

FORM APPROVED COUNTY COUNSEL
 BY: MS VICTOR 12/10/09
 MARSHAL VICTOR DATE

**SUBMITTAL TO THE BOARD OF SUPERVISORS
 COUNTY OF RIVERSIDE, STATE OF CALIFORNIA**

461



SUBMITTAL DATE:
 November 30, 2009

FROM: Economic Development Agency

SUBJECT: Riverside Centre Building, Fifth Floor - Aviation-CSA-Housing Tenant Improvement

RECOMMENDED MOTION: That the Board of Supervisors:

1. Approve the plans and specifications for the Riverside Centre Building, Fifth Floor - Aviation-CSA-Housing Tenant Improvement and authorize the Clerk of the Board to advertise for bids; and
2. Delegate project management authority for the project to the Assistant County Executive Officer EDA in accordance with Board policies.

BACKGROUND: (Commences on page 2)

Robert Field

Robert Field
 Assistant County Executive Officer EDA

FINANCIAL DATA	Current F.Y. Total Cost:	\$ 0	In Current Year Budget:	N/A
	Current F.Y. Net County Cost:	\$ 0	Budget Adjustment:	N/A
	Annual Net County Cost FY:	\$ 0	For Fiscal Year:	09/10

SOURCE OF FUNDS: Redevelopment Funds to be Reimbursed through Subleases to EDA Divisions	Positions To Be Deleted Per A-30	<input type="checkbox"/>
	Requires 4/5 Vote	<input type="checkbox"/>

C.E.O. RECOMMENDATION: APPROVE

BY: *Jennifer L. Sargent*
 Jennifer L. Sargent

County Executive Office Signature

Consent Policy
 Consent Policy

Dep't Recomm.:
 Per Exec. Ofc.:

Prev. Agn. Ref.: 3.21, 10/20/09; 3.103, 7/21/09; .104, 7/21/09

District: 2

Agenda Number:

3.15

BACKGROUND:

On October 20, 2009, the Board of Supervisors approved an architectural and engineering services agreement between the County of Riverside and Holt Architects for the Riverside Centre Building, Fifth Floor – Tenant Improvement. This tenant improvement project will provide adequate expansion space to accommodate the combining of the offices of Facilities Management with those of the Economic Development Agency (EDA) of the County of Riverside. In addition, the general fund will benefit from lease revenues collected from the non-general fund tenants in the Riverside Centre.

The bid documents are now complete and EDA requests approval to solicit bids for construction of this project. The bid documents have been approved by County Counsel as to legal form.

The department will continue to take every step necessary to achieve the most economic and cost-effective project. All costs associated with this project will be paid for with Redevelopment funds and reimbursed through subleases to EDA divisions.

461

SPECIFICATIONS AND CONTRACT DOCUMENTS
FOR

Riverside Centre: 5th Floor Aviation-CSA-Housing Tenant Improvement Project



PREPARED BY
COUNTY OF RIVERSIDE
DEPARTMENT OF ECONOMIC DEVELOPMENT AGENCY
DESIGN & CONSTRUCTION DIVISION
NOVEMBER, 2009

HOLT ARCHITECTS
70-225 HIGHWAY 111, SUITE D
RANCHO MIRAGE, CA 92270
760-328-5280

FORM APPROVED COUNTY COUNSEL
BY: Marsha L. Victor 12/10/09
MARSHA L. VICTOR DATE

For 9

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01730 -	Operation and Maintenance Data
01800 -	Summary List of Supplemental Warranties
01900 -	Summary List of Extra Materials

DIVISION 4 – MASONRY

04413 -	Granite Surfacing
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DIVISION 5 – MASONRY

05410 -	Metal Stud Framing
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DIVISION 6 – WOOD AND PLASTIC

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- 09250 - Gypsum Board Systems
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- 16480 - Transformers
- 16520 - Automatic Lighting Control System
- 16721 - Fire Alarms Systems

*****END OF SECTION*****

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NOTICE INVITING BIDS

COUNTY OF RIVERSIDE, herein called Owner, invites sealed proposals for :

This project is titled Riverside Centre: 5th Floor Renovation Project. It is a 9,850 S.F. office tenant improvement for the fifth floor in a high rise building in Riverside, CA. The work includes renovation and new construction, HVAC, electrical & plumbing improvement.

Proposals shall be delivered to the Clerk of the Board of Supervisors, on the 1st floor of the County Administrative Center located at 4080 Lemon Street, Riverside, CA 92501 no later than _____ a.m. on _____, 2009 and will be promptly opened in public at said address.

Each Proposal shall be in accordance with the Plans, Specifications, and other Contract Documents, dated July 2009 and prepared by Holt Architects, 70-225 Highway 111, Suite D Rancho Mirage, California 92270, (760) 328-5280.

Plans and Specifications are available for purchase by the Contractors at Mission Reprographics 2050 La Cadena Drive East, Riverside, CA 92507, www.missionreprographics.com, (951) 686-8828. Plan Holders List is available at Mission Reprographics.

Notice of Award will be available at Mission Reprographics, www.missionreprographics.com.

REQUEST FOR INFORMATION: Contact: Holt Architects and County of Riverside, Project Manager. Avenue to send RFI: All RFI's should be emailed to rcoronado@holtarchitects.net & nieves@holtarchitects.net, and drtorres@rivcoeda.org. or they may be faxed to Holt 760-328-5281 and Project Manager 951-955-0307. RFI's will not be answered via phone calls; they will be answered in writing via Addendum issued to all Bidders who attend the mandatory job walk. Deadline for submission of BID RFI is no later than _____ a.m., on _____, 2009

Pursuant to the Labor Code, the Governing Board of the Owner has obtained from the Director of the Department of Industrial Relations, State of California, his determination of general prevailing rates of per diem wages applicable to the work, and for holiday and overtime work, including employer payments for health and welfare, pension, vacation, and similar purposes, as set forth on the schedule which is on file at the principal office of the Owner, and which will be made available to any interested person upon request.

The Contract General Conditions for this project will contain provisions allowing successful contractor to substitute securities for monies withheld by the County to ensure performance (Public Contract Code 22300).

A Performance Bond and Payment Bond shall be required for this Project.

The Contractor will be required, per Public Contracts Code, Section 3300 and for this contract, to have a State of California contractor's license classification B – General Building Contractor. A **mandatory** pre-bid job walk inspection will be held on _____, 2009 at _____ a.m., meeting will be held at the project site, 5th Floor elevator lobby, 3403 Tenth Street, 5th Floor, Riverside, CA 92501, California. **No bids will be accepted from bidders who have not attended the pre-bid job walk.**

For further information, please call Dawn Torres at the County of Riverside Economic Development Agency, located at 3133 Mission Inn Avenue, Riverside, CA 92507-4199 whose telephone number is (951) 955-4880.

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INSTRUCTIONS TO BIDDERS

A. **FORM OF PROPOSAL:** The Proposal must be made on the attached Contractor's Proposal Form which must be filled out completely, dated and signed by the bidder or duly authorized agent in accordance with the directions on the Proposal Form. Each Proposal shall include a complete list of the Subcontractors proposed for every portion of the work, in accordance with Public Contract Code, Section 4100-4114, inclusive.

B. **SUBMISSION OF THE PROPOSAL:** Signed copies of each Proposal shall be sealed in an envelope labeled with Title of Bid and Opening Time. Proposals shall be submitted at the place designated in the Notice Inviting Bids at or before the time specified in said notice. Before that time a proposal may be withdrawn, but only in person by the bidder or someone authorized by him in writing, and not by telephone or telegram.

C. **DRAWINGS AND SPECIFICATIONS:** All drawings, herein enclosed, become a part of the Bid Documents. Plans and Specifications may be obtained from Mission Reprographics, 2050 La Cadena Drive East, Riverside, CA 92507, www.missionreprographics.com, (951) 686-8828. Plan Holders list is available at Mission Reprographics.

D. **INTERPRETATION OF THE DOCUMENTS:** Discrepancies in and omissions from the Plans, Specifications or other Contract Documents or questions as to their meaning shall, at once, be brought to the attention of the Owner. Any interpretation of the Documents will be made only by Addenda duly issued and a copy of such Addenda will be mailed or delivered to each person or firm receiving a set of such documents. The Owner will not be responsible for any other explanations or interpretations. Should anything in the scope of the work or any of the sections of the Specifications be of such nature as to be apt to cause disputes between the various trades involved, such information shall be promptly called to the attention of the Owner.

E. **ADDENDA TO THE DOCUMENTS:** The Owner reserves the right to issue such Addenda to the documents as it may desire at any time prior to the time fixed for receiving Proposals. A copy of all such Addenda will be promptly mailed or delivered to each bidder. The number and date of each Addenda shall be listed on the Contractor's Proposal in the space provided.

F. **OWNER'S RESERVATION OF RIGHTS:** The Owner reserves the right to reject any or all Proposals and to waive any informalities in a bid or in the bidding. No bidder may withdraw his bid for a period of sixty (60) days after the time set for the opening thereof.

G. **BIDDER'S CHECK OR BOND:** Each Proposal must be accompanied by a certified or cashier's check or by a bid bond on the form supplied by the Owner, drawn in favor of the Owner in an amount not less than ten percent (10%) of the total Proposal. This check or bond shall be given as a guarantee that the bidder, if awarded the contract, will execute and deliver the Contract Documents and the required Payment and Performance Bonds and proof of insurance in accordance with his Proposal accepted by the Owner. In default of execution of the Contract upon award and/or delivery of said Payment and Performance Bonds, such Proposal bond or check shall be held subject to payment to the Owner of the difference in money between the amount of the bidder's Proposal and the amount for which the Owner may legally contract with another party to perform the said work, together with the costs to the Owner of redrafting, redrawing and publishing documents and papers shall, in addition, be held subject to all other actual damages suffered by the Owner, as set forth on the Contract Documents. Said check or bond will be returned upon the close of the period mentioned in Paragraph F above, and to the successful bidder upon execution of the Contract Documents. **NO BONDS WILL BE ACCEPTED UNLESS SUBMITTED ON THE FORM SUPPLIED BY OWNER.**

H. **AWARD OF CONTRACT:** The Contract shall be awarded upon a Resolution or Minute Order to that effect duly adopted by the Governing Board of the Owner. Execution of the Contract Documents shall constitute a written memorial thereof.

I. **ADDITIONAL INFORMATION:** The Owner reserves the right to require of a bidder, information regarding financial responsibility or such other information as the Owner determines is necessary to ascertain whether a bid is in fact the lowest responsible bid submitted, All references to an Architect shall be deemed to refer to the Owner where no Architect has been employed by the Owner.

J. **PROMPT ACTION BY THE CONTRACTOR:** After the award of the Contract by the Governing Board and within four (4) days after the Agreement Forms are presented to the Contractor for signing, he shall return to the Owner the signed Agreements, along with all necessary Bonds and insurance.

K. **PRE-BID CONFERENCE:** There will be a mandatory pre-bid conference for this project that will be held at the site. No bids will be accepted from bidders who have not attended the pre-bid conference.

L. **BIDS:** Under the bidding items listed on the Contractor's Proposal, bidders shall state prices for each basis for bid given hereinafter.

1. Base Bid shall be the entire work complete in accordance with the contract documents, but not including work indicated or specified to be provided under any of the other bid items.

The basis for award will be the qualified bidder with the lowest total of the Base Bid with all alternates. Alternates may be awarded in any order after determination of the lowest responsible and responsive bidder.

CONTRACTOR'S PROPOSAL

TO THE GOVERNING BOARD OF THE COUNTY OF RIVERSIDE:

Date: _____

Bidder: _____

The undersigned, having carefully examined the proposed site and the Plans and Specifications, the Notice Inviting Bids, the Instructions to Bidders, the Agreement Form, the Bond Forms, the General Conditions for the Construction of the **Riverside Centre: 5th Floor Aviation-CSA-Housing Tenant Improvement Project**, hereby proposes and agrees to furnish all tools, equipment, services, apparatus, facilities, transportation, labor and materials necessary to complete the work in strict conformity with the Plans and Specifications, including all work specified in Addenda numbered and dated:

Addendum No. _____ Date _____

Addendum No. _____ Date _____

Addendum No. _____ Date _____

For the total Base Bid _____ dollars (\$ _____), including all applicable taxes, permits, licenses.

(Add or Deduct state which)

Alternate 1	\$ _____	_____
Alternate 2	\$ _____	_____
Alternate 3	\$ _____	_____
Alternate 4	\$ _____	_____

Bids must be submitted on all items. Failure to bid on all items may result in the bid being rejected as non-responsive. The basis for award will be the qualified bidder with the lowest total of the Base Bid and all alternates. Alternates may be awarded in any order after determination of the lowest responsible and responsive bidder.

AWARD OF CONTRACT

The undersigned fully understands that a Contract is formed upon the acceptance of this Proposal by the Owner and the undersigned further agrees that upon request he will promptly execute and deliver to Owner a written memorial of the Contract together with the required Payment and Performance Bonds and proof of insurance.

BID GUARANTEE

The enclosed certified or cashier's check or bidder's bond on approved form, made payable to the Owner in the amount of ten percent of the total bid submitted herewith, is hereby given as a guarantee that the bidder will execute and deliver the above mentioned written memorial and required bonds and insurance if awarded the contract, and in the event that the undersigned fails or refuses to execute and deliver said documents, such check or bond is to be charged with the costs of the damages experienced by the Owner as a result of such failure or refusal, including but not limited to publication costs, the difference in money between the amount of the bid of the said principal and the amount for which obligee may legally contract with another party to perform the said work if such amount be in excess of the former, building lease or rental costs, transportation costs and additional salary costs that result from the delay due to the principal's default on the awarded contract. In no event, however, shall the Surety's liability exceed the penal sum hereof.

Name of Bidder: _____

Type of Organization: _____

Signed By: _____

Title of Signer: _____

Address of Bidder: _____

Affix Seal
If
Corporation

Telephone No.: _____

Contractor's License No.: _____

Classification: _____ Expiration Date: _____

LICENSURE STATEMENTS ARE MADE UNDER PENALTY OF PERJURY

If bidder is a corporation, and signer is not President or Secretary, attach a certified copy of By-Laws or resolution authorizing execution. If bidder is a corporation, affix corporate seal. If signer is an agent, attach Power of Attorney. If bidder is not an individual, list names of other persons authorized to bind the organization.

NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

State of California) ss.
County of Riverside)

_____, being first duly sworn, deposes and says:

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

Signature

Subscribed and sworn to before me this _____ day of _____, 2009.

Signature of officer administering oath

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Bid Bond

KNOWN TO ALL MEN BY THESE PRESENTS, that we, the undersigned _____, as Principal; and _____, as Surety, are hereby held and firmly bound unto the County of Riverside, hereinafter called the "Owner", in the sum of _____ Dollars (\$ _____) for the payment of such sum, well and truly to be made, do hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

WHEREAS, the said Principal is herewith submitting its Proposal for the Riverside Center 5th Floor Aviation-CSA-Housing Tenant Improvement Project.

THE CONDITION OF THE ABOVE OBLIGATION IS SUCH, that if the aforesaid Principal shall be awarded the Contract upon said Proposal and shall, within the required number of days after the notice of such award, execute a written memorial of the awarded Contract and submit the required Labor and Material Payment and faithful Performance Bond and proof of insurance, then this obligation shall be null and void; and in the event that the Principal fails and/or refuses to execute and deliver said documents this Bond will be charged with the costs of the damages experienced by the Owner as a result of such refusal, including but not limited to, publication cost, the difference in money between the amount of the bid of the said Principal and the amount for which the obligee may legally contract with another party to perform the said work if such amount be in excess of the former; building lease or rental costs, transportation cost, and additional salary costs that result from the delay due to the Principal's default on the awarded Contract. In no event however, shall the Surety's liability exceed the penal sum hereof.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the above bounded parties have executed this instrument under their separate seals this _____ day of _____, 2009, the name and corporate seal of each corporate party being hereto affixed and those present duly signed by its undersigned representative, pursuant to authority of its governing body.

(Firm Name - Principal)

(Business Address)

By _____
(Original Signature)

(Title)

(Corporation Name - Surety)

(Business Address)

By _____
(Original Signature)

Affix Seal
If
Corporation

Affix
Corporate
Seal

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AGREEMENT FORM

THIS AGREEMENT, entered into this _____ day of _____, 2009, by and between _____, hereinafter called the "Contractor", and the County of Riverside hereinafter called the "Owner".

WITNESSETH: That the parties hereto have mutually covenanted and agreed as follows:

CONTRACT: The Complete Contract includes all of the Contract Documents, to wit: The Notice Inviting Bids, the Instructions to Bidders, the Contractor's Proposal, Wage Schedule, Payment and Performance Bonds, the Plans and Specifications plus any Addenda thereto, the General Conditions, the Supplementary General Conditions, if applicable and this Agreement. All Contract Documents are intended to cooperate and be complimentary so that any work called for in one and not mentioned in the other, or vice versa, is to be executed the same as if mentioned in all Contract Documents.

STATEMENT OF WORK: The Contractor hereby agrees to furnish all tools, equipment, services, apparatus, facilities, transportation, labor and materials for the Riverside Centre: 5th Floor Aviation-CSA-Housing Tenant Improvement Project. In strict accordance with the Plans and Specifications dated November, 2009 prepared by Holt Architects & County of Riverside hereinafter called the "Architect", including Addenda thereto as listed in the Contractor's Proposal, all of which are made a part hereof.

TIME FOR COMPLETION: The work shall be commenced on a date to be specified in a written order of the Architect and shall be completed within Sixty (60) calendar days from and after said date. It is expressly agreed that except for extensions of time duly granted in the manner and for the reasons specified in the General Conditions, time shall be of the essence.

COMPENSATION TO BE PAID TO CONTRACTOR: The Owner agrees to pay and the Contractor agrees to accept in full consideration for the performance of the Contract, subject to additions and deductions as provided in the General Conditions, the sum of _____ dollars (\$ _____) being the total of the base bid plus the following addenda: ____, ____, _____. The sum is to be paid according to the schedule as provided in the General Conditions.

Pursuant to Labor Code, Section 1861, the Contractor gives the following certification: I am 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 I will comply with such provisions before commencing the performance of the work of this Contract.

IN WITNESS WHEREOF, the parties hereto on the day and year first above written have executed this agreement in four (4) counterparts.

Type of Contractor's organization: _____
If other than individual or corporation, list names of all members who have authority to bind firm.
_____, _____, _____

Firm Name: _____
Address: _____
Contractor's License No.: _____

IF OTHER THAN CORPORATION EXECUTE HERE
Signature: _____
Title: _____

Affix Seal
IF CORPORATION, FILL OUT FOLLOWING AND EXECUTE
If

Name of President of Corporation: _____

Corporation

Name of Secretary of Corporation: _____

Corporation is organized under the laws of State of _____

Signature: _____

Title: _____

Owner: COUNTY OF RIVERSIDE

Signature: _____

Title: Chairman - Board of Supervisors

Attest: Clerk - Board of Supervisors

By: _____

Title: _____

PAYMENT BOND

(Public Work - Civil Code Section 3247 et seq.)

The makers of this Bond are _____ as Principal and Original Contractor and _____, a corporation, authorized to issue Surety Bonds in California, as Surety, and this Bond is issued in conjunction with that certain public works contract dated _____, 2009 between Principal and County of Riverside, a public entity, as owner, for _____ dollars (\$ _____) the total amount payable. THE AMOUNT OF THIS BOND IS 100% OF SAID SUM. Said contract is for public work of: Riverside Center 5th Floor Aviation-CSA-Housing Tenant Improvement Project.

The beneficiaries of this Bond are as is stated in 3248 of the Civil Code and the requirements and conditions of this Bond are as is set forth in Sections 3248, 3249, 3250 and 3252 of said Code. Without notice, Surety consents to extension of time for performance, change in requirements, amount of compensation, or prepayment under said Contract.

Signed and Sealed this _____ Day of _____ 2009.

(Firm Name - Principal)

(Business Address)

By: _____
(Signature - Attach Notary's Acknowledgment)

(Title)

(Corporation Name - Surety)

(Business Address)

By: _____
(Signature - Attached Notary's Acknowledgment)

ATTORNEY-IN-FACT
(Title-Attach Power of Attorney)

Affix Seal
if
Corporation

Affix
Corporate
Seal

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PERFORMANCE BOND

The makers of this Bond, _____, as Principal, and _____ as Surety, are held and firmly bound unto County of Riverside, hereinafter called the Owner, in the sum of _____ Dollars (\$ _____) 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 this obligation is such, that whereas the Principal entered into a certain contract, hereto attached, with the Owner, dated _____, 2009 for the Riverside Center 5th Floor Aviation-CSA-Housing Tenant Improvement Project.

Now therefore, if the Principal shall well and truly perform and fulfill all the undertakings covenants, terms, conditions and agreements of said Contract during the original term of said Contract and any extension thereof that may be granted by the Owner, with or without notice to the Surety, and during the file of any guarantee required under the Contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions, and agreements of any and all duly authorized modifications of said Contract that may thereafter be made, then this obligation to be void, otherwise to remain in full force and virtue. Without notice, Surety consents to extension of time for performance, change in requirements, change in compensation or prepayment under said Contract.

Signed and Sealed this _____ Day of _____, 2009.

(Firm Name - Principal)

(Business Address)

By: _____
(Signature - Attach Notary's Acknowledgment)

(Title)

(Corporation Name - Surety)

(Business Address)

By: _____
(Signature - Attach Notary's Acknowledgment)

ATTORNEY-IN-FACT
(Title-Attach Power of Attorney)

Affix Seal
if
Corporation

Affix
Corporate
Seal

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**CONTRACTOR'S CERTIFICATE
REGARDING WORKERS' COMPENSATION**

Labor Code Section 3700

Every employer, except the State and all political subdivisions or institutions thereof, shall secure the payment of compensation in one or more of the following ways:

- (a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this State.
- (b) By securing from the Director of Industrial Relations, a Certificate of Consent to Self-Insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employees

I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of this Contract.

Principal

Principal

Title

(In accordance with Article 5 [commencing at Section 1860], Chapter, Part 7, Division 2 of the Labor Code, the above Certificate must be signed and filed with the Owner prior to performing any work under this Contract.)

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GENERAL CONDITIONS OF THE CONTRACT

ARTICLE 1 GENERAL PROVISIONS

1.1 DEFINITIONS

THE CONTRACT DOCUMENTS - The Contract Documents consist of the Contract, the Performance Bond and Payment Bond and any other bond required by the Contract, the drawings, the specifications, addenda issued prior to execution of the Contract, and all modifications thereto.

THE CONTRACT - The Contract Documents form the Contract. The Contract represents the entire and integrated agreement between the parties hereto, and supersedes all prior negotiation, representations, or agreements, either written or oral, including the bidding documents.

ACT OF GOD - An Act of God is an earthquake of magnitude 4.5 or greater on the Richter scale, flood, tornado, or other cataclysmic phenomenon of nature, or rain, snowstorm, windstorm, high water, or other natural phenomenon in excess of the normal as established by National Oceanic and Atmospheric Administration weather data.

ACCEPTANCE - Acceptance is when the County determines all of the Contract requirements have been completed. Execution of the Notice of Completion will signify acceptance. A copy of the Notice of Completion will be sent to the Contractor after execution by the County. Upon receipt of the Notice of Completion, the Contractor will be relieved of the duty of protecting the work, and the County will initiate final settlement and payment.

ARCHITECT - The use of the term Architect shall mean the individual, partnership, corporation, association or joint venture contracted by the County for the design of this Work, as designated on the title sheet of these specifications and Contract Documents.

BENEFICIAL OCCUPANCY - The right of the County to occupy all or any portion of the project prior to final Acceptance of the Work. Such occupancy does not constitute acceptance or completion by the Contractor of the Work or any portion thereof, nor will it relieve the Contractor of the responsibility for correcting defective work or materials found at any time before Acceptance of the Work.

COUNTY - The term County when used herein shall mean the Board of Supervisors of the County of Riverside, a political subdivision of the State of California.

CHANGE ORDER - A Change Order is the document issued by the County authorizing any change or adjustment to the Contract Documents in accordance with Article 19 of this Contract.

CONTRACT DRAWINGS - "Contract drawings" or "drawings" means and includes (a) all drawings which have been prepared on behalf of the County and are included in the Contract Documents and all clarification drawings issued by notice to the bidders thereto; (b) all drawings submitted pursuant to the terms of the Contract by the Contractor to the County during the progress of the Work, which are accepted by the County.

