
Rigidity elements	:	Columns

Materials:

Material	:	CMU 1.5-40
Mortar type	:	Port/Mort - M/S
Grouting type	:	Full grouting
Masonry compression strength (F`m)	:	1.5 [Kip/in2]
Steel tension strength (fy)	:	40 [Kip/in2]
Steel allowable tension strength (Fs)	:	20 [Kip/in2]
Steel elasticity modulus (Es)	:	29000 [Kip/in2]
Masonry elasticity modulus (Em)	:	1350 [Kip/in2]
Masonry unit weight	:	0.135 [Kip/ft3]

Number of stories: 1

Story	Story height [ft]	Wall thickness [in]	Effective unit weight [Kip/ft3]
1	13.00	7.63	0.14

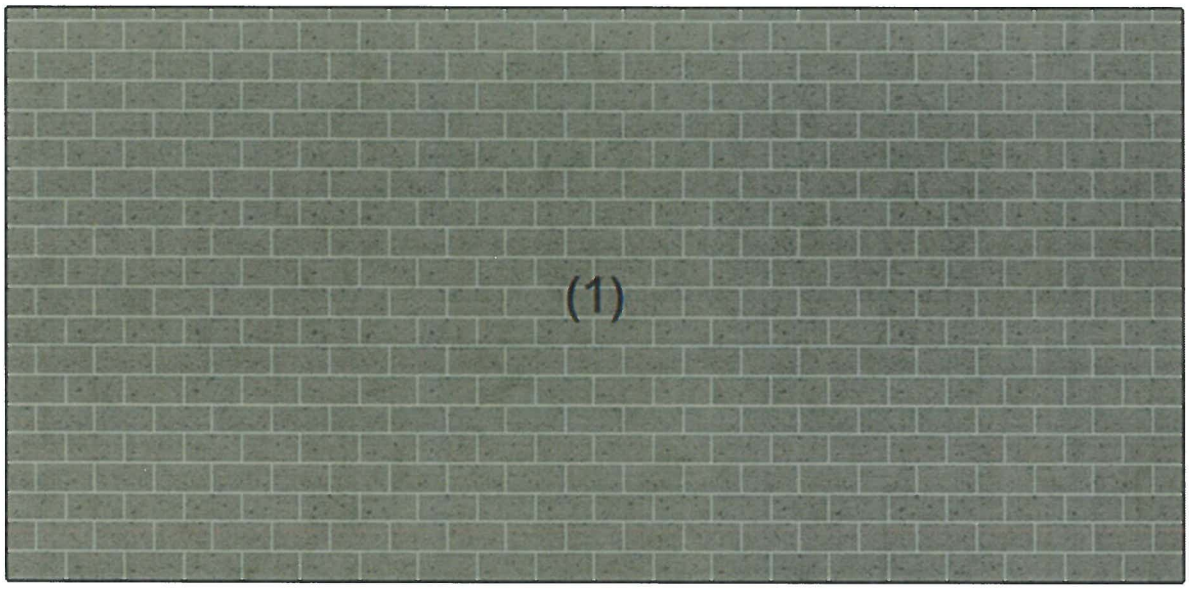
Load conditions:

ID	Comb.	Category	Description
DL	No	DL	Dead Load
LLR	No	LLR	Roof Live Load
EQ	No	EQ	Seismic
D1	Yes		DL
D2	Yes		DL+LLR
D3	Yes		DL+0.75LLR
D4	Yes		DL+0.7EQ
D5	Yes		DL+0.525EQ
D6	Yes		0.6DL+0.7EQ
S1	Yes		DL
S2	Yes		DL+LLR
S3	Yes		DL+0.75LLR
S4	Yes		DL+0.7EQ
S5	Yes		DL+0.525EQ
S6	Yes		0.6DL+0.7EQ

Distributed loads:
Consider self weight : DL

Story	Condition	Direction	Magnitude [Kip/ft]	Eccentricity [ft]
1	DL	Vertical	0.07	0.30
1	LLR	Vertical	0.10	0.30
1	EQ	Horizontal	0.52	0.00

BEARING WALL DESIGN:
Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	26.67	13.00