CONTRACTOR'S AGENT - The representative of the Contractor, approved by the County, who

shall be present at the Work and be authorized to receive and act upon instructions from the County and to execute and direct the Work on behalf of the Contractor.

CONTRACTOR - When used herein, Contractor means the prime or principal Contractor licensed to perform work in the State of California, including all joint ventures. References to subcontractor or others are only for convenience and all such references shall be considered to refer to the Contractor. The prime or principal Contractor shall be responsible for all subcontractors, and all subcontractors shall require their subcontractors to comply with the relevant provisions of the prime or principal contract.

CRITICAL PATH METHOD(CPM) - "Critical Path Method" is a schedule technique.

DAY - The use of "day" herein means calendar day and shall include every day including Saturdays, Sundays, and legal holidays.

DIRECTOR - The use of "Director" shall mean the Assistant County Executive Officer/EDA of the County or his designated representative.

INSTALL - When used herein, "install" shall mean the complete installation, in place, of any item, equipment or material.

MATERIAL - Material shall be construed to include machinery, equipment, manufactured articles, or construction such as form work, fasteners, etc., and any other classes of material to be furnished in connection with the Contract. All materials shall be new.

NOTICE OF COMPLETION - The Notice of Completion ("NOC") shall be issued at that point in the Contract when the Contractor has completed all Work required in the Contract Documents. The time for issuance shall be determined by the County through a final inspection. The NOC shall be issued by the Board of Supervisors.

NOTICE TO PROCEED - The Notice to Proceed is the written notification from the County giving the Contractor notice to commence with the Work. The Notice to Proceed will specify the start date for the Work and the completion date.

REQUEST FOR INFORMATION - (RFI) The form and procedure established for communication between the Contractor and the County to clarify or interpret the Contract Documents.

REQUEST FOR QUOTATION - (RFQ) A document consisting of supplemental details, instruction, or information issued by the Architect, through the County, for the purpose of obtaining price quotations for possible changes in the Work.

SHALL - When used herein, "shall" means anything, which is mandatory to be performed by the Contractor.

SPECIFICATIONS - The term "Specifications" means that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards and workmanship for the Work.

SUBCONTRACTOR - The term "Subcontractor" means a person or firm that has a contract with Contractor or with another subcontractor to perform a portion of the Work. Unless otherwise specifically provided, the term Subcontractor includes Subcontractors of any tier, suppliers, manufacturers, and distributors. The term Subcontractor is referred to throughout the Contract Documents as if singular in number.

WORK - The term "Work" comprises the services and materials required by the Contract Documents, as may be amended, and includes all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in such construction.

1.2 AUTHORITIES AND LIMITATIONS

- 1.2.1** The Board of Supervisors alone have the power to bind the County and to exercise the rights, responsibilities, authorities, and functions vested therein by the Contract Documents, except that they shall have the right to designate authorized representatives to act for them.
- 1.2.2** Neither the Contract, nor any part thereof, nor moneys due or to become due there under may be assigned by the Contractor without the prior written approval of the County, with the exception of the assignments to County which may be required under the terms of this Contract.

1.3 LEGAL REQUIREMENTS

- 1.3.1** Contractor shall keep informed of, and comply with, all federal, state and county laws, ordinances, rules, and regulations applicable to the Work or to those engaged or employed in the Work of this Contract, especially (but not limited to) those laws relating to hours of employment, prevailing wages, payment of wages, sanitary and safety conditions for workers, workers' compensation insurance, type and kind of materials that can be used, non-discrimination in employment and affirmative action programs. Failure to identify a specific provision in these Contract Documents shall not excuse the Contractor from complying with such applicable statutory requirements.
- 1.3.2** If conflict arises between provisions of the Contract Documents and any such laws, rules, or regulations, the Contractor shall notify the County at once in writing. If, before receiving clarification, Contractor performs any portion of the Work affected by such apparent conflict, such performance shall be at Contractor's own risk. Contractor shall not be entitled to any additional compensation or time by reason of the conflict or its later correction.
- 1.3.3** All work and materials shall be in full accordance with the latest applicable (or otherwise noted) codes, rules, and regulations including, but not limited to, the following:
- .Uniform Building Code
 - .Uniform Plumbing Code
 - .Uniform Mechanical Code
 - .Uniform Fire Code
 - .State Fire Marshal
 - .State Industrial Accident Commission's Safety Orders
 - .Rules of Local Utilities

1.3.4 Nothing in the specifications is to be construed to permit work not conforming to the above, and expense incurred complying with the above shall be borne by the Contractor. Whenever the specifications and working details require higher standards than those required by the ordinances, codes and statutes, the specifications and working details shall take priority over the ordinances, codes and statutes.

1.3.5 In submitting a bid on this public works projects, or any subcontractor agreeing to supply goods, services, or materials, and entering a contract pursuant thereto, the contractor and/or subcontractor do offer and agree to assign the County all rights, title, and interest in and to all causes of action it may have under Section 4 of the Clayton Act (15 U.S.C. Section 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final acknowledgment by the parties.

1.4 STANDARD REFERENCES

1.4.1 All documents and publications (such as, but not limited to, manuals, handbooks, codes, standards, and specifications) which are cited in this Contract for the purpose of establishing technical (non-administrative) requirements applicable to equipment, materials, or workmanship under this Contract, shall be deemed to be incorporated herein as though fully set forth.

1.4.2 Whenever reference is made to any particular document or publication, the Contractor shall comply with the requirements set out in the edition specified in this Contract, or if not specified, the latest edition or revision thereof, in effect on the date of the solicitation of bid on this project, except as modified by, as otherwise provided in, or as limited to type, class, or grade, in the specifications of this Contract.

1.5 PERMITS, LICENSES, FEES & TAXES

1.5.1 COUNTY'S RESPONSIBILITIES

- a. The County will apply for all plan checks and will apply for and obtain the Building Permit(s), the Grading Permit and Construction Permits required by the County of Riverside, paying all fees in connection therewith.
- b. The County will furnish, at no expense to the Contractor, all on-site inspection of the Work and will arrange and pay for off-site inspection only as noted in the Contract Documents.

1.5.2 CONTRACTOR'S RESPONSIBILITIES

- a. The Contractor shall obtain and pay for all other permits and licenses required for the Work, including excavation permit and for plumbing, mechanical and electrical work and for operations in or over public streets or right of way under jurisdiction of public agencies other than the County.
- b. Exclusive of off-site inspection specified herein to be the County's responsibility, the Contractor shall arrange and pay for all off-site inspection of the Work, including certification, required by the specifications, drawings, or by governing authorities.
- c. Before Acceptance of the project by the County, the Contractor shall submit all licenses,

permits, and certificates of inspection to the County.

1.6 SEPARATE CONTRACTS

- 1.6.1** The County reserves the right to perform work related to this project with its own forces, and to award separate contracts in connection with other portions of the project or other work on the site. The Contractor shall cooperate with others in the prosecution of all work and shall not interfere with material, appliances or workmen of the County or any other contractor engaged by the County at the site of the Work. In case of disagreement regarding such use, the matter shall be referred to the County whose decision relative to said use shall govern.
- 1.6.2** The Contractor shall afford the County and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work, and shall properly connect and coordinate Contractor's Work with theirs.
- 1.6.3** If any part of the Contractor's Work depends for proper execution or results upon the work of the County or any separate contractor, the Contractor shall inspect and promptly report to the County any discrepancies or defects in such other work that render it unsuitable for such proper execution and results. Failure of the Contractor to so inspect and report shall constitute an acceptance of the County's or the separate contractor's work as fit and proper to receive the Work, except as to defects which may develop in the other separate contractor's work after the execution of the Contractor's Work.
- 1.6.4** Should the Contractor cause damage to the work or property of any separate contractor on the Project, the Contractor shall, upon due notice, settle with such other contractor by agreement, if both will so settle. If such separate contractor sues the County because of any damage alleged to have been so sustained, the Contractor agrees to indemnify and defend the County in such proceedings with the County retaining the right to select and hire independent counsel for the County paid by the Contractor.
- 1.6.5** Any cost caused by defective or ill-timed work shall be borne by the party responsible therefore.

1.7 COUNTY'S AUTHORIZED REPRESENTATIVE, INSPECTOR(S), & ARCHITECT

1.7.1 AUTHORIZED REPRESENTATIVE

The County shall designate a representative during the Work, who shall have the right to be present at the job site during construction and shall supervise any additional representatives appointed by the County.

1.7.2 INSPECTOR(S)

The Inspector(s) shall have the right to observe the installation of all materials and equipment to be incorporated into the Work and the placing of such material and equipment to determine in general if the Work is proceeding in accordance with the Contract Documents. The Inspector(s) is not authorized to make changes in the Contract Documents. On the basis of his observations, he shall keep the County informed as to the progress of the Work. The Inspector shall not be responsible for means, methods, techniques, sequences, or procedures of construction nor for safety precautions and programs in connection with the Work. Nor will the inspector be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

1.7.3 ARCHITECT

- a. The County has retained an Architect for this project. The Architect will advise and consult with the County, and the County will issue instructions to the Contractor. The Architect will be requested to interpret the requirements of the Contract. When requested by the County, the Architect will, within a reasonable time, render such interpretations as he may deem necessary for the proper execution of the Work.
- b. The Architect will make periodic visits to the job site to familiarize himself generally with the progress and quality of the Work and to determine in general whether the work is proceeding in accordance with the Contract Documents. Based on such observations he will recommend approval of applications for progress payments made by Contractor. The Architect shall not be responsible for means, methods, techniques, sequences, or procedures of construction nor for safety precautions and programs in connection with the Work. Nor will the Architect be responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents.

ARTICLE 2 BONDS AND INSURANCE

2.1 BIDS OF \$25,000 OR LESS

2.1.1 If the total amount bid on the Work is \$25,000 or less, the payment bond and performance bond are not required, provided that one payment of all compensation shall be made following Acceptance of all work.

2.2 BONDS

2.2.1 GENERAL REQUIREMENTS

a. Before commencing any Work under this Contract, the Contractor shall file four of each bond with the County. These bonds shall be in the amounts and for the purposes specified below. They shall be surety bonds issued by:

- (1) Either a California Admitted Surety OR a current Treasury Listed Surety (Federal Register).

And

- (2) Either a current A.M. Best A VIII rated Surety OR an admitted surety insurer which complies with the provisions of the Code of Civil Procedure, § 995.660.

b. Should any surety or sureties upon said bonds or any of them become insufficient, Contractor shall renew said bond or bonds with good and sufficient sureties within ten (10) calendar days after receiving notice from the County that the surety or sureties are insufficient. Cost of bonds shall be included in the bid price.

2.2.2 PERFORMANCE BOND

The successful bidder shall deliver to the County an executed Performance Bond on the attached form in an amount equal to 100% of the accepted bid as security for the faithful performance of the Contract.

2.2.3 PAYMENT BOND

The successful bidder shall deliver to the County an executed *Payment Bond* on the attached form in an amount equal to 100% of the accepted bid as security for the payment of all persons performing labor and furnishing materials in connection with the Work.

2.3 INSURANCE

2.3.1 GENERAL REQUIREMENTS

Before commencing this Work under the Contract, and without limiting or diminishing CONTRACTOR'S obligation to indemnify and hold the COUNTY harmless, the Contractor shall procure and maintain, or cause to be maintained at its sole cost and expense, the following insurance coverages during the term of this Contract.

2.3.2 WORKERS' COMPENSATION INSURANCE

Contractor shall secure Workers' Compensation Insurance (Coverage A) as prescribed by the laws of the State of California. Policy shall include Employers' Liability (Coverage B) including Occupational Disease with limits not less than \$1,000,000 per person per accident. Policy shall be endorsed, if applicable, to provide a Borrowed Servant/Alternate Employer Endorsement, and contain a Waiver of Subrogation in favor of the County of *Riverside* Pursuant to Section 3700 of the Labor Code of the State of California, Contractor shall file with the County before commencing the Work the following signed certification:

"I am aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that Code, and I shall comply with such provisions before commencing the performance of the Work of this Contract."

2.3.3 COMMERCIAL GENERAL LIABILITY:

Commercial General Liability insurance coverage, including but not limited to, premises liability, contractual liability, products/completed operations if applicable, personal and advertising injury – which may arise from or out of CONTRACTOR'S operations, use, and management of the premises, or the performance of its obligations hereunder. Policy shall name the County of Riverside—it's Director's, Officers, special Districts, Board of Supervisors, employees, agents or representatives as Additional Insured, and contain a Waiver of Subrogation in favor of the County of Riverside. Policy limits shall not be less than \$1,000,000 per occurrence combined single limits. If such insurance contains a general aggregate limit, it shall apply separately to this agreement or be no less than two (2) times the occurrence limit. Policy shall also contain coverage for \$5,000 Medical Payments coverage per accident, per person, and Fire Legal Liability in an amount not less than \$50,000.

2.3.4 VEHICLE LIABILITY:

If CONTRACTOR'S vehicles or licensed mobile equipment are used on County property, or used in any manner on behalf of the County, CONTRACTOR shall maintain auto liability insurance for all owned, non-owned and hired automobiles in an amount not less than \$1,000,000 per occurrence combined single limit, \$2,000,000 in the aggregate. Policy shall name the County of Riverside, its Director's Officers, Special

original Certificate(s) of Insurance and certified original copies of Endorsements effecting coverage as required herein, or 2) if requested to do so in writing by the County Risk Manager, provide original Certified copies of policies including all Endorsements and all attachments thereto, showing such insurance is in full force and effect. The County of Riverside, its Director's and Officers, Special Districts, Board of Supervisors, elected officials, employees, agents or representatives are named as Additional Insureds. Further, said Certificate(s) and policies of insurance shall contain the covenant of the insurance carrier(s) that shall provide no less than thirty (30) days written notice be given to the County of Riverside prior to any material modification or cancellation of such insurance. In the event of a material modification or cancellation of coverage, this Agreement shall terminate forthwith, unless the County of Riverside receives, prior to such effective date, another properly executed original Certificate of Insurance and original copies of endorsements or certified original policies, including all endorsements and attachments thereto evidencing coverages set forth herein and the insurance required herein is in full force and effect. **CONTRACTOR shall not take possession, or use the Premises, or commence operations under this Agreement until the County of Riverside has been furnished original Certificate(s) of Insurance and certified original copies of Endorsements or policies of insurance including all Endorsements and any and all other attachments as required in this Section. The original Endorsements for each policy and the Certificate of Insurance shall be signed by an individual authorized by the insurance carrier to do so on its behalf.**

- c. It is understood and agreed to by the parties hereto and the insurance company(s), that the Certificate(s) of Insurance and policies shall so covenant and shall be construed as primary, and the COUNTY'S insurance and/or deductibles and/or self-insured retentions or self-insured programs shall not be construed as contributory.

The County of Riverside's Reserved Rights-Insurance. The County of Riverside reserves the right to adjust the monetary limits of insurance coverage's during the term of this agreement or any extension thereof-if in the County Risk Manager's reasonable judgment, the amount or type of insurance carried by the CONTRACTOR becomes inadequate.

- d. CONTRACTOR shall pass down the insurance obligations contained herein to all tiers of sub-consultants working under this Agreement.

2.4 INDEMNITY AND HOLD HARMLESS

- 2.4.1 CONTRACTOR agrees to and shall indemnify and hold the COUNTY-its officers, employees and agents free and harmless from any and all claims, actions, damages and liabilities of whatsoever kind and nature arising from death, personal injury, property damage or other cause asserted or, based upon any negligent act or omission of CONTRACTOR, its employees, agents, invitees, or any subcontractor of CONTRACTOR relating to or in any way connected with the accomplishment of the work or performance of services under this Agreement, regardless of the existence or degree of fault or negligence on the part of the COUNTY or any officer or employee of said COUNTY, other than the sole active negligence or willful misconduct of COUNTY-its Directors and Officers, Special Districts, Board of Supervisors, elected officials, employees, agents or representatives. As part hereto of the foregoing indemnity CONTRACTOR agrees to protect and defend at its own expense, including attorneys' fees the COUNTY-its Directors and Officers, Special Districts, Board of Supervisors, elected officials, employees, agents or representatives from any and all legal action based upon any acts or omissions, as stated hereinabove, by any person or persons.

- 2.4.2 If any such claim, action, or proceeding is brought against County or County's officers, agents, employees, or independent contractors, Contractor, upon notice from County, shall defend the same at Contractor's expense by counsel satisfactory to County.
- 2.4.3 County shall promptly notify Contractor of any claim, action, or proceeding against County or County's officers, agents employees, independent contractors, and consultants relating to the performance, or omission to perform, any term or condition of this Contract. County shall cooperate fully in the defense of such claim, action, or proceeding.
- 2.4.4 County shall not be liable or responsible for any accident, loss or damage occurring to the Work prior to the completion and Acceptance of same, unless otherwise specifically agreed to at the time of occupancy by the County.

ARTICLE 3 SITE CONDITIONS

3.1 DIFFERING SITE CONDITIONS

- 3.1.1 The Contractor shall have reviewed and ascertained pertinent local conditions such as location, accessibility, and general character of the site and satisfy himself as to the conditions under which the Work is to be performed. No claim for allowances shall be made because of Contractor's error or negligence in acquainting himself with the conditions at the site.
- 3.1.2 The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by County. The Contractor shall promptly report in writing to County any errors, inconsistencies, or omissions in the Contract Documents or inconsistencies with applicable code requirements observed by Contractor.
- 3.1.3 If Contractor performs any construction activity which it knows or should know involves an error, inconsistency, or omission without notifying and obtaining the written consent of County, Contractor shall be responsible for the resultant losses, including, without limitation, the costs of correcting defective work.
- 3.1.4 The County will furnish surveys necessary to properly locate the property and establish the boundaries thereof with general reference points as well as to enable the Contractor to proceed with the Work.
- 3.1.5 The Contractor shall provide competent engineering services to lay out the Work and all parts thereof and to establish all grades and elevations in accordance with the Contract requirements. He shall verify the figures shown on the survey and approach drawings before undertaking any construction work and shall be responsible for the accuracy of the finished work.
- 3.1.6 The Contractor shall protect and preserve established bench marks and monuments and shall make no changes in locations without the written approval of the County. Any bench marks or monuments that are lost or destroyed shall be replaced by the Contractor subsequent to notification and approval from County.

3.2 SITE INVESTIGATION AND CONDITIONS AFFECTING THE WORK

- 3.2.1 The Contractor acknowledges by submission of his/her bid that he has satisfied himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, including any exploratory work deemed

necessary by the Contractor. Any failure of the Contractor to take the actions described and acknowledged in this paragraph will not relieve the Contractor from responsibility for estimating the difficulty and cost of successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to the County.

3.3 DIMENSIONS AND MEASUREMENTS

- 3.3.1** All dimensions shown for existing conditions and all dimensions required for work that is to connect with work now in place, shall be verified and calculated by the Contractor by actual measurement of the existing work. Any discrepancies between the Contract Documents and the existing conditions shall be referred to the authorized representative of the County before any work affected thereby has been performed. Failure to notify the County before starting work will be considered acceptance by the Contractor. Where doubts as to dimensions exist, County shall determine the correct dimensions.

ARTICLE 4 SPECIFICATIONS AND DRAWINGS

4.1 GENERAL PROVISIONS

4.1.1 SUBDIVISIONS

For convenience, the specifications are arranged into several sections, but such separation shall not be considered as the limits of the work required of any separate trade. The terms and conditions of such limitations are wholly between the Contractor and his subcontractors. Requirements contained in any section are required as if contained in all sections and are the responsibility of the Contractor. The Contractor, prior to awarding subcontracts, will assure the Work required as a whole has been coordinated among the subcontracts.

4.1.2 RECORD DOCUMENTS

- a. The Contractor shall keep on the Work site a copy of the awarded construction documents (drawings and specifications) and shall at all times give the County and Architect access thereto.
- b. The Contractor will be given one set of drawings and specifications which shall be kept at the site of the Work at all times and updated weekly. Payment may be withheld if drawings are not kept current. Exact locations of all pipes and conduits and all changes in construction and details shall be indicated and dimensions provided upon these drawings, and all changes in materials and equipment installed shall be indicated in these specifications. Upon completion and prior to Acceptance of the Work, a final reproducible (transparencies) set of project record documents and specifications shall be submitted to the County by the Contractor. County will furnish a set of reproducibles.
- c. The working details will indicate dimensions, position, and kind of construction, and the specifications, qualities, and methods. Any Work indicated on the working details and not mentioned in the specifications, or vice versa, shall be furnished as though fully set forth in both. Work not particularly detailed, marked, or specified shall be the same as similar work that is detailed, marked, or specified.
- d. In case of discrepancy in the documents, the matter shall be promptly submitted to the County, who shall make a determination in writing. Any adjustment by the Contractor without such a determination shall be at its own risk and expense. The County shall furnish from time to time such

detailed information as considered necessary to clarify the Work.

- e. Where the word "similar" occurs on the drawings, it shall have a general meaning and not be interpreted as meaning identical, and all details shall be worked out in relation to their location and their connection with other parts of the work.
- f. Standard details or specification drawings are applicable when listed, bound with specifications, noted on the drawings or referenced elsewhere in the specifications. Where the notes on the drawings indicate modifications, such modifications shall govern.
- g. All drawings, specifications and copies thereof furnished to the Contractor are the property of the County and shall not be used on other work without its consent. Upon completion of this project, all copies of the drawings and specifications shall be returned to the County.

4.2 SUMMARY OF THE ORDER OF THE PROCEDURE

4.2.1 In case of conflicts between the Contract Documents, the order of precedence shall be as follows:

- 1) Modifications or changes last in time are first in precedence.
- 2) Addenda.
- 3) County-Contractor agreement.
- 4) General Conditions except for specific modifications thereto stated in the Supplementary Conditions.
- 5) Supplementary Conditions.
- 6) Division One Specifications.
- 7) Division Two through Sixteen Specifications.
- 8) Drawings - as between figured dimensions given on drawings and the scaled measurements, the figured dimension shall govern; as between large-scale drawings and small-scale drawings, the larger scale shall govern.
- 9) Structural drawings
- 10) Architectural drawings.
- 11) As between detailed drawings and typical details bound within the specifications, the detailed drawings govern.
- 12) In the event provisions of codes, safety orders, contract documents, referenced manufacturer's specifications or industry standards are in conflict, the more restrictive and higher quality shall govern.
- 13) Schedules shown on the drawings take precedence over conflicting information given on other drawings.
- 14) Mechanical drawings.
- 15) Electrical drawings.

4.3 CLARIFICATIONS/REQUEST FOR INFORMATION AND ADDITIONAL INSTRUCTIONS

4.3.1 NOTIFICATION BY CONTRACTOR

- a. Should Contractor discover what he perceives to be conflicts, omissions, or errors in the Contract Documents, or have any question concerning interpretation or clarification of the Contract Documents, or if it appears that the work to be done or any matters relative thereto are not

sufficiently detailed or explained in the Contract Documents, then, before proceeding with the work affected, Contractor shall notify County's authorized representative in writing, and request interpretation, clarification, or additional detailed information concerning the work. The Contractor shall ask for the clarification (Request for Information) immediately upon discovery but no less than 14 calendar days prior to the start date of the activities related to the clarification, based on the latest updated version of the accepted Progress Schedule. County, whose decision shall be final and conclusive, shall resolve such questions and issue instructions to Contractor. Should Contractor proceed with work affected before receipt of instructions from County, Contractor shall remove and replace or adjust work which is not in accordance with the instructions from County and shall be responsible for resultant damage, defect or added cost. In event of failure to agree as to scope of Contract requirements, Contractor shall follow the procedure set forth in the DISPUTES article.

- b. The Contractor shall not be entitled to any compensation for delays, disruptions, inefficiencies or additional administrative effort caused by the Contractor's untimely review of the Contract Documents for potential conflicts, omissions, discrepancies or ambiguities.
- c. County may charge back to the Contractor, time and expense associated with RFI's, as may be reasonably determined by the County to be unnecessary.

4.3.2 ADDITIONAL DETAILED INSTRUCTIONS

- a. The County may furnish additional detailed written instructions on any Request for Information to further explain the Work. If in the opinion of Contractor, the additional detailed instructions constitute work in excess of the scope of the Contract, he must submit written notice thereof immediately to the County, but no later than seven (7) calendar days following receipt of such instruction(s), and in any event prior to commencement of work thereon. The Contractor shall not be entitled to additional compensation due to any additional instructions unless the Contractor shall have given the appropriate written notice. County will then consider such notice and, if in its judgment it is justified, the County instructions will be revised or extra work shall be authorized by Change Order. In the event of a dispute hereunder, attention is directed to the DISPUTES article.