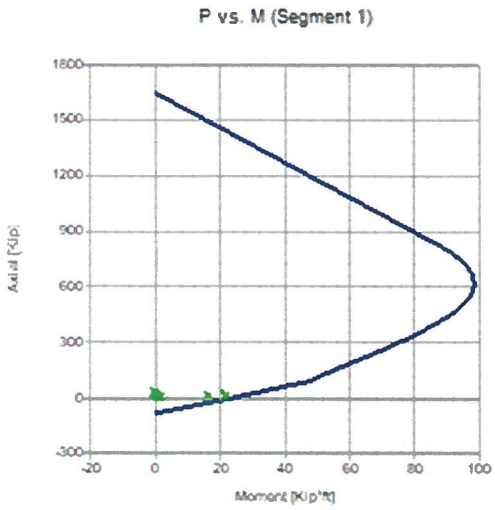
Vertical reinforcement:

Segment	Bars	Spacing [in]	Ld [in]
1	14-#5	24.00	26.22

Results: Combined axial flexure

Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Max)	9.16	-21.49	25.99	0.83

Interaction diagrams, P vs. M:



Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio	
1	D2(Bottom)	32.75	680.20	0.05	

Results: Axial tension

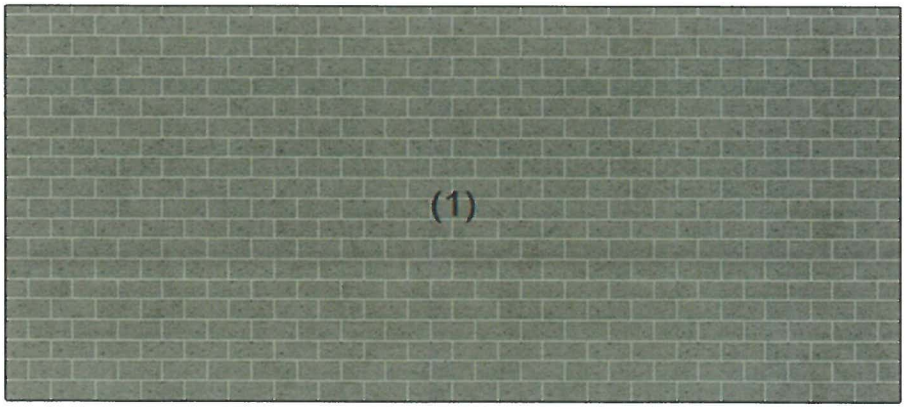
Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio	
1	D1(Top)	0.00	20.00	0.00	

Results: Shear

Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio	
1	D6(Max)	0.004	0.045	0.08	

SHEAR WALL DESIGN:

Status : OK



Geometry:

Segment	X Coordinate [ft]	Y Coordinate [ft]	Width [ft]	Height [ft]
1	0.00	0.00	26.67	13.00

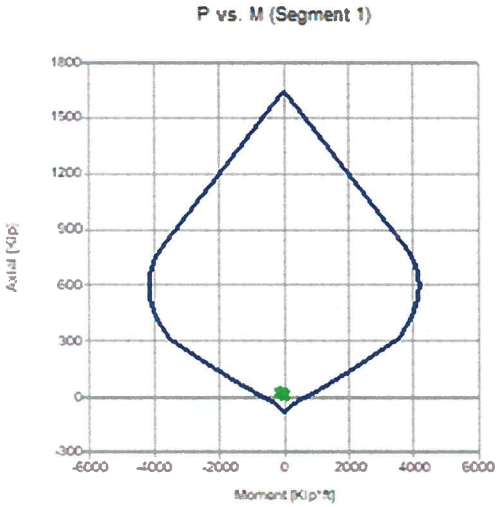
Reinforcement:

Segment	Vertical reinforcement Bars	Spacing [in]	Ld [in]	Horizontal reinforcement Bars	Spacing [in]	Ld [in]
1	14-#5	24.00	0.00	--	0.00	0.00

Results: Combined axial flexure

Segment	Condition	P [Kip]	M [Kip*ft]	Ma [Kip*ft]	Ratio
1	D6(Bottom)	18.05	-158.52	863.99	0.18