ARTICLE 5 SHOP DRAWINGS AND SUBMITTALS

5.1 SHOP DRAWINGS, PRODUCT DATA, COORDINATION DRAWINGS AND SCHEDULES

5.1.1 Shop drawings are drawings submitted to the County by the Contractor showing detail of the proposed fabrication and assembly of structural elements and the installation (i.e., form, fit, and attachment details) of materials or equipment. It includes drawings, diagrams, layouts, schematics, descriptive literature, illustrations, schedules, fabrication, erection and setting drawings, manufacturers' scale drawings, wiring and control diagrams, cuts or entire catalogs, pamphlets, and performance and test data, and similar materials furnished by the Contractor to explain in detail specific portions of the Work required by the Contract. The County may duplicate, use, and disclose in any manner and for any purpose shop drawings delivered under this Contract.

5.1.2 The Contractor shall coordinate all shop drawings and review them for accuracy, completeness, and compliance with Contract requirements, and shall indicate its approval thereon as evidence of such coordination and review. Shop drawings submitted to the County without evidence of the Contractor's approval shall be returned for resubmission. The Architect will indicate review for compliance of the shop drawings, and if not in compliance as submitted, shall indicate the reasons therefore. Any work done before

such review shall be at the Contractor's risk. Review by the Architect shall not relieve the Contractor from responsibility for any errors or omissions in such drawings, nor from responsibility for complying with the requirements of this Contract, except with respect to variations described and approved in accordance with paragraph 5.1.3.

- 5.1.3** If shop drawings show any variations from the Contract requirements, the Contractor shall describe such variations in writing, separate from the drawings, at the time of submission. If the Architect approves any such variation, no change in time or price will be allowed for Contractor changes. Should the Architect make changes on the shop drawings which affect time and/or cost, the Contractor will immediately notify the County with a Request for Information. If the Contractor fails to issue the Request for Information within seven (7) calendar days from receipt of the returned shop drawing, the Contractor shall have waived his right to any potential Change Order.
- 5.1.4** The Contractor shall submit shop drawings, coordination drawings, and schedules for review as required by the Contract Documents. The Contractor will provide a submittal schedule listing all shop drawings and submittals, the submission dates by the Contractor, and return dates from the Architect. This schedule will be provided fourteen (14) calendar days after the Notice to Proceed.
- 5.1.5** Shop drawings and schedules, other than catalogs, pamphlets, and similar printed material, shall be submitted with one reproducible plus one copy.
- 5.1.6** Each shop drawing or coordination drawing shall have a blank area 4 by 4 inches located adjacent to the title block. The title block shall display the following:
- 1) Number and title of drawing
 - 2) Date of drawing or revision
 - 3) Name of project building or facility
 - 4) Name of Contractor and (if appropriate) name of subcontractor submitting drawings
 - 5) Clear identity of contents and location on the work
 - 6) Project title and project number
 - 7) Submittal number
- 5.1.7** Unless otherwise provided in this Contract or otherwise directed by County, shop drawings, coordination drawings, and schedules shall be submitted to the Architect with a letter, sufficiently in advance of construction requirements to permit no less than twenty (21) calendar days for checking and appropriate action.

5.2 SAMPLES

- 5.2.1** After the award of the Contract, the Contractor shall deliver samples required by the specifications to the County for approval. The Contractor shall prepay any shipping charges. Any materials or equipment for which samples are required shall not be used in the Work until reviewed by County.
- 5.2.2** Each sample shall have a label indicating:
- 1) Name of project building or facility, project title, and project number.
 - 2) Name of Contractor and, if appropriate, name of subcontractor.
 - 3) Identification of material or equipment with specification requirement.
 - 4) Place of origin.
 - 5) Name of manufacturer and brand (if any).

6) Identify by specification section.

- 5.2.3 Samples of finished materials shall have additional markings that will identify them in reference to the finish schedules.
- 5.2.4 The Contractor shall mail a letter in triplicate under separate cover submitting each shipment of samples and containing the information required in paragraph 5.2.2. He shall enclose a copy of this letter with the shipment and send a copy to the County representative on the project. Approval of a sample shall be only for the characteristics or use named in such review and shall not be construed to change or modify any Contract requirement. Substitutions will not be permitted unless they are approved under paragraph 5.3.
- 5.2.5 Approved samples not destroyed in testing will be sent to the County. Approved samples of hardware in good condition will be marked for identification and may be used in the Work. Materials and equipment incorporated in the Work shall match the approved samples. Other samples not destroyed in testing or not approved will be returned to the Contractor at his expense if so requested at time of submission.
- 5.2.6 Failure of any material to pass the specified tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material or equipment under this Contract.
- 5.2.7 Samples of various materials or equipment delivered on the site or in place, may be taken by the County for testing. Samples failing to meet Contract requirements will automatically void previous approvals of the items tested. The Contractor shall replace such materials or equipment found not to have met Contract requirements, or there shall be a proper adjustment of the Contract price as determined by the County.
- 5.2.8 Unless otherwise specified, when tests are required, only one test of each sample proposed for use will be made at the expense of the County. Samples which do not meet specification requirements will be rejected. Requests for testing of additional samples by Contractor may be made by the County at the expense of the Contractor.

5.3 SUBSTITUTIONS

- 5.3.1 Wherever the name, or brand, or manufacturer of an article is specified in the Contract Documents, it is used as a measure of quality and utility or a standard. Except in those instances where the product is designated to match others presently in use, specifications calling for a designated material, product, thing or service by specific brand or trade name shall be deemed to be followed by the words "or equal" so that bidders may propose any equal material, product, thing or service in their bid. If the Contractor desires to use any other brand or manufacturer of equal quality and utility to that specified, he shall list definite particulars of that which he considers equivalent to the specified item in his bid. The Contractor shall have thirty-five (35) days after the award of the Contract for submission of data substantiating substitution of "equal" items. The County will then determine whether or not the proposed name brand or article is equal in quality and utility to that specified in the Contract Documents, and its written decision shall be final.
- 5.3.2 No proposal will be considered unless accompanied by complete information and descriptive data necessary to determine the equality of the offered materials, articles, or equipment. Samples shall be provided when requested by the County.
- 5.3.3 The burden of proof as to the comparative quality or suitability of the offered materials, articles, or equipment shall be upon the Contractor. The County shall be the sole judge as to such matters. In the event that the

County rejects the use of such alternative materials, articles, or equipment, then one of the particular products designated by brand name in the specifications shall be furnished.

- 5.3.4 The County will examine Contractor's submittals with reasonable promptness. Return of the submittals to the Contractor shall not relieve the Contractor from responsibility for deviations and alternatives from the Contract Documents nor shall it relieve him from responsibility for errors in the submittals. A failure by the Contractor to identify, in his letter of transmittal, material deviations from the Contract Documents shall void the submittal and any action taken thereon by the County. When specifically requested by the County, the Contractor shall resubmit such shop drawing(s), descriptive data, and samples as may be required.
- 5.3.5 If any mechanical, electrical, structural, or design revisions are required for the proper installation and fit of alternative materials, articles, or equipment, or because of deviations from the Contract Documents, such changes shall not be made without the consent of the County's authorized representative, and shall be made without additional cost to the County, such costs, including the fees of the Architect, to be borne by the Contractor.

ARTICLE 6 SCHEDULES

6.1 CONSTRUCTION SCHEDULE

- 6.1.1 The Contractor shall prepare and submit to the County a practicable schedule showing the order in which the Contractor proposes to perform the work, and the dates on which the Contractor contemplates starting and completing the salient features of the work (including acquiring materials and equipment). The schedule shall be in the form of a CPM (critical path method) schedule, of suitable scale to indicate appropriately the percentage of work scheduled for completion by any given date during the period. The scheduled completion date shall be the same as the contractual completion date, for the initial schedule and subsequent updates. Any proposed early completion date shall show the difference between that date and the contract completion date as Float, which shall belong to both the County and Contractor.
- 6.1.2 If, in the opinion of the County, the Contractor falls behind the approved schedule, the Contractor shall take steps necessary to improve its progress, without additional cost to the County. The Contractor shall submit any supplementary schedule or schedules in CPM form as the County deems necessary to demonstrate how the approved rate of progress will be regained.
- 6.1.3 All schedule updates must accurately reflect the as-built schedule. There shall be no change to the Critical Path without the County's written consent.

ARTICLE 7 TIME, LIQUIDATED DAMAGES AND EXTENSIONS

7.1 TIME OF WORK

The Contractor shall commence work on this project immediately upon receipt of the written Notice to Proceed and shall perform the work diligently to completion within the number of calendar days specified in the Contract. Neither site access nor physical work shall be commenced before the Contract is fully executed, and bonds, insurance and the schedule are submitted as required by the Contract Documents. No work shall be done on Saturday, Sunday and holidays and no work shall be performed outside of normal working hours without the prior written consent of the County, unless required by these Specifications. See: Working Hours.

7.2 LIQUIDATED DAMAGES

If the Work is not completed within the time required, damage will be sustained by the County. It is and will be impracticable and extremely difficult to ascertain and determine actual damage which County will sustain by reason of such delay; and it is therefore agreed that Contractor will pay to County the sum of \$850.00 per day for each and every day's delay in finishing the Work beyond the time prescribed. If the Contractor fails to pay such liquidated damages, the County may deduct the amount thereof from any money due or that may become due the Contractor under the Contract.

7.3 UNAVOIDABLE DELAYS

7.3.1 TIME EXTENSION

- a. The Contractor will be granted an extension of time for completion of the Work beyond that named in the Contract Documents, for delays which may result through causes beyond the control of the Contractor and which he could not have avoided by the exercise of care, prudence, foresight and diligence. The appropriate extension of time shall constitute full compensation. Costs associated with extended overhead will not be considered.
- b. If the Contractor is allowed extensions of time in which to complete the Work equal to the sum of all unavoidable delays, plus any adjustments of contract time due to contract change orders, during such extension of time liquidated damages shall not be charged to the Contractor.
- c. Unavoidable delays within the meaning of this section shall be those caused by Acts of God or of the public enemy, fire, epidemics, or strike. There will be no liquidated damages for delays as described within this paragraph.
- d. Delays in the performance of parts of the work which may in themselves be unavoidable, but do not necessarily prevent or delay the performance of critical activity(s) while the activity(s) is on the Critical Path, will not be considered as unavoidable delays within the meaning of the contract and shall not be the basis of a claim for delay.

7.3.2 WEATHER

Inclement weather shall not be a prima facie reason for granting a time extension. The Contractor shall make every effort to continue work under prevailing conditions. However, if the inclement weather prevents the Contractor from beginning at the usual starting time, or prevents the Contractor from proceeding with seventy-five percent (75%) of the normal labor and equipment force towards completion of the day's current Critical Path activities (shown on the most current, and accepted schedule update) for a period of at least five (5) hours, and the crew is dismissed as a result thereof, the County will designate such time as unavoidable delay and grant a one (1) calendar day, non-compensable, time extension.

7.3.3 NOTICE OF DELAYS

- a. Whenever the Contractor foresees any delay in the performance of a Critical Path work activity, and in any event immediately upon the occurrence of any delay which he regards as

an unavoidable delay, the Contractor shall notify the County in writing of such delay and its cause, in order that the County may take immediate steps to prevent, if possible, the occurrence or continuance of the delay, and may determine whether the delay is to be considered avoidable or unavoidable, how long it continues, and to what extent the prosecution and completion of the work are to be delayed thereby.

- b. After the completion of any part or the whole of the Work, the County, in calculating the amount due the Contractor, will assume that any and all delays which have occurred have been avoidable delays, except such delays as shall have been called to the attention of the County at the time of their occurrence and found by the County to have been unavoidable as substantiated by a change order. The Contractor shall make no claims that any delay not called to the attention of the County at the time of its occurrence has been an unavoidable delay.

7.4 REQUEST FOR TIME EXTENSION

7.4.1 In the event the Contractor requests an extension of contract time for unavoidable delay, justification shall be submitted no later than seven (7) calendar days after the initial occurrence of any such delay. When requesting time for proposed change orders, the request(s) must be submitted with the proposed change order with full justification. If the Contractor fails to submit justification he shall waive his right to a time extension at a later date. Justification must be based on the currently accepted contract schedule as updated at the time of occurrence of delay or execution of work related to any change(s) in the scope of work. The justification must include a schedule, including, but not limited to, the following information:

- a. The duration to perform the activity relating to the change(s) in the work and the resources (manpower, equipment, material, etc.) required to perform these activities within the stated duration.
- b. Logical activity ties to the contract schedule for the proposed changes and/or delay showing the activity/activities in the schedule whose start or completion dates are affected by the change and/or delay.

7.4.2 The County, after receipt of such justification and supporting evidence, shall make its finding of fact. The County's decision shall be final and conclusive and the County will advise the Contractor in writing of such decision. If the County finds that the Contractor is entitled to any extension of Contract time, the County's determination as to the total number of days of extension shall be based upon the latest updated version of the approved contract schedule.

7.4.3 In the event the Contractor disagrees with the County's decision, the Contractor shall be required to submit a claim pursuant to the DISPUTE article.

ARTICLE 8 PERFORMANCE

8.1 SUPERVISION & CONSTRUCTION PROCEDURES

8.1.1 The Contractor shall supervise and direct the work. The Contractor shall be solely responsible for all construction means, methods, techniques, sequences, procedures, project safety, and shall coordinate all portions of the Work under the Contract, including the relations of the various trades to the progress of the

Work, in accordance with the provisions of the Contract Documents.

8.1.2 The Contractor shall be responsible to the County for the acts and omissions of the Contractor's employees, subcontractors, and their agents and employees, and any other persons performing any of the work under a contract with the Contractor.

8.1.3 The Contractor is an independent contractor and nothing in the Contract Documents shall be interpreted to make the Contractor an agent of the County.

8.2 SUPERVISION

8.2.1 Within seven (7) days after the Notice to Proceed, the Contractor shall provide to the County an organization chart outlining key job personnel. The Contractor will also provide a Letter of Authority or Corporate Resolution for the individual(s) authorized to sign documents on its behalf, i.e., payment requests, change orders, inspection reports, etc.

8.2.2 The Contractor shall employ, during the progress of the Work, a competent Project Superintendent and any necessary assistants, as approved by the County. The Project Superintendent shall not be changed except with the consent of the Authorized Representative of County, unless the Superintendent proves to be unsatisfactory to the Contractor or ceases to be in his employ. The County shall be notified immediately of any new Superintendent appointed to the Work and the Contractor shall submit qualifications for approval. The Superintendent shall represent the Contractor and all directions given to him shall be as binding as if given to the Contractor.

8.2.3 The County shall be supplied at all times with the name and telephone number of a person in charge of or responsible for the Work, who can be reached for emergency work twenty-four (24) hours a day, seven (7) days a week.

8.3 CONDUCT OF WORK

8.3.1 In connecting one kind of work with another, marring or damaging same will not be permitted and, in the event such occurs, shall be corrected by the Contractor at its cost prior to acceptance by the County. Should improper work of any trade be covered by another which results in damage or defects, the whole work affected shall be made good by the Contractor without expense to County.

8.4 PROTECTION OF WORK & PROPERTY

8.4.1 The Contractor shall continuously maintain adequate protection of the Work from damage and shall protect the County's property from injury or loss in connection with this Contract. He shall make good any such damage, injury, or loss, except what may be directly due to errors in the Contract Documents or caused by agents or employees of the County. He shall adequately protect adjacent property as provided by law and the Contract Documents.

8.4.2 The Contractor shall preserve and protect all structures, equipment, and vegetation (such as trees, shrubs, and grass) on or adjacent to the Work site which are not to be removed and which do not unreasonably interfere with the work required under this Contract.

8.4.3 The Contractor shall protect from damage all existing improvements and utilities at or near the Work site and

on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this Contract or failure to exercise reasonable care in performing the Work. If the Contractor fails to repair the damage promptly, the County may have the necessary work performed and charge the cost to the Contractor.

8.5 CONTRACTOR'S RESPONSIBILITY FOR WORK

8.5.1 Until Acceptance of the Work by the County, Contractor shall have the charge and care thereof and shall bear risk of injury or damage to any part of the Work by action of the elements. If a separate Contractor sues the Owner, on account of any loss so sustained, the County shall notify the Contractor, who shall indemnify and hold harmless the County against any expenses, or judgment arising therefrom.

8.5.2 Contractor, at its cost, shall rebuild, repair, restore and make good all damages from the elements to any portion of the Work occasioned by such causes before its Acceptance.

8.5.3 No advertising of any description will be permitted in or about the Work, except by order of the County.

8.5.4 Contractor shall not create or permit the continued existence of any nuisance in or about the Work.

8.6 UTILITIES

8.6.1 Unless otherwise provided for under separate sections herein, Contractor will arrange all water, gas, and electricity required for construction purposes until acceptance of the Work. Contractor shall pay for such services unless otherwise specifically noted.

8.6.2 Utilities shall not be interrupted except with the approval of the County. A two (2) work day written notice is required prior to any and all interruptions. Interruptions shall be scheduled so as to minimize duration and disruption to existing operations.

- 8.6.3**
- a. The Contractor shall send notices, make all necessary arrangements, and perform all other services required in the care and maintenance of all public utilities.
 - b. Enclosing or boxing in, for protection of any public utility equipment, shall be done by the Contractor. Upon completion of the Work, the Contractor shall remove all enclosures, and leave in a finished condition.
 - c. All connections to public utilities shall be made and maintained in a manner so as not to interfere with the continuing use of same by the County during the entire progress of the Work.

8.7 WORKING HOURS

8.7.1 All work shall be performed on a calendar day basis during the customary working hours of the trades involved unless otherwise specified in this Contract. Work performed by the Contractor of his own volition outside such established working hours shall be at no additional expense to the County and without County approval.

8.7.2 It is expressly stipulated that no laborer, workman, or mechanic employed at any time by the Contractor or by

any subcontractor(s) under this Contract upon the Work or any part thereof, shall be required or permitted to work thereon more than eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except, as provided by Section 1815 of the California Labor Code. It is further expressly stipulated that for each and every violation of Sections 1811-1815, inclusive, of the California Labor Code, all the provisions of which are deemed to be incorporated herein, said contractor shall forfeit, as a penalty to County, twenty-five dollars (\$25.00) for each laborer, workman, or mechanic employed in the execution of this Contract by contractor for each calendar day during which said laborer, workman, or mechanic is required or permitted to work more than eight hours in any one calendar day and forty hours in any one calendar week in violation of the provisions of said Sections of the Labor Code.

8.7.3 The Contractor, and each subcontractor, shall keep an accurate record showing the names of and actual hours worked each calendar day and each calendar week by all laborers, workmen, and mechanics employed by them in connection with the Work contemplated by this Contract, which record shall be open at all reasonable hours to the inspection of the County or its officers or agents and to the Division of Labor Standards Enforcement of the Department of Industrial Relations.

8.7.4 No construction work shall be done on Saturdays, Sundays or County holidays and no work shall be performed outside of normal working hours without the prior written consent of the County. In any event, all work shall be subject to approval of the County. Prior to start of such work, the Contractor shall arrange with the County for the continuous or periodic inspection of the Work and testing of materials, when necessary. If requests are made by the Contractor for permission to work overtime, nights, Saturdays, Sundays or County holidays, and such requests are granted, the Contractor shall bear all extra expense to the County for inspection and other incidental expenses caused by such overtime work. If contractors are requested, in the interest of the County, to work overtime by the County, or if overtime work is specifically required by these specifications, all extra expense of inspection will be paid by the County.

8.8 MATERIAL & EQUIPMENT

8.8.1 Materials, equipment, and articles incorporated into the Work shall be new and of equal quality to the types and grades specified. When not particularly specified, the Contractor shall submit for approval satisfactory evidence as to the kind and quality of material. See SUBSTITUTION provision 5.3 concerning "or equal" requirements and procedure for submitting alternative material, articles, or equipment.

8.8.2 All materials shall be delivered so as to insure a speedy and uninterrupted progress of the Work. All materials shall be stored so as to cause no obstruction and so as to prevent overloading of any portion of the structure on the Work site, and the Contractor shall be entirely responsible for damage or loss by weather, theft, vandalism, or other cause.

8.8.3 Materials shall be stored to assure the preservation of their quality and fitness for the Work. Stored materials shall be reasonably accessible for inspection. When considered necessary by the County, stored materials shall be placed on wooden platforms or on other hard, clean surfaces and not directly on the ground, and shall be placed under cover when so directed.

8.9 LAYOUT OF WORK

8.9.1 The Contractor shall lay out its work from established base lines and bench marks indicated on the drawings, and shall be responsible for all measurements in connection with the layout. The Contractor shall furnish, at its own expense, all stakes, templates, platforms, equipment, tools, material, and labor required to lay out any part

of the Work. The Contractor shall be responsible for executing the Work to the lines and grades that may be established or indicated in the Contract Documents. The Contractor shall also be responsible for maintaining and preserving all stakes and other marks established by the County until authorized to remove them. If such marks are destroyed by the Contractor before their removal is authorized, the County may replace them and deduct the expense of the replacement from any amounts due or to become due to the Contractor.

8.10 USE OF PREMISES

8.10.1 The Contractor shall maintain the entire premises under his control in an orderly condition. He shall store his apparatus, materials, supplies and equipment in such a manner as will not interfere with the progress of his work or the work of other contractors.

8.11 OPERATIONS & STORAGE

8.11.1 The Contractor shall confine all operations (including storage of materials) on County premises to areas authorized or approved by the County.

8.11.2 Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the County and shall be built with labor and materials furnished by the Contractor without expense to the County. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at his expense upon completion of the work.

8.11.3 The Contractor shall, under regulations prescribed by the authority having jurisdiction, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the authority having jurisdiction. When materials are transported in performance of the Work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or County regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair, or pay for the repair, of any damaged curbs, sidewalks, or roads.

8.12 HEAT/POWER/LIGHT

8.12.1 Unless otherwise specified or already provided by the County, the Contractor shall:

- a. Provide heat, as necessary to protect all work, materials, and equipment against injury from dampness and cold;
- b. Provide heat as necessary in the area where work is to be done to provide the minimum temperature recommended by the supplier or manufacturer of the material;
- c. Provide electric power and light as required for performance of the Work.

8.13 CLEANING UP

8.13.1 The Contractor shall at all times keep the work area, including storage areas, free from accumulations of waste materials. Before completing the Work, the Contractor shall remove from the work and premises any weeds, rubbish, tools, scaffolding, equipment, and materials that are not the property of the County. Upon completing the Work, the Contractor shall leave the work area in a clean, neat, and orderly condition satisfactory to the County.

ARTICLE 9 SAFETY & HEALTH

9.1 ACCIDENT PREVENTION

9.1.1 In performing this Contract, the Contractor shall provide for protecting the lives and health of employees and other persons; preventing damage to property, materials, supplies, and equipment; and avoiding work interruptions. For these purposes, the Contractor shall:

- a. Provide a copy of its safety program;
- b. Provide appropriate safety barricades, signs, and signal lights;
- c. Comply with standards issued by the U.S. Government, State, County and City, and other governing agencies having jurisdiction;
- d. Ensure that any additional measures the County determines to be reasonably necessary for this purpose are taken.

9.1.2 The Contractor shall maintain an accurate record of exposure data on all accidents incident to work performed under this Contract resulting in death, traumatic injury, occupational disease, or damage to property, materials, supplies, or equipment. The Contractor shall report this data in the manner prescribed by the County.

9.1.3 Before beginning excavation for a trench 5 feet or more in depth, Contractor shall provide evidence of having obtained a permit from the authority having jurisdiction.

9.1.4 Nothing herein shall be deemed to allow use of shoring, sloping, or protective systems less effective than those required by the Construction Safety Orders of the California Division of Industrial Safety.

9.2 SANITARY FACILITIES

9.2.1 Contractor shall supply and maintain at its expense such toilets and other sanitary facilities including those which are accessible by the disabled as per ADA and Title 24 requirements necessary for use by visitors and workers employed at the job site. Such facilities shall be approved by the County.

9.3 RESPONSIBILITY FOR COMPLIANCE WITH CAL-OSHA

9.3.1 All work, materials, work safety procedures and equipment shall be in full accordance with the latest Cal-OSHA rules and regulations.

9.3.2 Contractor warrants that he and each of his subcontractors shall, in performance of this Contract, comply with each and every compliance order issued pursuant to Cal-OSHA. The Contractor assumes full and total responsibility for compliance with Cal-OSHA standards by his subcontractors as well as himself. The cost of complying with any order and/or payment of any penalty assessed pursuant to Cal-OSHA shall be borne by the Contractor. Nothing contained therein shall be deemed to prevent the Contractor and his subcontractors from otherwise allocating between themselves responsibility for compliance with Cal-OSHA requirements; provided, however, that the Contractor shall not thereby, in any manner whatsoever, be relieved of his responsibility to the County as herein set forth.

9.4 TOXIC AND HAZARDOUS MATERIALS AND WASTE

9.4.1 ASBESTOS

Operations which may cause release of asbestos fibers into the atmosphere shall meet the requirements of Title 8 CCR General Industrial Safety Orders, Section 5208 and California law. Some operations which may cause such concentrations include sanding, grinding, abrasive blasting, sawing, drilling, shoveling, or otherwise handling materials containing asbestos so that dust will be raised.

9.4.2 TOXIC MATERIALS

Operations which release toxic materials into the atmosphere shall meet the requirements of Title 8 CCR, General Industrial Safety Orders. Some operations which may release such materials include use of adhesives, sealants, paint, and other coatings.

9.4.3 LEAD-BASED PAINT

Lead-based paint is prohibited. Lead-based paint is defined as:

- a. Any paint containing more than five-tenths of one percentum lead by weight (calculated as lead metal in the total non-volatile content of the paint) or the equivalent measure of lead in the dried film of paint applied or both; or
- b. For paint manufactured after June 22, 1977, any paint containing more than six one-hundredths of one percentum lead by weight (calculated as lead metal) in the total content of the paint or the equivalent measure of lead in the dried film or paint already applied.

9.4.4 HAULING AND DISPOSAL

All hauling and disposal shall meet requirements of Title 22 CCR, Division 4, Chapter 30, "Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes."

9.4.5 ASBESTOS PROHIBITED

No products or materials containing asbestos shall be incorporated into the Work without the prior written approval of the County.

ARTICLE 10 COUNTY-FURNISHED PROPERTY

10.1 COUNTY-FURNISHED PROPERTY

- 10.1.1 The County may furnish to the Contractor property as identified in the specification(s) to be incorporated or installed into the Work or used in performing the Contract. The listed property will be furnished f.o.b. railroad cars at the place specified in the Contract or f.o.b. truck at the project site. The Contractor is required to accept delivery. When the property is delivered, the Contractor shall verify its quantity and condition and acknowledge receipt in writing to the County within twenty-four (24) hours of delivery, also specifying any damage to or shortage of the property as received. All such property shall be installed or incorporated into the

Work at the expense of the Contractor, unless otherwise indicated in this Contract.

10.1.2 Each item of property to be furnished under this clause shall be identified by the Contractor in a schedule by quantity, item, and description. Schedule form will be provided by the County.

10.1.3 The Contractor shall be held responsible for all material delivered to him and deductions will be made from any moneys due him to make good any shortages and deficiencies, from any cause whatsoever, which may occur after such delivery.

10.1.4 The Contractor shall set up accounting records and establish an inspection procedure as approved by the County.

ARTICLE 11 BENEFICIAL OCCUPANCY

11.1 BENEFICIAL OCCUPANCY

11.1.1 The County shall have the right to take possession of or use any completed or partially completed portion of the Work. The County's possession or use shall not be deemed an acceptance of any Work under the Contract. The Contractor will continue to pay for any portion of the utilities which he is using.

11.1.2 While the County has such possession or use, the Contractor shall be relieved of the responsibility for the loss of or damage to that portion of the Work resulting from the County's possession or use. If Contractor believes the partial possession or use by the County will delay the progress of the Work or will cause additional expense to the Contractor, Contractor shall immediately submit a written request for an equitable adjustment in the Contract price or the time of completion. County will then consider such request and, if in its judgment it is justified, the County will modify the contract in writing accordingly. In the event the Contractor disagrees with the County's decision, the Contractor shall be required to submit a claim pursuant to the DISPUTE article.

ARTICLE 12 INSPECTION AND TESTING

12.1 INSPECTION AND TESTING

12.1.1 The Contractor shall maintain an adequate inspection system and perform such inspections as will ensure that the work called for by this Contract conforms to contract requirements. The Contractor shall maintain complete inspection records and make them available to the County. The County shall at all times have access to the Work, and the Contractor shall provide proper facilities for such access and for inspection.

12.1.2 County inspections and tests are for the sole benefit of the County and do not:

- a. Relieve the Contractor of responsibility for providing adequate quality control measures;
- b. Relieve the Contractor of responsibility for damage to or loss of the material before Acceptance;
- c. Constitute or imply Acceptance; or
- d. Affect the continuing rights of the County after Acceptance regarding latent defects, gross mistakes, fraud or the County's rights under any warranty or guarantee.

- 12.1.3 The presence or absence of a County inspector does not relieve the Contractor from any Contract requirement, nor is the inspector authorized to change any term or condition of the specifications without the County's written authorization.
- 12.1.4 The Contractor shall promptly furnish, without additional charge, all facilities, labor, and material reasonably needed for performing such safe and convenient inspections and tests as may be required by the County. The County may charge to the Contractor any additional cost of inspection or test when work is not ready at the time specified by the Contractor for inspection or test, or when prior rejection makes reinspection or retest necessary. Special, full size, and performance tests shall be performed as described in the Contract.
- 12.1.5 The Contractor shall, without charge, replace or correct work found by the County not to conform to contract requirements, unless in the public interest the County consents to accept the work with an appropriate adjustment in Contract price. The Contractor shall promptly segregate and remove rejected material from the premises.
- 12.1.6 If, before Acceptance of the Work, the County decides to examine already completed work by removing it or tearing it out, the Contractor, on request, shall promptly furnish all necessary facilities, labor, and material. If the work is found to be defective or nonconforming in any material respect due to the fault of the Contractor or its subcontractors, the Contractor shall defray the expenses of the examination and of satisfactory reconstruction. However, if the work is found to meet Contract requirements, the County shall issue a Change Order for such removal and reinstallation.
- 12.1.7 The Contractor shall at all times maintain proper facilities and provide safe access for inspection by the County to all parts of the work, and to the shops wherein the work is in preparation. Where the specifications require work to be specially tested or approved, it shall not be tested or covered up without timely notice to the County of its readiness for inspection and without the approval or consent of County. Should any such work be covered up without such notice, approval, or consent, it must, if required by County, be uncovered for examination at the Contractor's expense.
- 12.1.8 The Contractor shall notify the County at least one (1) work day in advance of the time scheduled for the inspection. Should the Contractor fail to notify the County and proceed with work requiring inspection, all such work is rejected, and no further work shall be done on that portion of the project until the rejected work is accepted by the County. Should the Contractor request acceptance of such rejected work the County shall, at the Contractor's expense, secure the services of private material testing laboratories, consulting engineers or licensed land surveyors, who shall certify that said work does in fact conform to the requirements of the Contract Documents. The work previously rejected shall be accepted by the County after receipt of such certification if the County approves of such certification.
- 12.1.9 If the Contractor does not promptly replace or correct rejected work, the County may (1) by contract or otherwise, replace or correct the work and charge the cost to the Contractor or (2) terminate for default the Contractor's right to proceed.
- 12.1.10 Construction review of the Contractor's performance by the County is not intended to include the review of the adequacy of the Contractor's safety measures, in, on, or near the construction site.
- 12.1.11 The County will pay for initial testing services specified to be performed by the County. When initial tests indicate non-compliance with the Contract Documents, subsequent retesting occasioned by the non-compliance

shall be performed by the same testing agency, and costs thereof will be deducted by the County from the Contract sum.

12.2 INSPECTION BY OTHER JURISDICTIONS

Whenever any part of the Work to be performed is under the jurisdiction or control of another public entity, including but not limited to: The United States Government, State of California, or City, such work shall be subject to inspection by the officials of such entities and it must pass inspection, in addition to County inspection, and such other inspections as may otherwise be provided for in the Contract Documents.

12.3 FINAL INSPECTION AND TESTS

The Contractor shall give the County at least ten (10) calendar days advance written notice of the date the Work will be fully completed and ready for final inspection and tests. Final inspection and tests will be started within ten (10) calendar days from the date specified in the aforementioned notice unless the County determines that the Work is not ready for final inspection and so informs the Contractor.

ARTICLE 13 ACCEPTANCE

13.1 ACCEPTANCE OF THE WORK

13.1.1 After the final inspection by County and all the contract documentation has been received, it will be recommended to the County Board of Supervisors to accept the Work and file a Notice of Completion. Upon approval of the Notice of Completion, a copy will be sent to the Contractor. (See final payment clause.) Upon Acceptance of the Work, Contractor will be relieved of the duty of maintaining and protecting the Work. Neither determination by the County that the Work is complete, nor Acceptance thereof, shall operate as a bar to County's claim against Contractor pursuant to Contractor's warranty and guarantees.

13.1.2 Partial payments shall not be construed as acceptance of any part of the Work.

13.1.3 In judging the Work, no allowance for deviations from the drawings and specifications will be made, unless already approved in writing at the time and in the manner as called for herein.

13.1.4 County shall be given adequate opportunity to make any necessary arrangements for fire insurance and extended coverage.

13.1.5 The Acceptance of the Work will not be recommended until all requirements of the Contract Documents are complete and approved by the County. This shall include, but is not limited to, all construction, guarantee forms, parts lists, schedules, tests, operating instructions, as-built drawings, and all other documentation identified by the Contract Documents.

ARTICLE 14 WARRANTY AND GUARANTEES

14.1 CONTRACTOR'S WARRANTY AND GUARANTEE

14.1.1 Contractor warrants that all materials and equipment furnished under this Contract shall be new unless otherwise specified, and that all Work performed under this Contract conforms to the Contract requirements and is free of any defect whether performed by the Contractor or any subcontractor or supplier.

- 14.1.2 This warranty shall continue for a period of one (1) year from the date of filing of Notice of Completion on the Work. The Performance Bond shall remain in force during the warranty period.
- 14.1.3 The Contractor shall remedy at the Contractor's expense any damage to County-owned or controlled real or personal property, when that damage is the result of:
- a. The Contractor's failure to conform to Contract requirements or
 - b. Any defect of equipment, material, workmanship, or design furnished by the Contractor.
- 14.1.4 The Contractor shall restore any work damaged in fulfilling the terms and conditions of this Article. The Contractor's warranty with respect to work repaired or replaced will run for one (1) year from the date of repair or replacement.
- 14.1.5 The County shall notify the Contractor, in writing, within a reasonable time after the discovery of any failure, defect, or damage. The Contractor shall within ten (10) calendar days after being notified in writing by the County of any work not in accordance with the requirements of the Contract or any defects in the Work, commence, and perform with due diligence, all work necessary to fulfill the terms of this Article. If the Contractor fails to remedy any defect, or damage within fourteen (14) calendar days after receipt of notice, the County shall have the right to replace, repair, or otherwise remedy the defect, or damage at the Contractor's expense. Payment due to the Architect from the County for extra architectural services required in the enforcement of Contractor's guarantee after Acceptance of the Work shall be paid to the County by the Contractor.
- 14.1.6 In the event of any emergency constituting an immediate hazard to health or safety of County employees, property, or licensees, when caused by work of the Contractor that is not in accordance with the Contract requirements, the County may undertake at Contractor's expense and without prior notice, all work necessary to correct such hazardous condition(s).
- 14.1.7. With respect to all warranties, express or implied, from subcontractors, manufacturers, or suppliers for work performed and materials furnished under this Contract, the Contractor shall:
- a. Obtain all warranties that would be given in normal commercial practice;
 - b. Require all warranties to be executed, in writing, for the benefit of the County, unless directed otherwise by the County; and
 - c. Enforce all warranties for the benefit of the County, unless otherwise directed by the County.
- 14.1.8 This warranty shall not limit the County's rights under the Inspection and Acceptance section(s) of this Contract with respect to latent defects, gross mistakes, or fraud.

ARTICLE 15 ENVIRONMENTAL PROTECTION

15.1 DUST CONTROL

- 15.1.1 The Contractor shall provide any and all dust control required.

15.1.2 Whenever the Contractor is negligent in providing dust control, the County shall order the Contractor to provide such dust control. If the Contractor does not comply promptly with such order, the County shall have the authority to provide such dust control and charge the Contractor therefore by deducting the cost from progress payments to the Contractor as such costs are incurred by the County. The County shall not be held responsible for schedule delays due to actions taken by County to mitigate the failure of the Contractor in providing dust control.

15.2 EXCESSIVE NOISE

15.2.1 The Contractor shall use only such equipment on the Work and in such state of repair, that the emission of sound therefrom is within the noise tolerance level of that equipment as established by CAL-OSHA.

15.2.2 Should the County determine that the muffling device on any equipment used on the Work is ineffective or defective so that the noise tolerance of such equipment is exceeded, such equipment shall not, after such determination by the County, be used on the Work until its muffling device is repaired or replaced so as to bring the noise tolerance level of such equipment within such standards.

15.3 POLLUTION CONTROL, CLEANING

15.3.1 The Contractor shall not, in connection with the Work, discharge any smoke, dust, or other contaminants into the atmosphere which are in violation of South Coast Air Quality Management District standards or discharge any fluids or materials into any lake, river, stream, or channel as will violate regulations of State of California Water Resources Board. The Contractor shall control accumulation of waste materials and rubbish and dispose of waste materials and rubbish off-site at a minimum of weekly intervals. Burning of materials is not permitted.

ARTICLE 16 EMPLOYMENT PRACTICES

16.1 QUALIFICATIONS FOR EMPLOYMENT AND APPRENTICESHIP STANDARDS

16.1.1 In accordance with Section 1735 of the California Labor Code, no person under the age of 16 years and no person currently serving sentence in a penal or correctional institution shall be employed to perform any Work under this Contract. No person whose age or physical condition is such as to make his employment dangerous to his health or safety or to the health or safety of others shall be employed to perform Work under this Contract; provided that this requirement shall not operate against any physically handicapped persons otherwise employable where such persons may be safely assigned to Work which they ably perform.

16.1.2 This contract is subject to the provisions of Sections 1777.5 and 1777.6 of the California Labor Code concerning the employment of apprentices by the Contractor or any subcontractor under him. Section 1777.5 as amended, requires the Contractor or subcontractor employing tradesmen in any apprenticeable occupation to apply to the Joint Apprenticeship Committee nearest the site of this project and which administers the apprenticeship program in that trade for a certificate of approval. The certificate will also fix the ratio of apprentices to journeymen that will be used in the performance of the Contract.

16.1.3 The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if he employs registered apprentices or journeymen in any apprenticeable trade on such contracts and if other contractors on the public works site are making contributions.

16.1.4 All employees engaged in work on the project under this Contract shall have the right to organize and bargain collectively through representatives of their own choosing, and such employees shall be free from interference, restraint, and coercion of employers in the designation of such employees for the purpose of collective bargaining or other mutual aid or protection, and no person seeking employment under this Contract shall be required as a condition of initial or continued employment to join any company, union, or to refrain from joining, organizing, or assisting a labor organization of such person's own choosing. No person in the employment of the County shall be employed by this contractor.

16.2 WAGES & RECORDS

16.2.1 WAGE RATES

- a. Pursuant to Section 1770 and 1773 et seq. of the Labor Code of the State of California, the Director of Industrial Relations has ascertained the general prevailing rate of per diem wages and the rates for overtime and holiday work in the locality in which the work is to be performed for each craft, classification, or type of workman needed to execute the contract which will be awarded to the successful bidder, copies of which are on file and available upon request at the Clerk of the Board, Board of Supervisors, 4080 Lemon St., 14th Floor, Riverside, CA 92501-3655, and shall be posted at the job site.
- b. It shall be mandatory upon the Contractor and upon any subcontractor under him, to pay not less than the said specified rates to all laborers, workmen, and mechanics employed in the execution of the Contract. It is further expressly stipulated that the Contractor shall, as a penalty to County, forfeit twenty-five dollars (\$25.00) for each calendar day, or portion thereof, for each laborer, workman, or mechanic paid less than the stipulated prevailing rates for any work done under this Contract by him or by any subcontractor under him; and Contractor agrees to comply with all provisions of Section 1770 et. seq. of the Labor Code.
- c. In case it becomes necessary for the Contractor or any sub-contractor to employ on the project under this Contract any person in a trade or occupation (except executives, supervisory, administrative, clerical, or other non-manual workers as such) for which no minimum wage rate is herein specified, the Contractor shall immediately notify the County who will promptly thereafter determine the prevailing rate for such additional trade or occupation and shall furnish the Contractor with the minimum rate based thereon. The minimum rate thus furnished shall be applicable as a minimum for such trade or occupation from the time of the initial employment of the person affected and during the continuance of such employment.
- d. The County will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the prevailing wage rate set forth as provided herein. The possibility of wage increases is one of the elements to be considered by the Contractor in determining his bid, and will not under any circumstances be considered as the basis of a claim against the County on the Contract.

16.2.2 WAGE RECORDS

- a. The Contractor and each subcontractor shall keep or cause to be kept an accurate record (certified payroll) showing the names and occupations of all laborers, workers, and

mechanics employed by him in connection with the execution of this Contract or any subcontract thereunder. The record shall show the actual per diem wages paid to each of said workers, which records shall be provided to the County, and to the Division of Labor Standards Enforcement upon its request. Copies provided will include one which has the name and social security numbers marked out.

16.3 NOTICE OF LABOR DISPUTES

16.3.1 If the Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay the timely performance of this Contract, the Contractor shall immediately give notice, including all relevant information, to the County.

16.3.2 The Contractor agrees to insert the substance of this clause, including this paragraph into any subcontract in which a labor dispute may delay the timely performance of this Contract; except that each subcontract shall provide that in the event its timely performance is delayed or threatened by delay by any actual or potential labor dispute, the subcontractor shall immediately notify the next higher tier subcontractor or the prime Contractor, as the case may be, of all relevant information concerning the dispute.

16.4 NONDISCRIMINATION

16.4.1 EQUAL EMPLOYMENT OPPORTUNITY

- a. Contractor agrees for the duration of this Contract that it will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap. The Contractor will take affirmative action to insure that employees are treated during employment or training without regard to their race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- b. The Contractor will in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, age, political affiliation, marital status, or handicap.
- c. The Contractor will send to each labor union or other representative of workers with which it has a collective bargaining agreement or other contract or understanding, a notice advising the workers' representative of the Contractor commitments under this agreement.
- d. The Contractor agrees that it will comply with the provisions of Titles VI and VII of the Civil Rights Act, Revenue Sharing Act Title 31, U.S. Code Section 2716, and California Government Code Section 12990.

- e. The Contractor agrees that it will assist and cooperate with the County, the State of California and the United States Government in obtaining compliance with the equal opportunity clause, rules, regulations, and relevant orders of the State of California and United States Government issued pursuant to the Acts.
- f. In the event of the Contractor's non-compliance with the discrimination clause, the affirmative action plan of this contract, or with any of the said rules, regulations or orders, this Contract may be canceled, terminated, or suspended in whole or in part by the County.

16.4.2 HANDICAPPED NON-DISCRIMINATION

This project is subject to Section 504 of the Rehabilitation Act of 1973 as amended, (29 U.S.C. 794), and the Americans with Disabilities Act of 1990, as amended, and all requirements imposed by the guidelines and interpretations issued thereto. In this regard, the County and all of its contractors and subcontractors will take all reasonable steps to ensure that handicapped individuals have the maximum opportunity for the same level of aid, benefit or service as any other individual.

16.4.3 FAIR EMPLOYMENT AND HOUSING ACT ADDENDUM

In the performance of this Contract, the Contractor will not discriminate against any employee or Applicant for employment because of race, sex, color, religion, ancestry, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, sex, color, religion, ancestry, or national origin. Such action shall include, but not limited to, the following: employment, upgrading, promotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by the State or local agency setting forth the provisions of this Fair Employment and Housing Section.

16.4.4 ACCESS TO RECORDS

The Contractor will permit access to his records of employment, employment advertisements, application forms, and other pertinent data and records by the State Fair Employment and Housing Commission, or any other agency of the State of California designated by the awarding authority, for the purposes of investigation to ascertain compliance with the Fair Employment and Housing section of this Contract.

16.4.5 REMEDIES FOR WILLFUL VIOLATION

The State or local agency may determine a willful violation of the Fair Employment and Housing provision to have occurred upon receipt of a final judgment having that effect from a court in an action to which Contractor was a party, or upon receipt of a written notice from the Fair Employment and Housing Commission that it has investigated and determined that the Contractor has violated the Fair Employment and Housing Act and has issued an order or obtained an injunction under Government Code Sections 12900, et seq.

ARTICLE 17 SUBCONTRACTING

17.1 SUBCONTRACTORS

- 17.1.1 A subcontractor is an individual, firm or corporation having a direct contract with the Contractor or with any other subcontractor for the performance of a part of the Work. In accordance with Section 4104 of the Public Contract Code, each Contractor, in his bid, shall include the name and location of each subcontractor who will perform work or labor, or render services to the Contractor in or about the Work in an amount in excess of one half of 1% of the Contractor's total bid.
- 17.1.2 The County reserves the right to approve all subcontractors. Such approval shall be a consideration to the awarding of the Contract and unless notification to the contrary is given to the Contractor prior to the signing of the Contract, the list of subcontractors which is submitted with his proposal will be deemed to be acceptable.
- 17.1.3 The Contractor shall be as fully responsible to the County for the acts and omissions of his subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- 17.1.4 Nothing contained in the Contract Documents shall create any contractual relationship between any subcontractor and the County.
- 17.1.5 The divisions or sections of the specifications are not intended to control the Contractor in dividing the Work among subcontractors or to limit the work performed by any trade.

17.2 RELATIONS OF CONTRACTOR AND SUBCONTRACTOR

- 17.2.1 The Contractor agrees to bind every subcontractor by the terms of the Contract with the County, the General Conditions, Supplementary Conditions, and the drawings and specifications as far as applicable to his work, unless specifically noted to the contrary in a subcontract approved in writing as adequate by the County.

17.3 SUBCONTRACTS

- 17.3.1 Pursuant to the provisions of Sections 4100 to 4114 of the California Public Contract Code, inclusive, the Contractor shall not, without the consent of the County, either:
- a. Substitute any persons as subcontractors in place of the subcontractors designated in his original bid without the consent of County. (The County's consent can only be given in cases permitted by Public Contract Code Section 4107.)
 - b. Permit any subcontract to be assigned or transferred or allow any work to be performed by anyone other than the original subcontractor listed in his bid.
 - c. Sublet or subcontract any portion of the work in excess of one-half of one percent of his bid to which his original bid did not designate a subcontractor.

Should the Contractor violate any of the provisions of Sections 4100 to 4114, inclusive, of the Public Contract Code, his so doing shall be deemed a violation of this Contract, and the County may either cancel the contract, or assess the Contractor a penalty in the amount of not more than ten (10) percent of the amount of the subcontract involved, or both.

ARTICLE 18 TAXES

18.1 SALES AND PAYROLL TAXES

- 18.1.1** Each Contractor, subcontractor, and material dealer shall include in their bid all applicable taxes including but not limited to sales tax and payroll taxes required by law.