Interaction diagrams, P vs. M:



Results: Axial compression

Segment	Condition	P [Kip]	Pa [Kip]	Ratio
1	D2(Bottom)	32.75	680.14	0.05

Results: Axial tension

Segment	Condition	ft [Kip/in2]	Fs [Kip/in2]	Ratio
1	D1(Top)	0.00	20.00	0.00

Results: Shear

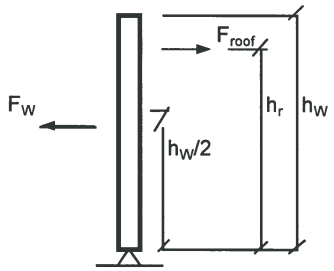
Segment	Condition	fv [Kip/in2]	Fv [Kip/in2]	Ratio
1	D6(Bottom)	0.007	0.067	0.10

Notes:

* P = Axial load
* Pa = Allowable compressive force due to axial load.
* M = Moment at the section under consideration.
* Ma = Wall allowable moment due to axial force or lintel pure flexure allowable moment
* fa = Calculated compressive stress due to axial load only
* fb = Calculated compressive stress due to axial flexure only
* ft = Calculated axial tension
* Fa = Allowable compressive stress due to axial load only
* Fb = Allowable compressive stress due to axial flexure only
* fv = Calculated shear stress
* Fs = Allowable tensile or compressive stress
* Fv = Allowable shear stress
* ld = Embedment length
* As = Effective cross sectional area of reinforcement
* δs = Calculated deflection
* δmax = Maximum allowable deflection

VINCI & ASSOCIATES
Structural Engineers
175 E. WILBUR ROAD, STE 103 • THOUSAND OAKS, CA 91360
p - 805.496-2100 f - 805.496-2442 e - vinci@vincise.com

DESIGN OF WALL ANCHORAGE



F = 0.985 W

h_W = 13 Ft.

$h_W/2$ = 6.5

h_{roof} = 13.00 Ft.

Wall D.L.= 84 PSF

F_W = (h_W x Wall D.L.) x 0.98

F_W = 1092 plf x 0.98 = 1075 plf

F_{roof} = (F_W x $h_W/2$)/h_W = 538 plf

USE F_{roof} = 538 plf

Anchorage of Walls

PURLINS @ 5 ' O.C.

F = 5 ' x (F_{roof}) = 2688 lbs x 0.7 = 1882 lbs

>>>>>USE : Purlin attachment w/ weld each side
3/16" fillet weld x 1.5" each side
F_{ALLOW} = **12150 lbs** lbs
& **3/4" Anchor Bolts @ 24" o.c.**
See next sheet

SUBPURLINS @ 5 ' O.C.

F = 5 ' x (F_{roof}) = 2688 lbs x 0.7 = 1882 lbs

>>>>>USE : L3x3x1/4 to wall
3/16" fillet weld x 1.5" each side
F_{ALLOW} = **12150 lbs** lbs
& **3/4" Anchor Bolts @ 24" o.c.**
See next sheet

CHECK L3x3x1/4 IN COMPRESSION PER AISC 360-10

$L/r_x = 5' \times 12/0.920 = 65 < 80$

$\therefore kl/r = 72 + 0.75(65) = 121$

$F_e = \frac{\pi^2(29{,}000{,}000)}{(121)^2} = 19{,}529$ psi

$\phi P_n = 0.877\,(19{,}529\text{ psi}) \times 1.44\text{ in}^2 \times .9 = 22{,}196$ #

$\therefore$ OK

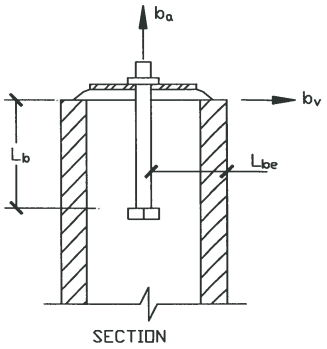
<< 1.4 x 2668
<< 3735 #

PROJECT : Rincon Pump Station
CLIENT :
JOB NO. :
DATE :
PAGE : 42
DESIGN BY :
REVIEW BY :