ARTICLE 19 CHANGES

19.1 CHANGE ORDER WORK

- 19.1.1** The County reserves the right to make changes in the work without impairing the validity of the Contract. The County may make changes to the work, or suspend the work, and all such changes or suspension are within the contemplation of the parties and will not be a basis for compensable delay. Such changes may be made in accordance with any of the following methods:
- a. By written change order to the Contract ordered by the Board of Supervisors.
 - b. By written change order, signed by the Assistant County Executive Officer/EDA in the manner and amounts specified by Board Policy B-11.
 - c. By written authorization, issued by the Assistant County Executive Officer/EDA, for items of work done under unit prices. The cost or credit for such added or omitted work shall be determined by multiplying the number of units added to or omitted from the work by the applicable unit price.
- 19.1.2** Upon receipt of a proposed Change Order from County, the Contractor shall submit a proposal in accordance with the requirements and limitations set forth in this "Change Orders" article, for work involved in the contemplated change.
- 19.1.3** The Contractor must submit a cost proposal within fifteen (15) calendar days after receipt of the proposed change order. The Contractor must submit cost proposals in less than fifteen (15) calendar days if requested by the County or if required by schedule limitations.
- 19.1.4** If the Contractor fails to submit the cost proposal within the 15-day period (or as requested), the County has the right to order the Contractor in writing to commence the work immediately on a force account basis and/or issue a lump sum change to the contract price in accordance with the County's estimate of cost. If the change is issued based on the County estimate, the Contractor will waive his right to dispute the action unless within fifteen (15) calendar days following completion of the added/deleted work, the Contractor presents proof that the County's estimate was in error.
- 19.1.5** If the County disagrees with the proposal submitted by Contractor, it will notify the Contractor in writing and the Contractor may elect to proceed under the DISPUTE article of this Contract, or, in the event either party contests the price or time extension of Change work, or time is of the essence, the County may issue a Construction Change Directive and the contractor shall proceed with the work. The County will provide its opinion of the appropriate price and/or time extension in a "Response to Change Order Request." If the contractor agrees with the County's estimate, a change order will be issued by the County. If no agreement can be reached, the County shall have the right to issue the Change Order Directive setting forth its unilateral determination of the reasonable additions or savings in costs and time attributable to the extra or deleted work. Such determination shall become final and binding if the Contractor fails to submit a Claim in writing to the

County, within twenty-one (21) days of the Change Order Directive, disputing the terms of such Directive. No dispute, disagreement or failure of the parties to reach agreement regarding the amount, if any, of any adjustment to the contract sum or contract time shall relieve the Contractor from the obligation to proceed with performance of the work, including extra work, promptly and expeditiously.”

- 19.1.6** The Contractor will give notice of a requested change on his letterhead within seven (7) calendar days of discovery and, if the County agrees, a proposed change order will be issued on the County's standard change order form.
- 19.1.7** If any change involves an increase or decrease in the cost of the Contractor's work, a change order shall state the amount to be added or deducted from the Contract amount, and the additional time, if any, needed for the performance of such work.
- 19.1.8** Any changes to the Contract amount shall be in a lump sum mutually agreed to by the Contractor and the County, except that when, in the opinion of the County, such basis is not feasible the change to the Contract amount shall be determined upon a cost-plus-percentage basis with a guaranteed maximum lump sum cost within the limitations provided by law.
- 19.1.9** Each lump sum quotation from the Contractor shall be accompanied by sufficiently detailed estimates to permit verification of totals in accordance with (a) through (d) in 19.1.11 below.
- 19.1.10** When the work is to be done on a cost-plus-percentage basis, the Contractor shall submit statements as required by the County showing all labor, material, and equipment costs incurred, and upon completion of the work, a summary of costs, including overhead and profit, and in accordance with Item (a) through (d) in 19.1.11 below.
- 19.1.11** Estimates for lump sum quotations and accounting for cost-plus-percentage work shall be limited to direct expenditures necessitated specifically by the subject extra work, and shall be segregated as follows:
- a. Labor. 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 cost 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.
 - b. Materials. The cost of materials reported shall be at invoice or lowest current price at which such materials are locally available in the quantities involved, plus sales tax, freight and delivery.
 - c. Tool and Equipment Use. 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 use costs shall not exceed listed rates prevailing locally at equipment rental agencies, or distributors, at the time the work is performed.
 - d. Overhead, Profit and Other Charges. The mark-up for overhead and profit on work added to the Contract shall be according to the following Schedule.

- (1) For work performed by the Contractor's forces the added cost for overhead and profit shall not exceed fifteen (15%) percent of the net cost of the work, equipment, labor and materials.
- (2) For work performed by a subcontractor, the added cost for overhead and profit shall not exceed fifteen (15%) percent of the net cost of the work, equipment, labor and materials, to which the Contractor may add five (5) percent of the subcontractor's price of the work.
- (3) For work performed by a sub-subcontractor the added cost for overhead and profit shall not exceed fifteen (15 %) percent of the net cost for work, equipment, labor and materials to which sub-contractor and general contractor may each add an additional five (5 %) percent of the total price from the lower tier subcontractor.
- (4) "Net Cost" is defined as consisting of costs of labor, materials and equipment use and/or rental only. The costs of applicable insurance and bond premium will be reimbursed to the Contractor and subcontractors at cost only, without mark-up.
- (5) The cost of direct supervision, except when provided by working foreman whose time is included above, of change order work when done exclusively, and not in conjunction or at the same time as, other work performed on the job and when approved in advance by the County's authorized representative, including only payroll taxes, insurance, pension and direct costs for the labor of supervision may be charged to the change order. The cost of transportation, use of vehicle and other costs incurred by supervision will not be allowed.

- 19.1.12 For added or deducted work by subcontractors, the Contractor shall furnish to the County the subcontractor's signed detailed estimate of the cost of labor, material and equipment, including the markup by such subcontractor for overhead and profit. The same requirement shall apply to sub-subcontractors.
- 19.1.13 For added or deducted work furnished by a vendor or supplier, the Contractor shall furnish to the County a detailed estimate or quotation of the cost to the Contractor for such work, signed by such vendor or supplier.
- 19.1.14 Any change in the work involving both extras and credits shall show a new total cost, including subcontracts. Allowance for overhead and profit, as specified therein, shall be applied if the net total cost is an extra; overhead and profit allowances shall not be applied if the net total cost is a credit. The estimated cost of deductions shall be based on labor and material prices on the date the Contract was executed.
- 19.1.15 The Contractor shall identify any adjustment in time of the final completion of the Work as a whole which is directly attributable to the changed work within fifteen (15) calendar days of receipt of the proposed change order. The Contractor's request for a change in time will be supported by a detailed schedule analysis including a schedule indicating the activities which have been affected and the additional time being requested.
- a. For a change in time for the Work, the Contractor shall be entitled only to such adjustments where completion of the entire Work (critical path) is delayed due to the performance of the changed work. Failure to request extra time when submitting such estimate shall constitute

waiver of the right to subsequently claim adjustment in time for final completion based upon such changed work.

- b. If the County and the Contractor fail to arrive at an agreement on the amount of extra cost, credit or time extension for a proposed change, a change order will be processed in the amount believed by the County to be reasonable, and the Contractor shall proceed with the work. If the Contractor believes that the amount or time stipulated in the change order is not reasonable for the work required, he may elect to issue a notification in accordance with the DISPUTES article for review by the County, stating therein the basis for his dispute with such change order.

19.1.16 Any change in the Work shall conform to the original Contract Documents insofar as they may apply without conflict to the conditions involved in the change.

19.1.17 Payment for additional work or extras, if any, shall become due and payable in accordance with the provisions for payment in the Contract.

19.1.18 Contractor shall not reserve a right to assess impact cost, extended job site costs, extended overhead, and/or constructive acceleration at a later date as related to any and all changes. All costs or estimated costs must be supported with full schedule and cost documentation with each proposed change within the prescribed submission times. If a request for a change is denied and the Contractor disputes the denial, the Contractor must supply the aforementioned documentation to support his claim under the DISPUTES article of this Contract. No claims shall be allowed for impact, extended overhead costs, and/or construction acceleration due to the multiplicity of changes and/or clarifications. Any attempt by Contractor to change or modify the change order form (sample included herein) shall void the form, including any letters the Contractor may issue in conjunction therewith.

19.1.19 All alterations, extensions of time, extra and additional work and other changes authorized by these specifications or any part of the Contract may be made without securing consent of the surety or sureties on the contract bonds.

19.2 CHANGE ORDERS AND LABOR RATES GUIDELINES

19.2.1 The following are guidelines for preparing change orders:

a. Labor Rates:

- (1) To establish the labor rate for each classification and trade, a breakdown shall be submitted to the County.
- (2) Labor rates are based on current prevailing state and federal wages. Only those benefits mandated by law or a valid labor contract are paid by the County.
- (3) Payroll taxes shall be paid as mandated by law. Labor related insurances shall be paid according to industry standard average.
- (4) No other costs related to labor shall be paid by County.

b. Change Orders:

- (1) Change orders shall be prepared in accordance with the project contract.
- (2) No insurance costs are paid by County, except for labor insurances specified in this guideline under section 1 titled "LABOR RATES".
- (3) Material cost shall be broken down on a separate sheet, and for those jobs designated as time and material shall be supported by valid invoices from suppliers.
- (4) Hours for non-productive labor, such as non-working foremen or general foremen, shall be paid only when justified in the opinion of the County, and approved by the County. The total number of nonproductive labor hours shall be limited to a maximum of 15% of the total number of productive labor hours.
- (5) Cost of use of special equipment shall be paid when justified in the opinion of the County, and approved by the County. Equipment refers to special equipment that is needed to perform that specific job, and does not include the usual tools customarily required for that trade. Small tools costs are not paid by County.
- (6) Material transportation costs are paid by County when justified in the opinion of the County, and approved by the County's authorized representative.
- (7) Overhead, profit and fees on subcontracts, are paid according to the contract.
- (8) No costs other than those designated above shall be paid by County. The percentages of overhead and fee allowed with change orders have been established to account for any other direct or indirect costs that might be incurred due to the change order.

19.3 AUDIT

- 19.3.1 The County shall have the right to examine and audit all books, estimates, records, contracts, documents, bid documents, subcontracts, and other data of the Contractor (including computations and projections) related to negotiating, pricing, or performing the modification in order to evaluate the accuracy and completeness of the cost or pricing data at no additional cost to the County.
- 19.3.2 The Contractor shall make available at its office at all reasonable times the materials described in paragraph 19.3.1 above, for examination, audit, or reproduction, until 4 years after final payment under this Contract.
- 19.3.3 The Contractor shall insert a clause containing all the provisions of this 19.3, including this paragraph, in all subcontracts over \$10,000 under this contract.

ARTICLE 20 PAYMENT

20.1 PROGRESS PAYMENTS

- 20.1.1 The County shall pay the Contractor the price as provided in this Contract.

- 20.1.2** The County shall make progress payments monthly as the Work proceeds, on estimates approved by the County. The Contractor shall furnish a breakdown of the total contract price, in a format provided by the County, showing the amount included therein for each principal category of the work, in such detail as requested, to provide a basis for determining progress payments.
- 20.1.3** Contractor shall submit to the County vouchers, schedule activities, or other satisfactory proof of the value of any work for which he claims payment on such account, and receipts showing that progress payments have been duly made on such contracts, and for materials furnished.
- 20.1.4** In the preparation of estimates, the County may authorize 75% of the value of material delivered and satisfactorily stored on the site, and preparatory work done to be taken into consideration for major equipment if:
- a. Consideration is specifically authorized by this Contract; and
 - b. The Contractor furnishes certified receipt that it has acquired title and paid invoices for such material and that the material will be used to perform this Contract.
- 20.1.5** On the 25th of each month the Contractor will submit his request for payment. Prior to that submittal the County will review the requested percentage of completion for each activity. The payment request will be in the format as provided by the County and will refer to the schedule.
- 20.1.6** Upon receipt of a payment request, the County shall:
- a. Review that request as soon as practicable after receipt for the purpose of determining that the payment request is a proper payment request; and
 - b. Any payment request determined not to be a proper request suitable for payment shall be returned to the Contractor as soon as practicable, but not later than seven (7) calendar days after receipt. The returned request for payment shall be accompanied by a document setting forth in writing the reasons why the payment request is not proper.
- 20.1.7** Any progress payment which is undisputed and properly submitted and remains unpaid for thirty (30) calendar days after receipt by County shall accrue interest to the Contractor equivalent to the legal rate set forth in subdivision (a) of Section 685.010 of the California Code of Civil Procedure. The number of days available to the County to make a payment without incurring interest pursuant to this section shall be reduced by the number of days by which the County exceeds the seven-day return requirement set forth in 20.1.6 above.
- 20.1.8** In making these progress payments, there shall be retained ten percent (10%) from the amount of each progress payment until the work is 50% complete. After the 50% completion point, if satisfactory progress is being made and at the sole discretion of the County, the retention may be reduced to a minimum of 5% of the contract.
- 20.1.9** Except as otherwise prohibited by law, the Contractor may elect to receive all payments due under the contract pursuant to this section without any retention, by posting securities in accordance with Public Contract Code Section 22300.

20.1.10 Contractor and each subcontractor shall pay each of its employees engaged in work under this Contract in full (less deductions made mandatory by law) in accordance with California law.

20.1.11 The County may withhold (in excess of retentions) or, on account of subsequently discovered evidence, nullify the whole or a part of any certificate to such extent as may be necessary to protect the County from loss on account of:

- a. Defective work not remedied.
- b. Claims filed or reasonable evidence indicating probable filing of claims.
- c. Failure of the Contractor to make payments properly to subcontractors or for material or labor.
- d. Damage to another Contractor.
- e. Delays in progress toward completion of the work, with the stipulated amount of liquidated damages being withheld for each day of delay for which no extension is granted.
- f. Default of the Contractor in the performance of the terms of the Contract.

20.1.12 Should stop notices be filed with the County, County shall withhold the amount required plus 25% from certificates until such claims shall have been resolved pursuant to applicable law. California Civil Code Section 3179 et seq.

20.1.13 At the election of the County, Contractor shall provide, within ten (10) calendar days of receipt of each progress payment, unconditional waivers and release of lien rights, signed by Contractor and each of its subcontractors and materials suppliers, in the form established therefore by Section 3262 of the Civil Code.

20.1.14 All material and work covered by progress payments made shall, at the time of payment, become the sole property of the County, but this shall not be construed as:

- a. An acceptance of any work not in accordance with the Contract Documents; or
- b. Waiving the right of the County to require the fulfillment of all of the terms of the contract.

20.2 FINAL PAYMENT

20.2.1 GENERAL

- a. The County shall pay the amount due the Contractor under this Contract after:
 - 1.) The Acceptance of all work and Notice of Completion per the terms of this Contract;
 - 2.) Presentation of a properly executed voucher;
 - 3.) Release of all liens and Stop Notices; and

- 4.) Presentation of release of all claims against the County arising by virtue of this Contract, other than claims and disputes in stated amounts, that the Contractor has specifically excepted from the operation of the release.
- b. The Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the County, to indemnify him against any lien.

20.2.2 FINAL CERTIFICATE FOR PAYMENT

- a. When the work is ready for acceptance by the County, the Department of Facilities Management will certify and submit to the Board of Supervisors a Notice of Completion. Upon approval of the Notice of Completion, a copy will be sent to the Contractor.
- b. Notice of Completion will be recorded by the County upon completion and Acceptance of the Work. Providing no stop notices have been filed, thirty-five (35) calendar days after filing of such Notice of Completion, payment due under the contract will become due to the Contractor and the County shall so certify authorizing the final payment.

20.2.3 FINAL PAYMENT

- a. After Acceptance of Work, the County will submit to Contractor a statement of the sum due Contractor under this contract, together with County payment in the amount thereof. Said statement shall take into account the contract price, as adjusted by any change orders; amounts already paid; sums to be withheld for incomplete work; liquidated damages; and for any other cause under the Contract.
- b. The Contractor shall, from the effective date of Acceptance until the expiration of four years after final settlement under this Contract, preserve and make available to the County, all its books, records, documents, and other evidence bearing on the costs and expenses of the Contractor under this Contract.

ARTICLE 21 SUSPENSION OF WORK/TERMINATION

21.1 NON-COMPLIANCE WITH CONTRACT REQUIREMENTS

21.1.1 In the event the Contractor, after receiving written notice from the County of non-compliance with any requirement of this Contract, fails to promptly initiate appropriate action to comply with the specified requirement, the County shall have the right to withhold payment for work completed under the Contract until the Contractor has complied with the notice or has initiated such action as may be appropriate to comply, within a reasonable period of time. The Contractor shall not be entitled to any extension of contract time or payment for any costs incurred for work under this article.

21.1.2 Should the Contractor abandon the Work called for under the Contract, or assign his Contract, or unnecessarily and unreasonably delay the work, or willfully violate or perform the work in bad faith, the County shall have the power to notify the Contractor to discontinue all work or any part thereof under this Contract, and thereupon the Contractor shall cease to continue said work or such part thereof as the County may designate, and the County shall have the power to employ such persons as it may consider desirable, and

to obtain by contract, purchase, hire or otherwise, such implements, tools, material or materials as the County may deem advisable to work at and be used to complete the work herein described, or such part thereof as shall have not been completed, and to use such material as it may find upon the site of the work, and to charge the expense of such labor and material, implements and tools to the Contractor, and the expense so charged shall be deducted and paid by the County out of such monies as may either be due, or may at any time thereafter become due to the Contractor under the Contract.

21.2 TERMINATION

21.2.1 TERMINATION FOR BREACH

If the Contractor should be adjudged bankrupt or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he or any of his subcontractors should violate any of the provisions of the Contract, the County may serve written notice upon him and his surety of its intention to terminate Contractor's performance hereunder, said notice shall contain the reasons for such intention to terminate Contractor's performance, and, unless within ten (10) calendar days after serving of said notice, such violation shall cease and satisfactory arrangements for correction thereof be made, Contractor's performance shall, upon the expiration of said ten (10) calendar days, cease and terminate. In the event of any such termination, the County shall immediately serve written notice thereof upon the surety and the Contractor, and the County may take over the Contractor's work and prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and his surety shall be liable to the County for any excess cost occasioned the County thereby, and in such event the County may without liability for so doing take possession of and utilize in completing the work, such materials, appliances, plants, and other property belonging to the Contractor as may be on the site of the work and necessary therefore.

21.2.2 TERMINATION FOR CONVENIENCE

- a. If the construction of the project herein is damaged, which damage is determined to have been proximately caused by an Act of God, in excess of 5% of the contract amount, provided that the work damaged is built in accordance with applicable building standards and the plans and specifications, then the County may, without prejudice to any other right or remedy, terminate the Contract.
- b. The County may terminate performance of work under this Contract in whole or in part, if the County determines that a termination is in the County's interest. The County shall terminate by delivering to the Contractor a Notice to Terminate specifying the extent of termination and the effective date.
- c. After receipt of such Notice, and except as directed by the County, the Contractor shall immediately proceed with the following obligations, regardless of any delay in determining or adjusting any amounts due under this clause:
 - (1) Stop work as specified in the notice.
 - (2) Place no further subcontracts or orders (referred to as subcontracts in this clause) for materials, services, or facilities, except as necessary to complete any continued portion of the Contract.

- (3) To terminate all subcontracts to the extent they relate to the work terminated.
 - (4) With approval or ratification to the extent required by the County, settle all outstanding liabilities and termination settlement proposals arising from termination of subcontracts; the approval or ratification will be final for purposes of this clause.
 - (5) As directed by the County, transfer title and deliver to the County (1) the fabricated or unfabricated parts; work in progress, completed work, supplies, and other material produced or acquired for the work terminated; and (2) the completed or partially completed plans, drawings, information, and other property that, if the contract had been completed, would be required to be furnished to the County.
 - (6) Complete performance of work not terminated.
 - (7) Take any action that may be necessary, or that the County may direct, for the protection and preservation of the property related to this contract that is in the possession of the Contractor and in which the County has or may acquire an interest.
 - (8) Use its best efforts to sell, as directed or authorized by the County, any property of the types referred to in subparagraphs above; provided, however, that the Contractor (1) is not required to extend credit to any purchaser and (2) may acquire the property under the conditions prescribed by, and at prices approved by the County. The proceeds of any transfer or disposition will be applied to reduce any payments to be made by the County under this contract, credited to the price or cost of the work, or paid in any other manner directed by the County.
- d. After termination, the Contractor shall submit a final termination settlement proposal to the County in the form and with the certification prescribed by the County. The Contractor shall submit the proposal promptly, but no later than thirty (30) days from the effective date of termination. If the Contractor fails to submit the proposal within the time allowed, the County may determine, on the basis of information available, the amount, if any, due the Contractor because of the termination and shall pay the amount determined.
- e. Subject to subparagraph (2) above, the Contractor and the County may agree upon the whole or any part of the amount to be paid because of the termination. The amount may include a reasonable allowance for profit on work done. However, the agreed amount, may not exceed the total contract price as reduced by:
- (1) the amount of payments previously made and;
 - (2) the contract price of work not terminated. The contract shall be amended with a Change Order, and the Contractor paid the agreed amount.
- f. If the Contractor and County fail to agree on the whole amount to be paid the Contractor because of the termination of work, the County shall pay the Contractor the amounts

determined as follows:

- (1) For contract work performed before the effective date of termination, the total (without duplication of any terms) of:
 - (i) The cost of this work;
 - (ii) The cost of settling and paying termination settlement proposals under terminated subcontracts that are properly chargeable to the terminated portion of the contract if not included in subdivision (i) above; and
 - (iii) A sum, as profit on (i) above, determined by the County to be fair and reasonable; however, if it appears that the Contractor would have sustained a loss on the entire contract had it been completed, the County shall allow no profit under this subdivision (iii).
- (2) The reasonable costs of settlement of the work terminated including:
 - (i) Accounting, clerical, and other expenses reasonably necessary for the preparation of termination settlement proposals and supporting data; and
 - (ii) Storage, transportation, and other costs incurred, reasonably necessary for the preservation, protection, or disposition of the termination inventory.
- g. Except for normal spoilage, the County shall exclude from the amounts payable to the Contractor the fair value, as determined by the County, of defective work, and of property that is destroyed, lost, stolen, or damaged so as to become undeliverable.
- h. The Contractor shall have the right to make a claim under the DISPUTES article, from any determination made by the County.
- i. In arriving at the amount due the Contractor, there shall be deducted:
 - (1) All unliquidated advance or other payments to the Contractor under the terminated portion of this Contract;
 - (2) Any claim which the County has against the Contractor under this Contract; and
 - (3) The agreed price for, or the proceeds of sale of, materials, supplies, or other things acquired by the Contractor or sold under the provisions of this clause and not recovered by or credited to the County.
- j. If the termination is partial, the Contractor may file a proposal with the County for a Change Order of the price(s) of the continued portion of the Contract. The County shall process any Change Order agreed upon. Any proposal by the Contractor for an equitable adjustment under this clause shall be requested within thirty (30) days from the effective date of termination unless extended in writing by the County.

- k. The County may, under the terms and conditions it prescribes, make partial payments and payments against costs incurred by the Contractor for the terminated portion of the Contract, if the County believes the total of these payments will not exceed the amount to which the Contractor will be entitled. If the total payments exceed the amount finally determined to be due, the Contractor shall repay the excess to the County upon demand, together with interest.
 1. Unless otherwise provided in this Contract or by statute, the Contractor will maintain all records and documents relating to the terminated portion of this Contract for 4 years after final settlement. This includes all books and other evidence bearing on the Contractor's costs and expenses under this Contract. The Contractor shall make these records and documents available to the County, State and/or the U.S. Government or their representatives at all reasonable times, without any direct charge.

ARTICLE 22 DISPUTES/CLAIMS

22.1 CLAIMS RESOLUTION

In accordance with Public Contract Code Sections 20104 20104.6 and other applicable law, public works claims of \$375,000 or less which arise between the Contractor and the Owner shall be resolved under the following the statutory procedure unless the Owner has elected to resolve the dispute pursuant to Public Contract Code Section 10240 et seq.

- a. All claims shall be submitted in writing and accompanied by substantiating documentation. Claims must be filed on or before the date of final payment unless other notice requirements are provided in the contract. "Claim" means a separate demand by the claimant for (1) a time extension, (2) payment of money or damages arising from work done by or on behalf of the claimant and payment of which is not otherwise expressly provided for or the claimant is not otherwise entitled, or (3) an amount the payment of which is disputed by the Owner.
- b. Claims Under \$50,000. The Owner shall respond in writing to the claim within 45 days of receipt of the claim, or, the Owner may request, in writing, within 30 days of receipt of the claim, any additional documentation supporting the claim or relating to defenses or claims the Owner may have. Of additional information is needed thereafter, it shall be provided upon mutual agreement of the Owner and the claimant. The Owner's written response shall be submitted 15 days after receiving the additional documentation, or within the same period of time taken by the claimant to produce the additional information, whichever is greater.
- c. Claims over \$50,000 but less than or equal to \$375,000. The Owner shall respond in writing within 60 days of receipt, or, may request in writing within 30 days of receipt of the claim, any additional documents supporting the claim or relating to defenses or claims the Owner may have against the claimant. If additional information is needed thereafter, it shall be provided pursuant to mutual agreement between the Owner and the claimant. The Owner's response shall be submitted within 30 days after receipt of the further documents, or within the same period of time taken by the claimant to produce the additional information or documents, whichever is greater. The Contractor shall make these records and documents available to the County, State and/or the U.S. Government or their representatives at all reasonable times, without any direct charge.