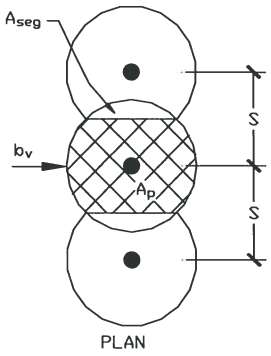
Fastener Anchorage in Tension & Perpendicular Shear Based on TMS 402-16/13 — **Wall Anchorage**

INPUT DATA & DESIGN SUMMARY

MASONRY STRENGTH	f_m'	=	1.5	ksi
FASTENER YIELD STRESS	f_y	=	36	ksi
SERVICE TENSION LOAD	b_a	=	0	kips / ft
SERVICE SHEAR LOAD	b_v	=	0.941	kips / ft
WALL THICKNESS	b	=	8	in
FASTENER DIAMETER	ϕ	=	3/4	in
EFFECTIVE EMBEDMENT	L_b	=	10	in
FASTENER SPACING	S	=	24	in
ALLOWABLE INCREASING ? (IBC/CBC 1605.3.2)			Yes	



SECTION



PLAN

[THE ANCHORAGE DESIGN IS ADEQUATE.]

ANALYSIS

CHECK MIN. EMBEDMENT (TMS 402-16/13 6.3.6/6.2.6)

$L_{b,min} = MIN[4\phi , 2] =$ 2.00 in < L_b [SATISFACTORY]

CHECK TENSION CAPACITY (TMS 402 8.1.3.3.1)

$B_a = MIN[1.25A_{pt}(f_m')^{0.5} , 0.6A_bf_y] =$ 1.80 kips / fasteners

> $k S b_a$ [SATISFACTORY]

Where L_{be} = 3.44 in

$L = MIN[L_b , L_{be}] =$ 3.44 in, conservative value

$\theta = COS^{-1}(0.5S / L) =$ 0.00 rad

$A_{seg} = L^2 [\theta - 0.5 SIN(2\theta)] =$ 0.00 in^2

$A_{pt} = \pi L^2 - 2 A_{seg} =$ 37.18 in^2 (TMS 402-16/13 6.3.2/6.2.2)

$A_b = \pi \phi^2 / 4 =$ 0.44 in^2

k = 3/4

CHECK SHEAR CAPACITY (TMS 402 8.1.3.3.2)

$B_v = MIN[1.25A_{pv}(f_m')^{0.5} , 350(A_bf_m')^{1/4} , 2.5A_{pt}(f_m')^{0.5} , 0.36A_bf_y] =$ 1.78 kips / fasteners

> $k S b_v$ [SATISFACTORY]

Where $A_{pv} = A_{pt} =$ 37.18 in^2, since $L = MIN[L_b , L_{be}]$ used above, (TMS 402-16/13 6.3.3/6.2.3)

CHECK COMBINED SHEAR AND TENSION CAPACITY (TMS 402 8.1.3.3.3)

$(S b_a / B_a)^{(5/3)} + (S b_v / B_v)^{(5/3)} =$ 1.10 < 1.33 [SATISFACTORY]

APPENDIX B

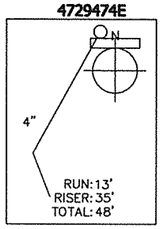
EDISON PRELIMINARY

METER AND SERVICE CHANGE PLAN

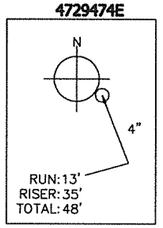
FOR

RINCON PUMP PLANT ELECTRICAL UPGRADE

EXISTING RISER DETAIL
4729474E



PROPOSED RISER DETAIL
4729474E



FIBERGLASS SWEEP REQUIRED

T.L.M. DATA: 5402343

	SIZE	KVA	CUST	% LOAD
EXIST.	2500	1131.9	1	45 %
PROP.	2500	1138.0	1	45 %

VOLTAGE DROP: _____
FLICKER FACTOR: _____
PRI. CIRCUIT: RED MOUNTAIN 16KV

C.O. POURED IN PLACE
SLAB 10'X14'

EX: P5402343 SLAB BOX (1)
10'x12' CONCRETE
RM: 1- TR PM DE 2500KVA 16KV 2400/4160Y 3P (LIVEFRONT)
SN: _____
RM: 3- PH CS 16KV 1/0 FOR PM TR/SW
RM: 3- PH CS 16KV 750
RM: 1- GR 2/0 STR PM/BURD TRANS 500 & UP NO ROD
RM: 51- CBL 750 AL 1-1/C 17KV CLP PJ (P2343 TO CABINET)

- **JOINT POLE - JPA REQUIRED**
- **SCE TO TRANSFER HLA & PULL BUTT**

GPS COORDINATES
LAT: 34.369127
LONG: -119.330289

RM 4729474E (3)
45' Class C2
RM: 1- POLE 45' CLASS 2 WOOD FULL TREAT
RM: 1- XA DBLE FB 10' STEEL PINS
RM: 3- INS POLY W/PIN 16(25)KV CLMP #4-336 ACSR
RM: 3- INS POLY DE 16KV HOT SHOE #4 & 1/0 ACSR
RM: 1- MISC AVIAN HOOD FOR F-NECK INSUL #4-653
RM: 1- FE FH SMD20 17" 200A 16KV 3P
RM: 3- FE FUSE X-LIMITER 17KV 40A
RM: 1- PH CS 10' XA 16KV 3P 3-1/0
RM: 1- AG DOWN GUY 3/8" - 50' LESS THAN 22.5KV (ATTACHED @ 37'6")
RM: 1- RSR PVC/STRAP 4" UNISTRUT APP
RM: 1- RSR PRECUT UNISTRUT W/ HARDWARE NO PVC
RM: 48- CBL 1/0 AL 3-1/C 17KV CLP PJ (474E-P343)

POLE 4729474E (4)
50' Class C2
IN: 1- POLE 50' CLASS 2 WOOD FULL TREAT
IN: 1- XA DBLE FB 10' STEEL PINS
IN: 3- INS POLY DE 16KV HOT SHOE #4 & 1/0 ACSR
IN: 1- SW OMNI HZ-UP DE 600A 16KV 3W
SN: _____
IN: 3- INS POLY W/PIN 16(25)KV CLMP #4-336 ACSR
IN: 1- FE FH SMU20 17" W/10' XA 200A 16KV 3P
IN: 3- FE FUSE SMU20 17KV 125E
IN: 1- PH CS 10' XA 16KV 3P 3-1/0
IN: 1- SA POLY W/GND & T-GAP PRI-N 16KV 3P
IN: 1- RSR 4" EXTENSION
IN: 48- CBL 1/0 AL 3-1/C 17KV CLP PJ (474E-P343)
IN: 1- AG DOWN GUY 3/8" - 50' LESS THAN 22.5KV (ATTACHED @ 41'6")(TO EX ANCHOR N)
IN: 1- AG DOWN GUY 9/32" - 50' MORE THAN 22.5KV (ATTACHED @ 39')(TO EX ANCHOR N)