- d. If the claimant disputes the Owner's response, or if the Owner fails to respond within the statutory time period(s), the claimant may so notify the Owner within 15 days of the receipt of the response or the failure to respond, and demand an informal conference to meet and confer for settlement. Upon such demand, the Owner shall schedule a meet and confer conference within 30 days.
- e. If following the meet and confer conference, the claim or any portion thereof remains in dispute, the claimant may file a claim pursuant to Government Code 900 et seq. and Government Code 910 et seq. For purposes of those provisions, the time within which a claim must be filed shall be tolled from the time the claimant submits the written claim until the time the claim is denied, including any time utilized for the meet and confer conference.
- f. If a civil action is filed to resolve any claim, the provisions of Public Contract Code 20104.4 shall be followed, providing for nonbinding mediation and judicial arbitration.

22.2 CLAIM FORMAT/REQUIREMENTS

22.2.1 The Contractor will submit the claim justification in the following format:

- a. Summary of claim merit and price plus clause under which the claim is made.
- b. List of documents relating to claim
 - (a) Specifications
 - (b) Drawings
 - (c) Clarifications (RFIS)
 - (d) Schedules
 - (e) Other
- c. Chronology of events and correspondence
- d. Analysis of claim merit
- e. Analysis of claim cost
- f. Analysis of Time in CPM format
- g. Cover letter and certification (form included herein)

22.2.2 If any claim submitted includes a request for overhead, the County may request a Profit & Loss statement and supporting documentation from Contractor. If requested, such documentation must be submitted for the County to consider the claim.

22.2.3 Submission of a claim, properly certified, with all required supporting documentation, and written rejection or denial of all or part of the claim by County, is a condition precedent to any action, proceeding, litigation, suit, general conditions claim, or demand for arbitration by Contractor.

22.3 NOTICE OF THIRD PARTY CLAIMS

The County shall provide notification to the Contractor within a reasonable time after receipt of any third-party claim relating to the Construction Contract.

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SECTION 01025

ALTERNATES

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Work Included: Provide alternative bid proposals as described in this Section.
- B. Procedures:
 - 1. Provide alternative proposals to be added to or deducted from the amount of the Base Bid if the Owner accepts the corresponding change in scope.
 - 2. Include within the alternative bid prices all costs, including labor, materials, installations, and fees.
 - 3. Show the proposed alternative amounts opposite their proper description on the Contractor's Proposal.
- C. Acceptance or Rejection:
 - 1. Acceptance or rejection of Alternate Bids is subject to Owner's discretion. The Owner reserves the right to award any or none of the Alternate Proposal items as the Owner may deem to be in its best interests and without regard to the order in which such items are listed in the Proposal.

***** END OF SECTION *****

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SECTION 01049
SUPPORTING FROM STRUCTURE

PART 1 -- GENERAL

1.01 GENERAL REQUIREMENTS

Requirements of Division 1 apply to all Work in the Section.

1.02 SCOPE

Work Included:

1. This section provides guidelines and limitations for supporting all mechanical, electrical, plumbing or architectural items from the building structure, and for seismic bracing for all such items.
2. Design and install all support and bracing systems except as noted. Provide for attachment to portions of the building structure capable of bearing the loads imposed. Design systems to not overstress the building structure.

Work Not Included:

1. The Contractor is not required to design support and bracing for items for which the contract documents provide specific attachment, support, and bracing. Items specifically noted in the CBC as not requiring bracing may be exempt from seismic bracing if all conditions of attachment in the CBC are compliant. Seismic bracing is not typically required for the following items:
 - a. Gas piping less than 1 inch inside diameter.
 - b. Piping for boilers and mechanical equipment less than 1.25 inches inside diameter.
 - c. All other piping less than 2.5 inches inside diameter, unless racked together.
 - d. All piping and duct suspended by individual hangers 12 inches or less in length with flexible connections.
 - e. All rectangular air handling ducts less than 6 square feet in cross sectional area.
 - f. All round air handling ducts less than 28 inches in diameter.
 - g. All electrical conduits less than 2.5 inches inside diameter, unless racked together.

1.03 RELATED WORK (See also Table of Contents)

Information relating solely to mechanical or electrical work is included under those divisions, except as specifically indicated herein.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.05 QUALITY ASSURANCE

A. General:

1. Design and install all support systems to comply with the requirements of the 2007 California Building Code Chapter 16.
2. For seismic bracing design engage the services of a structural engineer licensed in California.

3. For guidelines regarding seismic bracing for mechanical, electrical and plumbing systems, refer to the Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), "Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Piping Systems". Where SMACNA guidelines deviate from CBC requirements, CBC requirements shall govern
- B. Standards and References: (Latest Edition unless specified otherwise)
1. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 apply to the work of this Section as if printed herein.
 2. If the year of the adoption or latest revision is omitted from the designation, it shall mean the specification, manual or test designation in effect the date of Notice to Proceed with the Work given.
- C. Submittals: (submit under provisions of Article 5 of the General Conditions):
1. Submit shop drawings for all substructures and attachment methods.
 2. Submit proposed alternative methods of attachment for review by the Architect, prior to deviating from the requirements given below.
 3. For all seismic bracing systems, submit structural calculations and details prepared and signed by the Contractor's licensed engineer which include all resultant forces applied to the building structure. Do not overstress building structure. Calculations will be reviewed for compliance with design criteria, not for arithmetic.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Furnish all substructures and fasteners required to comply with the limitations given below. Use materials as specified in the various sections and as appropriate to the use.
- B. All exterior materials: hot dipped galvanized or stainless steel.

PART 3 -- EXECUTION

3.01 GUIDELINES AND LIMITATIONS

- A. The General Contractor shall coordinate the load requirements from all sub-contractors so that no combination of loads exceeds the limitations given below without written approval.
- B. Maximum Loading: Attach no loads greater than the following without specific approval of the Structural Engineer.
 1. Metal deck without concrete fill - acoustical tile and gypsum board ceilings only; no piping, ducting or conduit. Maximum ceiling weight - 3.5 psf. Maximum wire hanger load = 60#.
 2. Metal deck with concrete fill - ceilings as indicated for metal deck without concrete fill above, plus electrical conduits, gas piping and ducting not exceeding 3.0 psf. Maximum point load from trapeze = 200 lbs. at 8'-0" cc each way. Mechanical units hung from concrete filled deck shall not exceed 500 lbs.
 3. Steel beams and girders: water and gas piping, electrical conduits, ducting and trapeze of same not to exceed 3.0 psf. Maximum load on a single span = 600#. Mechanical units hung from beams shall not exceed 1000# unless specifically indicated on structural plans.

4. Cast-In-Place concrete slabs - ceilings, piping, conduit and ducts shall not exceed 10 psf. Maximum hanger load 600#. Mechanical units hung from slabs shall not exceed 800#.
5. Wood sawn joists - loads from ceilings, piping, conduit and ducting shall not exceed 5.0 psf. Maximum concentrated load = 300 lbs. per joist.
6. Steel Joists - Loads from ceiling, piping, conduit and ducting shall not exceed 8 psf. Maximum concentrated load = 500 lbs. per joist.

3.02 SEISMIC BRACING

- A. In applying formulas from Chapter 16 of the 2007 CBC the value for I_p (importance factor) shall be assumed to be no less than 1.0. See structural drawings for other seismic factors.
- B. Design and install seismic bracing so as not to ground out vibration and sound isolation items.

*****END OF SECTION*****

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SECTION 01200
PROJECT MEETINGS

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Work Included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Architect will conduct project meetings throughout the construction period.
- B. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.02 QUALITY ASSURANCE

For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Architect at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Minutes:
 - 1. The Architect will compile minutes of each project meeting, and will furnish copies to the Contractor and to the Owner.
 - 2. Recipients of copies may make and distribute such other copies as they wish.

PART 2 -- PRODUCTS

(No products are required in this Section.)

PART 3 -- EXECUTION

3.01 MEETING SCHEDULE

- A. Progress Review Meetings will be held every other week, except for the Pre-Construction Meeting, which will occur as described below. Additional meetings will be held as needed in order to accomplish the Project Schedule.
- B. Progress Review Group will coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

The Architect will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRE-CONSTRUCTION MEETING

- A. A Pre-Construction Meeting will be held within 15 working days after the Owner has issued the Notice to Proceed.
 - 1. Provide attendance by authorized representatives of the Contractor and major subcontractors.

2. The Architect will advise other interested parties, including the Owner, and request their attendance.
- B. Minimum agenda: Data will be distributed and discussed on at least the following items:
1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials, suppliers, and Architect.
 2. Channels and procedures for communication.
 3. Construction schedule, including sequence of critical work. (To be presented by Contractor)
 4. Contract Documents, including distribution of required copies of original Documents and revisions.
 5. Processing of Shop Drawings and Submittals to the Architect.
 6. Processing of Requests For Information (RFI's).
 7. Processing of Requests for Proposal, field decisions, and Change Orders.
 8. Rules and regulations governing performance of the work.
 9. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.
 10. Format and procedures for submitting "Application and Certificate for Payment" and "Schedule of Values" forms.

3.04 PROJECT MEETINGS

- A. Attendance:
1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
 2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.
- B. Minimum agenda:
1. Review, revise as necessary, and approve minutes of previous meetings.
 2. Review progress of the Work since last meeting, including status of submittals for review.
 3. Identify problems that will impede planned progress.
 4. Develop corrective measures and procedures to regain planned schedule.
 5. Complete other current business.
- C. Revisions to minutes:
1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.
 2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
 3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

*** END OF SECTION ***

SECTION 01350
LIST OF REQUIRED SUBMITTALS

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Submit Shop Drawings, Product Data, Samples and other information according to Article 5 – Shop Drawings & Submittals of the General Conditions.
- B. Provide specific information according to the each Specification Section.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- ITEMS

- 06410 - Rough Carpentry
- 06600 - Plastic Surfacing Materials
- 07210 - Thermal Insulation
- 07840 - Firestopping
- 07900 - Caulking and Sealants
- 08100 - Metal Doors and Frames
- 08200 - Wood Doors and Frames
- 08400 - Aluminum Entrance and Framing System
- 08800 - Glazing
- 09250 - Gypsum Board Systems
- 09300 - Tilework
- 09510 - Acoustical Ceiling Systems
- 09650 - Resilient Flooring
- 09900 - Painting Sherwin Williams
- 10100 - Projection Screens
- 10200 - Louvers
- 10400 - Identifying Devices
- 10520 - Fire Protection Specialties
- 10800 - Toilet and Bath Accessories
- 12500 - Window Treatment
- 15010 - Basic Mechanical Requirements
- 15075 - Mechanical Identification
- 15086 - Duct Installation
- 15145 - Plumbing Piping
- 15146 - Plumbing Specialties
- 15410 - Plumbing Fixtures
- 15430 - Plumbing Equipment
- 15810 - Ducts
- 15820 - Duct Accessories
- 15850 - Air Outlets and Inlets
- 15928 - Instructions and Control Elements
- 15950 - Testing, Adjusting, and Balancing
- 16050 - Basic Electrical Materials and Methods
- 16110 - Conduits and Raceways
- 16130 - Outlet and Junction Boxes
- 16131 - Interior Pullboxes
- 16133 - Cabinets

- 16140 - Wiring Devices
- 16141 - Nameplates, and Warning Signs
- 16170 - Switches, Disconnect and Safety
- 16180 - Overcurrent Protection
- 16190 - Vibration Isolation
- 16191 - Restraining Devices
- 16470 - Panelboards
- 16480 - Transformers
- 16520 - Automatic Lighting Control System
- 16721 - Fire Alarm System

*****END OF SECTION*****

SECTION 01730
OPERATION AND MAINTENANCE ITEMS

PART 1 -- GENERAL

1.01 SUMMARY

- A. Division 0, Contract Requirements and Division 1, General Conditions apply to this Section.
- B. Work Included: To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding the products incorporated into the Work, furnish and deliver the data described in this Section and in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

In preparing data required by this Section, use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

1.03 SUBMITTALS

- A. Comply with pertinent provisions of Article 5 of the General Conditions.
- B. Submit two copies of a preliminary draft of the proposed Manual or Manuals to the Architect for review and comments.
- C. Unless otherwise directed in other Sections, or in writing by the Architect, submit (3) three copies of the final Manual to the Architect prior to indoctrination of operation and maintenance personnel.

PART 2 -- PRODUCTS

2.01 OPERATION MANUALS

- A. Where instruction Manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Reference Chart:

Section:	Name:	Comment(s):
09300	Tilework	Per Item 1.06
09650	Resilient Flooring	Per Item 1.05
09680	Carpet	Per Item 1.04
09900	Painting	Per Item 1.03 A
15010	Basic Mechanical Requirements	Per Item 1.010 F
15145	Plumbing Piping	Per Item 1.04 B
15300	Fire Protection System	Per Item 1.02
15928	Instruments and Control Elements	Per Item 1.04 B
16050	Basic Electrical Materials and Methods	Per Item 1.04 A.2.a
16721	Fire Alarm	Per Item 1.6

- C. Format:
 - 1. Size: 8-1/2" x 11"

2. Paper: White bond, at least 20 lb. weight
 3. Text: Neatly written or printed
 4. Drawings: 11" in height preferable; bind in with text; fold-out acceptable; larger drawings acceptable but fold to fit within the Manual and provide a drawing pocket inside rear cover or bind in with text.
 5. Flysheets: Separate each portion of the Manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets may be in color.
 6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the Manual; 3-ring binders will be acceptable; all binding is subject to the Architect's acceptance.
 7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs., and cfm.
- D. Provide front and back covers for each Manual, using durable material accepted by the Architect, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE INSTRUCTIONS:

Name and Address of Work

Name of Contractor

General Subject of this Manual

Space for Signature of the Architect and Date

- E. Contents: Include at least the following:
1. Neatly typewritten index near the front of the Manual, giving immediate information as to location within the Manual of all emergency information regarding the installation.
 2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
 3. Complete nomenclature of all parts of all equipment.
 4. Complete nomenclature and part number of all replacement parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
 5. Copy of all guarantees and warranties issued.
 6. Manufacturer's bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturer's data with which this installation is not concerned.
 7. Such other data as required in pertinent Sections of these Specifications.

PART 3 -- EXECUTION

3.01 INSTRUCTION MANUALS

A. Preliminary:

1. Prepare a preliminary draft of each proposed Manual.
2. Show general arrangement, nature of contents in each portion, probable number of drawings and their size, and proposed method of binding and covering.
3. Secure the Architect's acceptance prior to proceeding.

B. Final: Complete the Manuals in strict accordance with the accepted preliminary drafts and the Architect's review comments.

C. Revisions: Following the indoctrination and instruction of operation and maintenance personnel, review all proposed revisions of the Manual with the Architect.

3.02 EXTRA MATERIALS

Coordinate review of condition, quantity, and delivery locations of Materials with the Owner's designated Representative

***** END OF SECTION*****

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SECTION 01800
SUPPLEMENTAL WARRANTY LIST

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Provide Letter for Supplemental Warranty from the Contractor Performing the work on the Company's Letterhead.
- B. The Supplemental Warranty shall not diminish the requirements for Warranty and Guarantees of the General Conditions. See Article 14 of the General Conditions

1.02 SUBMITTALS

- A. Submit extended Warranty Letter along with other Submittal requirements of the Section at the same time.
- B. Date of Commencement shall be the Date of Substantial Completion. Leave blank space for date. Date will be added at once Date of Substantial Completion has been determined.

PART 2 -- ITEMS

Section:	Name:	Items:	Time:	Comments:
07210	Insulation	All	5 years	
07900	Sealants & Caulking	All	5 years	
08100	Metal Doors & Frames	All	2 years	
08200	Wood Doors	All	2 years	
08800	Glazing	All	2 years	
15410	Plumbing Fixtures	Electric Water Cooler	5 years	
15430	Plumbing Equipment	Domestic Water Heater	5 years	

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SECTION 01900
EXTRA MATERIAL SUMMARY LIST

PART 1 -- GENERAL

1.01 DESCRIPTION
LIST

Section:	Name:	Comments:
09300	Tile	2% (1 box minimum)
09510	ACT	3% (1 box minimum)
09650	Resilient Flooring	5% (1 box minimum)
09680	Carpet	5%
09900	Painting	10% (1 gallon per color minimum)
10800	Accessories	(2) Master Keys

*****END OF SECTION*****

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SECTION 04413
GRANITE SURFACING

PART 1 -- GENERAL

1.01 SCOPE

This specification includes fabricated granite components required for the completion of granite work indicated by the contract documents.

1.02 DEFINITION OF TERMS

The definition of terms used in these specifications shall be those published by the National Building Granite Quarries Association, Inc.

1.03 SOURCE OF SUPPLY

All granite shall be obtained from quarries having adequate capacity and facilities to meet the specified requirements. Fabrication shall be by a firm equipped to process the material promptly in accordance with specifications. Evidence to this effect shall be provided by the supplier if required by the Design Professional.

1.04 SAMPLES

Sufficient samples of granite shall be submitted to the Design Professional through the General Contractor.

1. Each sample set shall include three samples.
2. Sample set shall show anticipated range of color, natural variations of grain structure, inclusions and any other visual characteristics to be expected in the final installation.
3. Approved sample set shall establish the standard by which stonework will be judged.

1.05 SHOP DRAWINGS

The granite supplier shall submit: copies of required shop drawings to the Design Professional for approval. These drawings shall show all bedding, bonding, jointing and anchoring details, and the dimensions of each piece of granite. No final sizing or finishing shall be done until the shop drawings for that part of the work have been approved.

1.06 DEFECTIVE WORK

Any piece of granite showing manufacturing flaws upon receipt at the storage yard or building site shall be referred to the Design Professional for determination as to whether it shall be rejected, patched, or redressed for use.

1.07 REFERENCES

ASTM A 123-02: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.

ASTM C 97-02: Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone.

ASTM C 119-04: Terminology Relating to Dimensions Stone

ASTM C 170-90 (1999): Test Method for Compressive Strength of Dimension stone

ASTM C 615-03: Specification for Granite Dimension Stone

ASTM C 880-98: Test Method for Flexural Strength of Dimensional Stone

1.08 METRIC CONVERSIONS:

The following metric conversions shall apply where English measurements are indicated in the text:

1. 1/16 inch (1.5 mm)
2. 1/8 inch (3 mm)
3. 3/16 inch (5 mm)
4. ¼ inch (6 mm)
5. 5/16 inch (8 mm)
6. 3/8 inch (10 mm)
7. ½ inch (12 mm)
8. 5/8 inch (15 mm)
9. ¾ inch (20 mm)
10. 1 inch (25 mm)
11. 1-1/4 inches (32 mm)
12. 1-1/2 inches (40 mm)
13. 1-5/8 inches (40 mm)
14. 2 inches (50 mm)
15. 3 inches (75 mm)
16. 4 inches (100 mm)
17. 6 inches (150 mm)
18. 8 inches (200 mm)
19. 12 inches (300 mm)

1.09 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- MATERIALS

2.01 GRANITE

Granite Standard: Granite shall comply with ASTM C 615, "Standard Specification for Granite Dimension Stone" for material characteristics, physical requirements, and sampling for selection of granite.

GENERAL: All granite shall be of standard architectural grade, free of cracks, seams, or starts, which may impair its structural integrity or function. Color or other visual characteristics indigenous to the particular material and adequately demonstrated in the sampling or mock-up phases will be accepted provided they do not compromise the structural or durability capabilities of the material. Texture and finish shall be within the range of samples approved by the Design Professional.

1. Granite Variety, as indicated on drawings.
2. Location, as indicated in drawings.
3. Nominal Thickness, as indicated in drawings.
4. Finish, as indicated in drawings.

PART 3 -- FABRICATION

3.01 DIMENSIONAL TOLERANCE (E)

Panel Thickness $\frac{3}{8}$ " or $\frac{1}{2}$ " (10 or 13 mm)	$\pm\frac{1}{32}$ " (± 0.8 mm)
Panel Thickness $\frac{3}{4}$ " to $1\frac{1}{8}$ " (20 to 41 mm)	$\pm\frac{1}{8}$ (± 3 mm)
Panel Thickness Greater than $1\frac{1}{2}$ " (41 mm)	$\pm\frac{1}{4}$ " (± 6 mm)
Panel Face Dimension	$\pm\frac{1}{16}$ " (± 1.5 mm)
Face variation from rectangular (Maximum out of Square) (non-Cumulative)	$\pm\frac{1}{16}$ " (± 1.5 mm)
Heads/Calibrated Edges	$\pm\frac{1}{16}$ " (± 1.5 mm)
Quirk Miters (width of Nose) up to $\frac{1}{4}$ "	-0; +25% of dim
Quirk Miters (width of Nose) over $\frac{1}{4}$ "	-0, $+\frac{1}{16}$ " (-0, + 1.5 mm)
Location of Back Anchors	$\pm\frac{1}{8}$ " (± 3 mm)
Depth of Back Anchors	-0, $+\frac{1}{16}$ " (-0, + 1.5 mm)
Location of Holes for Precast Anchors	$\pm\frac{1}{4}$ " (± 6 mm)
Hole Depth for precast anchors	$\pm\frac{1}{16}$ " (± 1.5 mm)
Anchor Slots – from face to centerline of Slot:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Anchor Slots – Lateral Placement:	$\pm\frac{1}{4}$ " (± 6 mm)
Anchor Slots – Width:	$\pm\frac{1}{16}$ (± 1.5 mm)
Anchor Slots – Depth at Maximum:	$\pm\frac{1}{8}$ " (± 3 mm)
Anchor Holes – from face to centerline of Hole:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Anchor Holes – Lateral Placement:	$\pm\frac{1}{8}$ " (± 3 mm)
Anchor Holes – Diameter:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Anchor Holes – Depth:	$\pm\frac{1}{8}$ " (± 3 mm)
Anchor Sinkages – Depth:	-0, $+\frac{1}{8}$ " (-0, +3 mm)
Continuous Kerfs – from face to centerline of Kerf	$\pm\frac{1}{16}$ " (± 1.5 mm)
Continuous Kerfs – Maximum Bow in 4'-0" (1.2m):	$\pm\frac{1}{16}$ " (± 1.5 mm)
Continuous Kerfs – Width:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Continuous Kerfs – Depth:	$-\frac{1}{16}$ "; $+\frac{1}{8}$ " (-1.5 mm, +3 mm)
Rebated Kerf	
Elevation of Bearing Surface:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Bearing Checks -	
Elevation of Bearing Surface:	$\pm\frac{1}{16}$ " (± 1.5 mm)
Bearing/Clearance Checks	
Lateral Location:	$\pm\frac{1}{2}$ " (± 13 mm)
Bearing/Clearance Checks – Setback from Face:	$\pm\frac{1}{16}$ " (± 1.5 mm)

Comment: TOLERANCES AND THICKNESSES: The suggested minimum nominal thickness for exterior veneer is as follows:

Bush hammered finish: 4" (102 mm)

Pointed finish: 4" (102 mm)

All other finishes: Minimum nominal thickness of granite panel is to be determined pending analysis of the following criteria:

- A. Piece Size
- B. Face Finish
- C. Anchoring Method & Location
- D. Structural Design Load Requirements

(e) Comment: It is more economical if the granite panel thickness coincides with one of the industry standard nominal thicknesses of 4" (102 mm), 3" (76 mm), 2" (51 mm), 1 5/8" (41 mm) or 1 1/4" (32 mm).

3.02 FLATNESS TOLERANCES

Variation from true plane, or flat surfaces, shall be determined by a 4' dimension in any direction on the surface.

Such variations on polish, hone, and fine rubbed surfaces shall not exceed tolerances listed below or 1/3 of the specified joint width, whichever is greater. On surface having other finishes, the maximum variation from true plane shall not exceed the tolerance listed below or 1/2 of the specified joint width, whichever is greater.

Polished, honed or fine rubbed finishes	1/16" (1.5 mm)
Sawn, 4-cut, 6-cut, and 8-cut finishes	1/8" (3 mm)
Thermal and coarse stippled finishes	3/16" (1.5 mm)
Pointed or other rough cut finishes	1" (25 mm)
Split face	Dependent on piece size & stock

3.03 BEDS AND JOINTS (F)

(f) Comment: BED AND JOINT WIDTH: The minimum recommended joint width is 3/8" for pieces with sawn beds and joints. Larger joint widths are required if pieces have split or otherwise rough cut beds and/or joints.

Pieces shall be bedded and jointed as shown on the approved shop drawings, and bed and joint surfaces shall be cut as follows:

- (1) Bed and joint surfaces shall be sawn through the full thickness of the granite piece. Bed and joint surfaces shall be within $\pm 3^\circ$ of 90° to the face of the piece unless otherwise specified.

Comment: (This specification is recommended for most applications where a 3/8" bed or joint width specification is used.)

- (2) Beds and joints shall be sawn or cut full square 2" back from the face and from that point may fall under square not more than 1" in 12". Both beds and joints shall be reasonable free of large depressions.

Comment: (This or similar specification is recommended for pieces 4" or more in thickness when cost savings may be achieved by eliminating the above full sawn specification.)

- (3) Beds and joints shall be split or rough sawn generally square with the face and may fall under square with the face not more than 2" in 12".

Comment: (This or similar specification is recommended only for projects with bed and joint widths of ¾" or more where a split face or other rough sawn appearance is specified.)

3.04 BACKS OF PIECES (G)

(g) Comment: SAWN BACKS: Because of physical characteristics, most granites cannot be split to a thickness less than one-third the lesser face dimension. Consequently sawn backs (the first specifications) should be specified for most veneers, and are frequently specified also for thicker ashlar, because of design considerations.

Installer's Option of one of the following:

- (1) Backs of all pieces shall be sawn to approximately true planes.

Comment: (Recommended for most building granite specifications.)

- (2) Backs of all pieces may be either rough or natural quarry split to provide surfaces, which vary not more than 1" in 12" from true plane and not more than 2" from their specified thickness.

Comment: (Recommended for structural bridge piers, 4" or more split face pieces, or other installations of thicker pieces where a sawn back is not required.)

Fabricate stone to maintain minimum clearance of 1 inch between backs of stone units and surfaces behind stone.

All tolerances listed assume panels 4" or less in thickness, not more than 5' x 5', and sawn on all six sides.

Comment: For thicker pieces, very large pieces, or pieces with split, pointed or rough sawn faces, backs, beds or joints, tolerances generally must be increased. Consult with suppliers on tolerances for special pieces.

A minimum cavity void of approximately 1" (25 mm) shall be maintained behind ashlar or dimensional granite used as a veneer. This cavity should be adequately ventilated and wept to eliminate the accumulation of moisture behind the granite veneer.

Comment: The NBGQA recommends a minimum factor of safety of 3.0 to 1 for granite panels and a minimum factor of safety of 4.0 to 1 for all anchorage assemblies.

3.05 FABRICATION, GENERAL REQUIREMENTS

- A. Mouldings, washes, and drips shall be constant in profile throughout their length, in strict conformity with details shown on approved shop drawings.
- B. Dress joints straight and at 90 degree angle to face. Shape beds to fit supports.
- C. Anchor Provision: Cut and drill sink provisions and holes in stone for anchors, fasteners, supports, and lifting devices as indicated or needed to set stone in place.
- D. Allow room for expansion of the anchoring devices where necessary.
- E. Where liners are required on the back of panels, secure by means of mechanical anchors. Comply with referenced standards.
- F. Finish exposed faces and edges of stone, except sawed reveals, to comply with requirements indicated for finish and to match final samples and mockups.

- G. Joint Width: Cut stone to produce uniform joints 3/8 inch or as shown on Drawings.
- H. Provide chases, reveals, reglets, openings, and similar features as required to accommodate adjacent work.
- I. Grade and mark stone to achieve uniform appearance when installed. Inspect finished stone units at fabrication plant. Replace defective units.

3.06 INCIDENTAL CUTTING AND DRILLING

Panels in excess of 100 pounds (45 kg) may include, at installer's option, lifting clamp dimples, Lewis holes, or other provisions as required to accommodate the lifting device (s) utilized by the installing contractor. Lifting holes in the top beds of panels or other locations where moisture collection is likely to occur shall be filled with non-expanding grout or high-modulus elastomeric sealant after installation and final alignment.

PART 4 -- EXECUTION

4.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

PART 5 -- SHIPPING AND HANDLING

5.01 PACKING AND LOADING

Finished granite shall be carefully packed and loaded for shipment using all reasonable and customary precautions against damage in transit. No material which may cause staining 3.4(h) or discoloration shall be used for blocking or packing.

(h) Comment: STAINING: Granite is highly resistant to staining, but should be protected from certain elements, such as wet (green) wood, oils mud, rust, construction waste, and asphalt compounds. Contact supplier for proper remedies to staining problems that occur.

5.02 SITE STORAGE

Upon receipt at the building site or storage yard, the granite shall be stacked on timber or platforms at least 3" above the ground, and extreme care shall be taken to prevent staining 3.4(h) during storage. If storage is to be for a prolonged period, polyethylene or other suitable plastic film shall be placed between any wood and finished surfaces, and shall be used also as an overall protective covering. All holes shall be plugged during freezing weather to prevent the accumulation of water. Salt shall not be used for melting of ice formed in Lewis holes or on pieces, or for any purpose involving its contact with the granite.

PART 6 -- STONE INSTALLATION

Proceed with the installation of the stonework in accordance with Drawings and using skilled mechanics capable of proper handling of the setting of the stone and able to field cut where necessary with sharp and true edges.

Set stone with joints uniform in appearance and stone edges and faces aligned to tolerances indicated.

Clean surfaces that are dirty or stained. Scrub with fiber brushes, and then rinse with clear water.

Provide expansion, control, and pressure-relieving joints of widths and at locations shown on Drawings.

PART 7 -- CLEANING AND PROTECTION

7.01 CLEANING

Granite shall be shop cleaned at the time of final fabrication. After installation and pointing or caulking are completed, the contractor shall carefully clean the granite, removing all dirt, excess mortar, weld splatter, stains, and/or other site incident defacements.

Stainless steel wire brushes or wool may be used, but the use of other wire brushes or of acid or other solutions which may cause discoloration is expressly prohibited. Fabricator should be contacted before cleaners other than detergents are used.

7.02 PROTECTION OF FINISHED WORK

After the granite work is installed, the granite shall be properly and adequately protected from damage. Boxing or other suitable protection shall be provided wherever required, but no lumber which may stain or deface the granite shall be used. All nails shall be non-corrosive.

All granite work in progress shall be protected at all times during construction by use of a suitable strong impervious film or fabric securely held in place.

*****END OF SECTION*****

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SECTION 06100
ROUGH CARPENTRY

PART 1 -- GENERAL

1.01 SCOPE OF WORK

Work of this Section includes everything necessary for and incidental to completing all Rough Carpentry and its fasteners and supports as indicated on the Drawings and designated herein.

1.02 QUALITY CONTROL

A. Field Inspection:

1. At site, verify all conditions affecting work of this Section, taking required field measurements. Report any discrepancies between Drawings and field dimensions to the Architect before beginning work. Commencing work shall indicate acceptance of conditions and surfaces underlying or adjacent to work of this Section.
2. Field Measurements shall be required to ascertain precise configurations and quantities required.

B. Delivery and Storage:

1. Deliver and store lumber on sills and cover for protection.

C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

D. Reference Standards:

1. UBC -- All work shall conform or exceed the standards set forth in the current edition of the Uniform Building Code.
2. CBC: Work shall conform to California Code Amendments, current edition.
3. ICBO -- All rough hardware products shall be as approved by the International Conference of Building Officials for the use indicated.
4. ASTM -- Designation as specified in the materials paragraph hereinafter.
5. OSHA: Equipment used in work of this Section shall comply with the requirements established by the Occupational Safety and Health Administration.
6. Structural and Framing Lumber and plywood shall be graded in accordance with "Standard Grading and Dressing Rules No. 16" of West Coast Lumber Inspection Bureau.

E. Grade Marking: Each piece of structural and framing lumber and plywood must bear official grade mark of association under whose rules it was graded.

1.03 CLOSEOUT

A. Upon completion of work of this Section, the Subcontractor shall remove all equipment, excess material, and waste products from the site.

B. Provide (1) one-year warranty.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Products shall be all new, bearing grade markings and shipped in quantities sufficient to maintain proper job progress.
- B. Lumber shall be from a single source when they are similar in usage to avoid minor discrepancies in finished dimension and quality.
- C. Fasteners shall be as manufactured by:
 - 1. Timber Connectors:
Simpson Company
220 North Palm Street
Brea, CA 92621 (714) 871-8873
 - 2. Power Driven Pins and Wedge Anchors:
Hilti Fastening Systems
P.O. Box 45400
Tulsa, OK 74145 (918) 627-9711
 - 3. Bolts and Anchors: Any source conforming to the requirements designated herein.
- D. Acceptable alternate manufacturers are subject to Architect's approval based upon conformance with the specified products functional properties and compatibility with other project materials.

2.02 MATERIALS

- A. General:
 - 1. Sizing: Provide S4S Lumber, dressed to standard sizes of association under which it is graded.
 - 2. Moisture Content:
 - a. Lumber: Dry to approximately same moisture content as anticipated when in service, maximum 19% moisture content for rough carpentry lumber and 12% for finish lumber.
 - b. Treated Lumber: Dried before and after treatment to maximum 15% moisture content.
 - 3. Glue Laminated Beams: Re-sawn yellow cedar Architectural grade for exterior use; to have concealed connections with countersunk bolts.
- B. Usage: Use various grades as follows, unless otherwise noted on the drawings:
 - 1. Grades as follows for studs and vertical framing unless otherwise shown or specified on structural drawing, nonstructural furring, concealed blocking and stripping, and miscellaneous nailers and backing.

Size:	Grade:
1 inch boards	"Construction"
2x4 studs, sills, plates, etc.	No. 2 or better
Other framing lumber, 2 x 4 up to 4 x 12	No. 2 or better
Beams 5 inches and over in least dimension	No. 1 or better

Post & Columns 5 inches and over in least dimension	Select Structural
Miscellaneous blocking, bridging, etc.	"Construction"
Sill plate	Redwood # 1 Foundation Grade
All other framing lumber not noted	No. 1

2. Plywood Sheathing: Structural 1, Douglas Fir plywood complying with "Product Standard PS-1-95, issued by U.S. Department of Commerce, grade marked by Douglas Fir Plywood Association or grade marked and stamped "Teco Tested Douglas Fir Plywood" or "Pittsburgh Testing Laboratory Analysis Inspection", thickness as indicated on drawings. Furnish in 48" x 96" sheets. Grade C.D., Exterior glue all locations except as noted otherwise on Drawings -- "C" face where exposed.
3. Fire Retardant: Chemically treated and pressure impregnated; capable of providing a maximum flame spread/fuel contribution/smoke development rating of 25; Provide UL approved identification on fire resistant treated materials.

C. Fasteners:

1. Timber Connectors: Manufactured from galvanized steel conforming to ASTM A525, ASTM A526 and ASTM A527. Plate material shall conform to ASTM A36.
2. Power driven pins shall conform to the designated manufacturers production specifications.
3. Screws: Standard domestic manufacture, bright steel. Galvanized for exterior use. Brass, bronze, aluminum or stainless when used to fasten items made of those metals.
4. Galvanizing shall be performed by the hot dip process after fabrication in as large sections as practicable.
5. Common Nails: Commercial Standard, 16d unless otherwise specified. Galvanized for exterior work.
6. Threaded Nails: "Screw-Tite", "Stronghold", or equal, either spiral-thread or annular-grooved; "Common" type for framing; "underlay floor nails" for plywood underlayment over sub-flooring; "sinker" type for plywood sub-flooring and risers.
7. Bolts: Standard mild steel square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers as indicated. Bolts, nuts and washers wholly or partially exposed on exterior shall be galvanized. Conform to ASTM A307 and A325-F.
8. Steel Plates and Angles: ASTM A-36, galvanized after fabrication except at stage of building #300 use corrosion preventive primer.
9. Lag Screws, Shear plates, Split Ring Connectors: As per National Forest Products Association, "National Design Specification for Stress-Grade Lumber and its Fastenings."
10. Framing Anchors, Joist Hangers, Etc.: As made by Simpson Company, or similar devices as approved by Architect, as indicated on Drawings.
11. Miscellaneous Clips, Steel Assemblies: As per ASTM A-36.
12. Glue to meet APA A-FG-01 Specifications.
13. Washers: malleable round plain iron washers by Industrial thread Products (800) 976-BOLT. Paint to match stain finish of Trellis. Conform to ASTM A307 and A325.

D. Wood Backing and Nailing Strips:

1. Provide all wood backing, furring or blocking indicated or required for proper installation and attachment of Work of other trades. Form lumber that has been cleaned and is in sound condition may be used, unless other material is indicated.
 2. Provide wood stripping where indicated for attachment of finish materials to wood surfaces.
- E. Sheathing Paper: Shall be 15-pound asphalt impregnated building paper.
1. Install sheathing paper on exterior wall sheathing, lay horizontally starting at bottom; lap edges and ends 6" and extend back of window casings and other finish work.
 2. Provide two layers at all locations over plywood sheathing.
- F. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Supervision: Perform rough carpentry work under the direction of a capable, experienced foreman. Cooperate with other tradesmen doing work. Carefully plan and layout work of construction.
- B. Cutting: Under this Section, have skilled mechanics do cutting and framing of wooden members required to accommodate structural members, routing of piping, conduit, ducts and installation of mechanical, electrical, or other apparatus or equipment. Cutting must be approved by the Architect and as indicated on the structural drawings.
- C. Framing: Provide necessary shoring, bracing, or temporary structural units as required. Accurately saw-cut lumber and timber framing and fit into respective positions and securely nail, spike, lag screw, or bolt together as indicated, or specified.
- D. Nailing: Conform to nailing schedule in the UBC and California Code Amendments 1995 except as shown on drawings. Follow more stringent requirements in each case.
- E. Storage: Store in dry, ventilated, covered location. Re-dry any wet lumber to maximum specified moisture content before installing.
- F. Coordinate work with related trades to prevent undue delay in job progress.
- G. Provide materials in sufficient quantities on job site to complete work and to accommodate minor unforeseen changes and additions in the scope of work.

3.03 INSTALLATION

- A. General: Provide framing as shown and specified. Accurately cut and fit members; securely nail, bolt or anchor together as shown in such a manner to produce rigid substantial construction free of squeaks or other defects.
- B. Rough Framing: Fit closely; set accurately to required lines and levels and secure rigidly in place. Set horizontal and inclined members with crown edge up. Do not cut, notch or bore structural members without specific approval, except for not more than one-fifth the

depth of the member. Reinforce cut members as directed. Bolt, nail and spike thoroughly with not less than sizes and quantities indicated. Structural members shall provide full contact at all bearing surfaces.

1. Studs: Make exterior and separation walls of nominal 2x6 studs, 16 inches on center and remaining partition walls of 2x4 studs at 16" o.c. or as required, to be larger to accommodate mechanical or electrical equipment, piping and fixtures or the fixtures or equipment of any other trade. Unless otherwise indicated, all panels, valve covers, cleanouts, devices, access doors, recessed cabinet boxes, etc. shall be mounted flush with the adjacent wall surface. When any such item is of a depth where it is not practical to use solid studding to the full thickness of the wall, the wall shall be furred. When furring is required it shall extend the full width of the room on the wall in which it occurs and from floor to roof or ceiling joists. The studs comprising all interior partitions and the wall material affixed to them shall extend from floor to ceiling joist framing except as otherwise indicated.
 2. Top plates in bearing partitions shall be doubled and lapped at each intersection with walls or partitions. Stagger joints in upper and lower members of top plate not less than 4 feet. Exception: where headers require top chords to be cut out, ties are required according to Plan.
 3. Provide blocking not less than 2 inches in nominal thickness of same width as studs as shown on Drawings.
 4. Frame corners solid where stud walls or partitions meet, or as indicated on Drawings.
- C. Nailing: Drive nails not closer together than 1/2 their length unless driven in drilled holes, nor closer to edge of member than 1/4 its length; drill holes slightly smaller than nail diameters when necessary to prevent splitting. Penetrate second or farther member not less than 1/2 length of nail.
- D. Bolts and Nuts: American Standard with malleable or cut steel washers under heads and nuts except where bearing on steel plates or other steel attachments. Clamp members together and bore holes of same diameter as bolts, true to line, drive bolts in place and draw nuts up tight. Immediately prior to enclosing with finish or, if left exposed, and upon completion of other work, draw bolts tight again.
- E. Connectors: Types shown and where not shown, of types most suitable for substantial concealed construction. Nail per manufacturer's recommendations.
- F. Grounds: Provide and set wood grounds at points where trim occurs and where shown. Douglas Fir S1S, thickness and location required. Set plumb or level and true-to-line. Securely nail to wood backing at each stud or bearing.
- G. Nailing, Strips and Plates: Provide and securely fasten in place wood nailing strips, plates, blocking, etc., indicated or required to complete work. Bolt nailing strips in connection with metal work as indicated.
- H. Wood Backing: Provide wood backing to receive electrical fixtures and equipment, bases, cabinets, door stops and plates and other fixed equipment, as required to complete the work, securely nailed to frame work. Provide backing at 7'-6" typical in all classroom areas.
- I. Install all fasteners and supports as required on the Drawings as specified herein.

*** END OF SECTION ***

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SECTION 06200
FINISH CARPENTRY

PART 1 -- GENERAL

1.01 SCOPE OF WORK

Supply and install complete Finish Carpentry Work as shown on Drawings and as specified herein. Provide hardware and attachment accessories as required for a complete and proper installation.

1.02 SHOP DRAWINGS

Per General Conditions, submit shop drawings of millwork at full size or large scale showing sizes, materials, grain run, methods of construction, connection to adjacent members and installation. Indicate all backing members for installations and all hardware.

1.03 MEASUREMENTS

Verify all dimensions shown on Drawings by taking field measurements; proper fit and attachment of all parts is required.

1.04 QUALITY CONTROL

Following standards apply to Work of this Section except where more stringent requirements are specified herein:

1. Architectural Woodwork Institute "Quality Standards".
2. Western Wood Products Association Manual.
3. American Wood Preservers Association Specifications.

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Douglas Fir: West Coast Lumber Inspection Bureau "Standard Grading and Dressing Rules" and Western Wood Products Association, graded "C" and better, flat grain grade marked by WCLIB or WWPA.
- B. Douglas Fir Plywood: U.S. Product Standard PS-1, American Plywood Association, grade trademarked "C-D", plugged, exterior glue, sanded.
- C. Blocking, Furring, etc.: Standard Grade Western White Pine, Construction grade Douglas Fir or other equally sound softwood, as graded by WCLIB or WWPA.
- D. Softwood Lumber: PS 20; custom grade in accordance with AWI maximum moisture content of 6%; of quality capable of transparent finish.
- E. Hardwood Lumber: FS MM-L-736; custom grade in accordance with AWI; maximum moisture content of 6% of quality capable of transparent finish.

2.02 ACCESSORIES

- A. Nails, bolts, nuts, washers, blind fasteners, lags and screws, size and type to suit application.
- B. Wood Filler: oil base, tinted to match surface finish color.

- C. Shelf Standards and Rests: Knape and Vogt #255 & #256 for recessed application. Provide two hold down clips for each shelf in the slot above
- D. Closet Hanger Bars and Supports: Knape and Vogt #770, #660, #734, #735, and #1195. Provide intermediate support of spans over 6'-0".

2.03 SHOP TREATMENT OF WOOD MATERIALS

- A. Shop pressure treat wood materials requiring UL fire rating or preservations.
 - 1. Provide UL approved identification on fire retardant treated material.
- B. Wood Preservative (PT type) Wolmanized, Pressure Treated Lumber, manufactured by Osmose Wood Products or approved equal.
- C. Fire Retardant (FR-S Type) chemically treated, and pressure impregnated, capable of providing a maximum rating of 25; manufactured by Demose Wood Products. Dricon FRT or approved equal.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.
- E. Verify that surfaces and openings are ready to receive work and field measurements are as shown on Shop Drawings and instructed by the fabricator.
- F. Verify that mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.02 PRIMING

Back paint all wood surfaces inaccessible and unexposed after installation before delivery with an approved linseed oil and aluminum primer.

- 1. Prime coat all unfinished metal parts.
- 2. Prime paint surfaces of items or assemblies to be in contact with cementitious materials.

3.03 FINISH CARPENTRY INSTALLATION

- A. Use only hot dip galvanized or aluminum finish or casting nails. Set nails for putty stopping in surface members. Hammer marks not acceptable on any exposed finished surface and may be cause rejection of Work by Architect.
- B. Make all end splices exposed in finished members bevel splices and not square butted. Install members in as long lengths as possible.
- C. Install Work to details shown, plumb, level and to line and securely anchored per AWI custom quality standard. Make scribes where required accurate. Miter corners of trim.
- D. Provide and install other miscellaneous millwork items and related Work required to complete Work of this Section.
- E. Prepare all woodwork installed hereunder by cleaning and sanding as required to receive finishes specified in Section "Painting and Finishing".

- F. Install all doors and frames; finish hardware and bathroom accessories per manufacturer's recommendation.
- G. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth and site finish.

***** END OF SECTION *****

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SECTION 06410
CUSTOM CASEWORK

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Furnish all: labor, materials, equipment and services necessary and/or reasonably incidental to the proper execution of cabinetwork, including hardware as shown on Drawings and specified herein.
- B. Work includes counters, shelving, countertops and cabinetry.

1.02 STANDARDS OF WORKMANSHIP

Quality of millwork and fabrication shall conform to:

- 1. Woodwork Institute of California (WIC)
- 2. National Kitchen Cabinet Association (NKCA)
- 3. American Woodworkers Institute (AWI)

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Within 35 Calendar Days after the Contractor has received the Notice To Proceed, submit:

- 1. Submit Shop Drawings, include materials, component profiles, fastening methods and schedule of finishes.
- 2. Submit samples of finishes.

1.05 WARRANTY

Contractor Guarantee: Contractor guarantees the work covered by the specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Softwood plywood: PS-1 graded per AWI. Application: 3/4" for cabinets -- plastic laminated.
- B. Plastic Laminate: high pressure laminated plastic conforming to NEMA LP-3, 0.50" thickness for tops, and 0.028" thickness for vertical surfaces.
 - 1. All splashes shall be 4" high; provide end splashes with sq. bottom joints.
 - 2. Interiors: Low Pressure Melamine.
 - 3. Backing Sheet: LD-3-BK 20 backing grade undecorated plastic laminate.
- C. Wood particleboard: Per AWI standard, composed of wood chips, made with waterproof resin binders, sanded faces, application 3/4" for countertops.
- D. Hardboard: PS-58: pressed wood fiber with resin binder, tempered grade, smooth two sides for drawer bottoms.

- E. Hardwood Lumber: Grade in accordance with AWI; maximum moisture content of 6%; application.
- F. Plastic Edge Trim: Same as face finish -- plastic laminate.
- G. Adhesive - Type II adhesive -- an approved thermosetting-on-contact adhesive.
- H. Doors and drawer fronts shall be 3/4" plywood with edges veneered or plastic laminate finish.
- I. Hardware: Cabinet hardware shall be concealed self-closing hinges, drawer slide, shelf-standards and clips as manufactured by Blum, Knape & Voigt or equal.
- J. Drawer Slides for Drawers 24" wide or less: 100 pound load rated, full extension, ball bearing. Accuride 3832.
Drawer Slides for File, Paper Storage and Heavy Duty Drawers 42" wide or less: 150 pound load rated, over travel extension, ball bearing. Accuride 4034.

2.02 FABRICATION

- A. Assemble casework in Shop for delivery to site in units easily handled and to permit passage through building openings.
- B. Apply plastic laminate finish in full-uninterrupted sheets consistent with manufactured sizes. Make corners and joints hairline. Locate counter butt joints minimum 2' from sink cutouts.
- C. Mechanically fasten splash backs to countertops with steel brackets 16" o.c.
- D. Countertop edges and splashes to have radius corners.
- E. Outside corners of free standing desks to be radiused per plans.
- F. Apply laminated backing sheet to reverse side of plastic laminate finish surfaces.
- G. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Seal contact surface cut edges.
- H. On items to receive transparent finishes, use wood filler that match surrounding surfaces. Apply wood filler in exposed nail and screw indentations. Sand work smooth.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.
- E. Verify that surfaces and openings are ready to receive work and field measurements are as shown on Shop Drawings and instructed by the fabricator. Verify dimensions for work of other trades incorporated into the casework.
- F. Verify that mechanical, electrical, and other building items affecting work of this Section are placed and ready to receive this work.