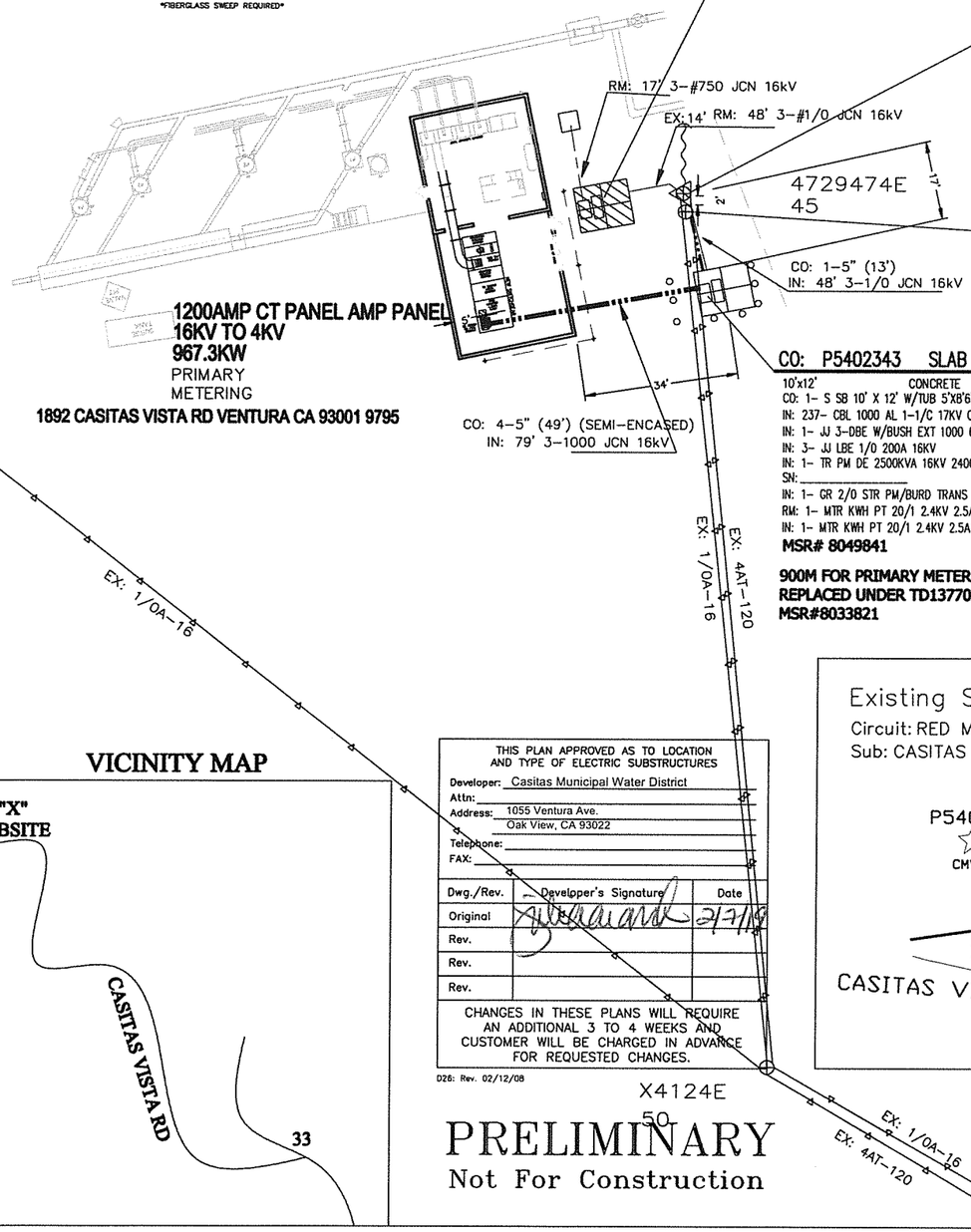
CREW NOTES:
- **LOCATED BEHIND LOCKED GATE. NEED TO CONTACT ERIC W/ CASITAS WATER 805-797-1728**

CUSTOMER NOTES:
- **CUSTOMER TO INSTALL BOLLARDS**
- **SLAB BOX TO BE ROTATED 180° TO MATCH UP KNOCK OUT LOCATIONS W/ REQUIRED # OF SERVICE DUCTS**

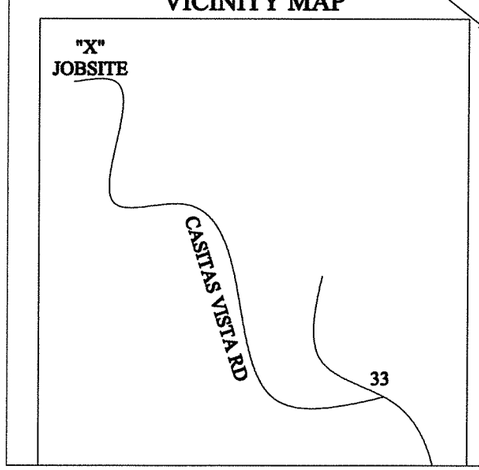
PROJECT REQUIREMENTS (Y/N)	
EDISON EASEMENT REQUIRED	N
PWRD 88 REQUIRED	Y
UG CIVIL ONLY WORK ORDER	N
PERMIT REQUIRED	N
PERMIT TYPE: N/A	
OUTAGE REQUIRED	Y
OUTAGE DATE: TBD TIME: TBD	
TRAFFIC CONTROL REQUIRED	N
PED. TRAFFIC CONTROL REQ'D	N
CONVEYANCE LETTER REQ'D	N
ENVIRONMENTAL CLEARANCE REQ'D	Y
CSD 140 (TLM) REQ'D	N

D124: Rev. 02/08/18

DUCT AND STRUCTURE INSPECTOR
NAME: DOUG STEIFF
PHONE: 805-814-7097
CABLING CONSTRUCTION COORDINATOR
NAME: GREG CHENOWETH
PHONE: 805-654-7475



VICINITY MAP



THIS PLAN APPROVED AS TO LOCATION AND TYPE OF ELECTRIC SUBSTRUCTURES
Developer: Casitas Municipal Water District
Attn: _____
Address: 1055 Ventura Ave. Oak View, CA 93022
Telephone: _____
FAX: _____

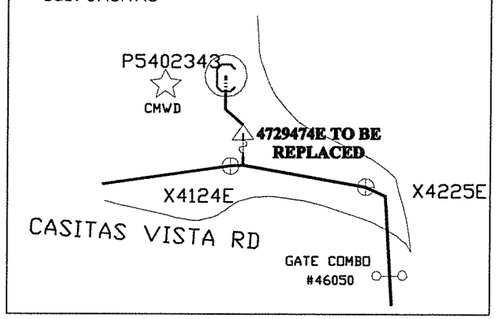
Dwg./Rev.	Developer's Signature	Date
Original		2/7/18
Rev.		
Rev.		
Rev.		

CHANGES IN THESE PLANS WILL REQUIRE AN ADDITIONAL 3 TO 4 WEEKS AND CUSTOMER WILL BE CHARGED IN ADVANCE FOR REQUESTED CHANGES.

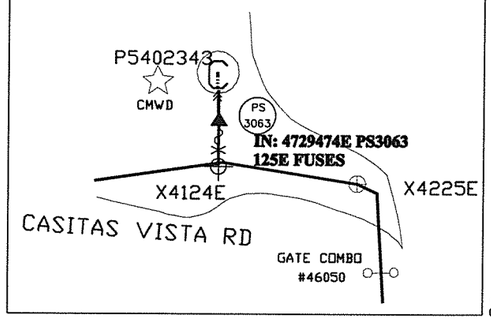
D26: Rev. 02/12/08

PRELIMINARY
Not For Construction

Existing Single Line
Circuit: RED MOUNTAIN 16KV
Sub: CASITAS



Proposed Single Line
Circuit: RED MOUNTAIN 16KV
Sub: CASITAS



DISTRICT: 39 – VENTURA	PROJ. MGR. WILSON, LAURA PHONE 805-654-7335	PLANNER WILSON, LAURA PHONE 805-654-7335	DESIGNER LAPOINTE, KIM		
PROJECT NO. 1567503	SERVICE REQUEST 2477513	MSR NO. 8049841	PRODUCT-1 1376472-METER & SERVICE CHANGE		ASSOC DESGN
CIRCUIT / VOLTAGE RED MOUNTAIN 16KV		THOMAS GUIDE	PRODUCT-2		ASSOC DESGN
SUB / PG NO. CASITAS		CIRCUIT CODE 14810	PRODUCT-3		ASSOC DESGN
INVENTORY MAP 50-17B-9		J.P.A. NO.	PROPOSED CONSTRUCTION (LOCATION) CASITAS MUNICIPAL WATER DISTRICT 1892 CASITAS VISTA RD VENTURA, CA 93001		
TYPE	DATE	APPROVED BY	CHECKED BY	DRAWN BY	PAX #
Southern California Edison Company					
SHEET 1 OF 2			DESIGN\DRWG NO. 1016012_0.01		