3.02 INSTALLATION

- A. All parts shall be precision machined to close tolerances, accurately fitted and assembled with appropriate fastening and adhesives required to produce first quality fixtures, square, true, plumb and level.
- B. Carefully scribe casework that is against other building materials, leaving gaps of 1/32" maximum. Do not use additional overlay trim for this purpose.
- C. Anchor securely to wall and floor with all anchorage devices required. Coordinate to allow anchorage devices to be set with other work as applicable. Provide temporary protection over finish work as required during construction to protect the work from damage.
- D. Installation shall be complete including continuous bases. All work shall be installed by skilled workmen under the control and supervision of personnel trained in the handling and installation of this cabinetwork and equipment.
- E. Install and adjust cabinet hardware to correct operations.

***** END OF SECTION *****

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SECTION 06600
PLASTIC SURFACING MATERIALS

PART 1 – GENERAL

1.01 DESCRIPTION

Provide factory-finished Surface Materials, and similar items where shown on the drawings, as specified herein, and as needed for a complete and proper installation. Work may include, but is not limited to:

1. Standard Decorative Laminates.
2. Solid Surfacing.
3. Marker Board Laminate.

1.02 REFERENCES

- A. ASTM D 638 - Standard Test Method for Tensile Properties of Plastics.
- B. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- C. ISO 4586-2 - High Pressure Decorative Laminates; International Organization for Standardization.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Samples:
 1. Selection Samples: Submit actual samples of surfacing materials to illustrate full range of colors, patterns, and finishes available.
 2. Verification Samples: Submit two samples, each 12 inches square, illustrating each selected surfacing material in specified color, pattern, and finish.
- B. Manufacturer's Instructions:
 1. Submit manufacturer's printed installation instructions for each product.
 2. Submit manufacturer's Safety Data Sheets (M.S.D.S.) for each adhesive.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

Acceptable Products: Wilsonart International, Dupont Corian, Transolid, Inc.

2.02 STANDARD DECORATIVE LAMINATES

- A. Acceptable Products: Wilsonart Laminate, Formica.
- B. Product Description: Decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.
- C. Standard Decorative Laminate – General Purpose Type: having the following physical characteristics:
 1. Sheet thickness: 0.048-inch (1.219 mm) plus/minus 0.005-inch (0.127 mm).
 2. Exceeding performance requirements of NEMA LD 3-1995 Grade HGS.

3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 55; Smoke developed 30.
4. Patterns and Finishes: Selected from manufacturer's full range of available selections, as selected and approved by Architect.

2.03 SOLID SURFACING MATERIAL

- A. Acceptable Product: Wilsonart Gibraltar Solid Surfacing, Type 051, or approved equal.
- B. Product Description: Homogenous sheet material composed of acrylic resins, fire-retardant filler materials, and coloring agents.
 1. Nominal sheet thickness: 0.50 inch (13 mm).
 2. Surface burning characteristics in accordance with ASTM E 84: Flame spread less than 25; Smoke developed less than 25.
 3. Liquid Absorption, ISO 4586-2, for 1/2-inch material thickness: 0.4 percent after 2 hours boiling water.
- C. Izod Impact, ASTM D 256, Method A: 0.2 foot pounds per inch.
 1. Tensile Modulus, ASTM D 638 Nominal: 1.7 million pounds per square inch.
 2. Thermal Expansion, ASTM D 696: 0.000019-inch per inch per degree F, maximum.
 3. Hardness, ASTM D 2583, Barcol Impressor: 59.
 4. Flexural Modulus, ASTM D 790: 1.6 million pounds per square inch.
 5. Deflection Temperature under load, ASTM D 648: 90 degrees C.
 6. Stain Resistance: ANSI Z124.6 modified, Method 3.4: No effect.
 7. Boiling Water Resistance, NEMA LD 3-1995, Method 3.5: No effect.
 8. High Temperature Resistance: NEMA LD 3-1995, Method 3.6: No effect.
 9. Radiant Heat Resistance: NEMA LD 3-1995, Method 3.10: No effect.
 10. Light Resistance: NEMA LD 3-1995, Method 3.3: No effect.
 11. Ball Impact Resistance, NEMA LD 3-1995, Method 3.8, one half pound ball, unsupported: 125 inches.
 12. Specific Gravity: 0.977 ounces per cubic inch (1.69 grams per cubic centimeter).
 13. Approximate weight: 4.2 pounds per square foot (20.5 kg/square m).
 14. Weatherability: ASTM D 2565: Pass.
 15. Fungus Resistance, ASTM G 21: Pass.
 16. Bacterial Resistance, ASTM G 22: Pass.
 17. Pittsburgh Protocol Toxicity: 66.9 grams.
 18. Patterns and Finishes: Selected from manufacturer's full range of available selections, selected and approved by Architect.
 19. Impact Resistance NEMA LD3-1995 (1/2 lb. Ball) SSV bonded to substrate*** Method 3.08 modified. 125" (No Failure)
 20. Tensile Toughness ASTM D 638. 21 (in. - lb./in. ³)
 21. Tensile Modulus ASTM D 638 Nominal. 1.7×10^{-5} lb./in. ³
 22. Density 1.60 gram/cm³

23. Approximate weight 4.2 lbs./ft²
24. Pittsburgh Protocol Toxicity = 30 grams range

2.04 MARKER BOARD LAMINATES

- A. Acceptable Product: Wilsonart Marker Board Laminate.
- B. Product Description: Overlay saturated with melamine resins and decorative surface papers, impregnated with melamine resins, bonded under heat and pressure to kraft papers impregnated with phenolic resins.
- C. Marker Board Laminate - Horizontal Grade Type: Type 136.
 1. Sheet thickness: 0.050-inch plus/minus 0.005-inch (1.27 plus/minus 0.127 mm).
 2. Exceeding performance requirements of NEMA LD 3-1995 Grade HGS.
 3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 40; Smoke developed 115.
- D. Marker Board Laminate - Vertical Grade Type: Type 336.
 1. Sheet thickness: 0.030-inch plus/minus 0.003-inch (0.762 plus/minus 0.076 mm).
 2. Exceeding performance requirements of NEMA LD 3-1995 Grade VGP.
 3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 40; Smoke developed 70.
 4. Colors: Selected from manufacturer's full range of available selections, as selected and approved by Architect.
- E. Marker Board Laminate - Fire-Rated Type: Type 636.
 1. Sheet thickness: 0.050-inch plus/minus 0.005-inch (1.27 plus/minus 0.127 mm).
 2. Exceeding performance requirements of NEMA LD 3-1995 Grade HGF.
 3. Surface burning characteristics in accordance with ASTM E 84; unbonded: Flame spread 25; Smoke developed 110.
 4. Color: Selected from manufacturer's full range of available selections, as selected and approved by Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

Surface preparation: Precondition surfacing materials and surfaces to receive surfacing materials in accordance with manufacturer's printed installation instructions.

3.03 APPLICATION

Install materials in accordance with manufacturer's printed instructions.

*** END OF SECTION ***

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SECTION 07210
THERMAL INSULATION

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install Thermal Insulation indicated on the Drawings and as specified herein.
- B. The principal items of work include:
 - 1. Thermal Insulation within roof.
 - 2. Thermal Insulation within exterior walls.
 - 3. Thermal Insulation within interior walls.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Upon completion of this portion of the Work, complete and post a certificate of insulation compliance in accordance with pertinent requirements of governmental agencies having jurisdiction.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

- 1. Materials list of items to be provided under this Section.
- 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- 3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

1.05 GUARANTEE

Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Provide thermal insulation as indicated on Drawings. All insulation shall be inorganic glass fiber insulation. Insulation shall comply with ASTM Testing Standards. Fire Hazard Classification, Flame Spread Index, Smoke Developed Index, Combustibility, and Fire Endurance Ratings as required by Code.
- B. Insulation shall be as manufactured by Certain-Teed, Johns-Manville, Owens-Corning, or Architect approved equal.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Verify adjacent materials are dry and ready to receive installation.
- B. Verify mechanical and electrical services within walls have been installed and tested.

3.03 INSPECTION

- A. Before any installation is started, determine that the other work is suitable to receive insulation.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- C. Remove or protect against projections in construction framing that may damage or prevent proper insulation.

3.04 INSTALLATION

- A. All work shall be performed by licensed applicators, shall comply with the recommendations of the manufacturer and the National Association of Insulation Manufacturers.
- B. Install insulation with factory applied membrane facing warm side of building spaces. Lap ends and side flanges of membrane over and between framing numbers. Secure in place. Tape seal butt ends and lapped side flanges. Tape seal tears or cuts in membrane.
- C. Trim insulation neatly to fit spaces. Use batts free of damage. Install batt insulation, in wall spaces without gaps or voids.
- D. Install Insulation in all indicated walls from floor to underside of roof. Secure insulation with 19-gage wire or 1" wide, 20 gage steel strips. Architect shall approve all insulation details, including methods of fastening, before commencement of the work.

3.05 CLEAN UP AND DISPOSAL

At frequent intervals during and again upon completion of work, remove from building and working premises tools and equipment, surplus materials, all rubbish and debris of whatever nature not caused by other trades, and leave the work in a clean, orderly and acceptable condition approved by the Architect.

***** END OF SECTION *****

SECTION 07840
FIRE STOPPING

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Work included: Provide firestopping where indicated on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. It is the intent of this section of the specifications to establish a single, competent source to be responsible for providing all labor, materials, products, equipment and services, to supply and install the firestopping and smoke seal work for the entire project, at the following locations, as indicated on the drawings:
 - 1. Openings in fire rated walls, floors and roofs both empty and those containing penetrations such as cables, conduits, cable trays, pipes, ducts and similar penetrating items.
 - 2. Gaps between fire-rated floor slabs and exterior curtain walls.
 - 3. Gaps between fire-rated walls and exterior curtain walls.
 - 4. Gaps located within expansion joints.
 - 5. Gaps between the tops of fire rated walls and underside of fire rated floor or roof assemblies.
 - 6. Penetrations through smoke barriers and construction enclosing compartmentalized areas involving both empty openings and openings containing penetrating items.
 - 7. Openings at each floor level in fire rated shafts or stairwells.

1.02 RELATED WORK

- A. Openings through Floors and Walls:
 - 1. Fire Rated: Metal sleeves for fire rated openings through floors and walls shall be provided under applicable mechanical and electrical specification sections.
 - 2. Non-Rated: Non-rated openings through floors and walls shall be sealed under applicable mechanical and electrical specification sections.
- B. Firestopping and smoke seals within mechanical (i.e. inside ducts, dampers) and electrical assemblies shall be sealed under applicable mechanical and electrical specifications sections and only in accordance with the equipment or device manufacturers' installation instructions. Firestopping and smoke seals around outside of such mechanical and electrical assemblies, where they penetrate fire rated separations, are the responsibility of this section.

1.03 REFERENCE STANDARDS/DOCUMENTS

- A. ASTM E814 - Test Method of Fire tests of Through Penetration Firestops.
- B. ANSI/UL 1479 - Fire Tests Of Through-Penetration Firestops
- C. ANSI/UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems
- D. UL: Fire Resistance Directory, Volume 2.
- E. ITS: Directory of Listed Products.
- F. Factory Mutual, Approvals Guide

1.04 SYSTEM DESCRIPTION

- A. Firestopping Materials: Provide firestopping system(s) of sufficient thickness, width and density to provide and maintain a fire resistance rating, as indicated on drawings and in accordance with [UL], [WH], or [FM] design numbers.
- B. Provide a seal completely filling all annular spaces to prevent the passage of flame, smoke and gases through the opening in the fire separation in which it is installed.
- C. Material Compatibility: Provide materials which are compatible with all materials used in the system including materials used in or on penetrating items as well as all construction materials used in conjunction or contiguous with the system.
- D. Accessories: Provide components for each firestopping system that are needed to install fill materials. Use only components specified by the firestopping manufacturer and approved by the qualified testing and inspecting agency for the designated fire resistance rated systems. Accessories include but are not limited to the following items:
 - 1. Permanent forming/damming/backing materials
 - 2. Temporary forming materials
 - 3. Substrate primers
 - 4. Collars
 - 5. Steel sleeves

1.05 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.06 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's specifications, installation instructions and product data for each material required. Include [UL], [WH], or [FM] tested systems or designs to show compliance with the Contract Documents.
- B. Shop Drawings: Submit shop drawings showing typical installation details including reinforcement, anchorage, fastenings and method of installation for each type of firestopping condition.
- C. Samples: If requested, submit samples of each type of firestopping systems, smoke seals and accessories. Indicate location where material/system shall be utilized.

1.07 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in manufacturing products of this Section with minimum ten (10) years documented experience, and having a quality management system that is registered as conforming to the requirements of ISO9001.
- B. Applicator: Company having a minimum of three (3) years experience in the installation of materials specified herein on projects comparable to this project. The firm shall have the written authorization of the firestopping material manufacturer (s).

1.08 REGULATORY REQUIREMENTS

- A. Conform to applicable local Building Codes for fire resistance ratings.
- B. Provide materials, accessories and application procedures which have been listed by [UL], [WH], [FM] or [tested by a nationally recognized independent testing agency] in accordance with [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] to achieve the required fire protection rating(s).

1.09 ENVIRONMENTAL REQUIREMENTS

- A. Do not proceed with the installation of firestopping materials when temperatures or weather conditions exceed the manufacturer's recommended limitations for installation.

- B. Ventilate solvent based and moisture-cure firestopping per firestopping manufacturer's instructions by natural means or, where this is inadequate, by forced air circulation.

1.010 DELIVERY, STORAGE AND HANDLING

Deliver materials to Site in manufacturer's sealed and labelled containers intact. Handle and store materials in accordance with manufacturer's instructions.

1.011 PROJECT/SITE CONDITIONS

Comply with manufacturer's recommended requirements for temperature, relative humidity and substrate moisture content during application and curing of materials.

1.012 SEQUENCING AND SCHEDULING

Do not install firestopping system(s) until Work within opening has been completed. Coordinate with other applicable Sections. Schedule work of other trades so that firestopping applications can be inspected prior to being covered by subsequent construction.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Provide firestopping silicone sealants, water-based sealants, intumescent sealant, mortars, or firestop devices from the following manufacturer:

A/D Fire Protection Systems Inc. or Architect approved equal.

2.02 MATERIALS

- A. Provide a complete system of asbestos-free firestop systems capable of maintaining an effective barrier against flame, smoke and gases in compliance with requirements of [ASTM E814], [ANSI/UL 1479], or [ANSI/UL 2079] and listed by [UL], [WH], or [FM] and in addition are approved by jurisdictional authorities and the Consultant.
- B. A/D FIRE BARRIER Silicone Sealants: For use in: openings with penetrating items subject to high movement; multiple penetration systems; for combustible pipes up to 2-in. diameter; in control joints; in curtain wall joints; expansion joints; floor/wall joints; wall/wall joints; head of wall joints; and as a sealant for smoke barrier construction.
- C. A/D FIRE BARRIER Intumescent Caulk: For general use as a firestop sealant with: insulated pipes; pipes; electrical cables and conduit; ducts.
- D. A/D FIRE BARRIER Seal and Seal NS: Water based firestop sealants for use with: control joints; head of wall joints; floor/wall joints; wall/wall joints; multiple penetration systems; plumbing; mechanical; electrical; and where sprayed sealant application is required or desired.
- E. A/D FIRE BARRIER Mortar: For use in: large openings; static non-moving penetrations such as cable trays; for multiple penetration systems; electrical and communication bundles; conduits; non-combustible sleeves; and insulated pipes.
- F. A/D FIRE BARRIER Collars: For use in openings with single combustible pipe penetrations greater than 2-in. diameter.
- G. A/D FIRE BARRIER Pillows: For use in openings with: cable tray; multiple cable penetrations; where retrofitting of penetrating items is anticipated, and as a temporary fire stop system.
- H. Fire stop system ratings: Comply with applicable Building Code requirements for locations and ratings.

2.03 ACCESSORIES

- A. Damming and backup materials, supports and anchoring devices: Non-combustible, to manufacturer's recommendations and in accordance with the tested system being installed as acceptable to jurisdictional authorities.
- B. Primers: As required by firestopping manufacturer and compatible with selected system and contiguous materials.
- C. Water: Potable.
- D. Firestopping for vertical (wall) applications: Non-sag caulk or spray grade sealants, Mortar, Collars or Pillows.
- E. Firestopping for horizontal (floor) applications: Non-sag caulk or self-levelling or spray grade sealants, Mortar, Collars or Pillows.
- F. Firestopping for overhead applications: Non-sag caulk or spray grade sealants or Mortar.
- G. Tape: Pressure sensitive masking tape as recommended by the firestopping manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Examine substrates, openings, voids, adjoining construction and conditions under which the Work is to be installed. Confirm compatibility of surfaces scheduled to receive firestopping.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Verify that penetrating elements are securely fixed and properly located with the proper space allowance between penetrations and surfaces of openings.
- E. Do not proceed with Work until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Surfaces to receive firestopping shall be free of dirt, dust, grease, oil, rust, loose materials, form release agents, frost, moisture or any other matter which would impair the bond of firestopping material to the substrate of penetrating item(s).
- B. Prime substrates in accordance with manufacturer's written instructions or recommendations. Confine primers to areas of bond; do not allow spillage or migration onto exposed surfaces.
- C. Do not apply firestopping and smoke seals to surfaces previously painted or treated with sealers, curing compounds, water repellent or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- D. Ensure that anchoring devices, back-up materials, clips, sleeves, supports and other related materials used in the actual fire tests are provided.
- E. Mask where necessary to prevent firestopping materials from contacting adjoining surfaces that will remain exposed upon completion of Work. Remove tape as soon as it is possible to do so without disturbing firestopping seal with substrates.
- F. Installation is not to proceed until submittals have been completed.

3.03 INSTALLATION

- A. Manufacturer's Instructions: Comply with [UL], [WH] or [FM] Listings and manufacturer's instructions for the type of material and condition of opening in each case. Consult with

the manufacturer's technical representative to determine proper procedure for conditions not fully covered by printed instructions. Record in writing any oral instructions received, with copy to manufacturer.

- B. Install firestopping with sufficient pressure to properly fill and seal openings to ensure an effective smoke seal. Tool or trowel exposed surfaces. Remove excess firestopping material promptly as the Work progresses and upon completion.
- C. Damming: Provide leak-proof dams as required to seal openings and contain liquid sealants, putty or mortar until cured. Install damming in accordance with manufacturer's instructions.
- D. Damming Boards: Install forming/damming materials and other accessories of type required to support fill materials during their application and in the position needed to produce the shapes and depths required to achieve fire ratings of through-penetration fire stop systems.
 - 1. Combustible Type: For temporary dams only. Remove after firestopping material has cured.
 - 2. Non-Combustible Type: For temporary or permanent dams. Provide non-combustible type wherever damming material cannot be removed after applying firestopping materials.
- E. Void Filler: Use materials recommended by the firestopping manufacturer to seal gaps created by non-combustible type damming boards and to seal around cables, conduits, pipes and where void filler material becomes part of the fire rated assembly.
- F. Sealant: Install damming material or mineral wool as required. Apply sealant so air voids are not present and sealant is in full contact with penetrating items. Tool sealant to ensure substrate contact. Remove excess sealant in accordance with manufacturer's recommendations.
- G. Mortar: Install damming material as required. Mix mortar in strict accordance with manufacturers instructions. Pump, trowel or hand pack mortar through openings to minimum thickness as recommended by manufacturer and as listed by [UL], [WH] or [FM], to achieve required fire rating.
- H. Firestopping Mineral Wool: Install firestopping by compressing material to the minimum required by [UL], [WH] or [FM] listing. Apply firestopping in sufficient thickness, depth and density so as to achieve the required fire resistance rating. Use impaling clips to support and secure firestopping where required by tested system.

3.04 FIELD QUALITY CONTROL

- A. Notify Consultant when completed installations are ready for inspection prior to concealing or enclosing an area containing firestopping materials.
- B. Arrange for inspections by the Owners independent inspection and testing company, appointed and paid for by Owner.
- C. Following field inspections, provide all repair as required to ensure compliance with the Contract Documents.

3.05 CLEANING AND PROTECTION

- A. Upon completion of this work, remove all materials, equipment and debris from the site.
- B. Leave work area and adjacent surfaces in a condition acceptable to the Consultant.
- C. Leave installed work with sufficient protection to enable it to remain untouched until project turnover.

END OF SECTION

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SECTION 07900
CAULKING AND SEALANTS

PART 1 -- GENERAL

1.01 DESCRIPTION

Work included: Throughout the work, seal and caulk joints where shown on the Drawings and elsewhere as required to provide a positive barrier against passage of moisture and passage of air.

1.02 QUALITY ASSURANCE

- A. Conform to Sealant and Waterproofers Institute requirements for materials and installation.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- D. Warranty: Provide written warranty for all caulking and sealants against all defects of material or application for a period of five (5) years after date of acceptance. All failures that may occur within this period due to defective application or materials shall, upon written notification of such failures, be repaired or replaced with proper materials and labor as accepted by the Architect, at no additional cost to the Owner.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

- 1. List of items that will be provided under this Section.
- 2. Manufacturer's Data: catalog cuts, dimensioned drawings, and other data needed to prove compliance with the specified requirements.
- 3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.05 WARRANTY

- A. The guarantee specified herein shall include warranties against leakage, hardening, cracking, crumbling, melting, running, shrinking or staining adjacent surfaces.
- B. Contractor Guarantee: Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than five (5) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 SEALANTS

- A. Except as specifically otherwise accepted by the Architect, use only the types of sealants described as follows:

1. One component polyurethane sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, ASTM-C-920, Class 25, for vertical and horizontal joints in connection with all building materials. Do not use in traffic areas. Minimum ¼" joint; maximum 1-1/4" x 3/8"d.
 - a. Dymonic by Tremco
 - b. Sonolastic NP1 by Sonneborn
2. One-part silicone sealant, moisture curing, low modulus, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Class A, for vertical and horizontal joints in connection with aluminum, glass and concrete materials which require greater movement capabilities. Do not use in traffic areas. Minimum joint ¼" x 3/16"d; maximum 1" x ½"d.
 - a. Spectrum 1 by Tremco
 - b. Omniseal by Sonneborn
 - c. Dow Corning 790
3. One-part silicone sealant, medium modulus, neutral cure, FS S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, ASTM C920, Class 25, for vertical and horizontal joints in connection with non-porous surfaces such as aluminum, glass, tile, laminated plastic and concrete. Do not use in traffic areas.
 - a. Spectrum 2 by Tremco
 - b. Omni Plus by Sonneborn
 - c. Dow Corning 795
 - d. Construction 1200 by GE
4. Multi-Component polyurethane sealant, FS TT-S-00227E, Type I, Class A, ASTM C920 for horizontal joints in traffic areas. Minimum 3/8" wide, depth to be 3/8" to ½" - use primer.
 - a. THC-900/901 by Tremco
 - b. Chem. Caulk 950 by Bostick
5. One-part translucent silicone sealant, low modulus, moisture curing, FS TT-S-0023OC, Type II, Class A, FS TT-S-001543A, Type II, Class A, for vertical joints in connection with butt glazing.
 - a. 895 Silicone by Pecora
 - b. Silglaze N by GE
6. One-part mildew resistant silicone sealant meeting requirements of FDA Regulation 21 CFR 177.2600, for vertical and horizontal joints in connection with non-porous applications as sealing around bathroom fixtures, shower-tub enclosures, sinks and urinals.
 - a. Dow Corning 786
 - b. Sanitary 1700 by GE
7. One-part siliconized acrylic latex polymer caulk, ASTM C834-76, for interior horizontal and vertical joints in connection with window and door buck perimeters, interior wall surfaces, etc.
 - a. AC-20 by Pecora
 - b. Acrylic Latex by Tremco

8. Roof Penetrations: Use asphalt mastic conforming to ASTM D491.
9. For other services, provide products especially formulated for the proposed use and accepted in advance by the Architect.

B. Colors:

1. The Architect will select Colors for each sealant installation to match adjacent finishes from a standard color list normally available from the specified manufacturers.
2. Should a matching standard color not be available from the accepted manufacturer except at additional charge, the Contractor shall provide such colors at no additional cost to the Owner.
3. In concealed installations, and in partially or fully exposed installations where so accepted by the Architect, use standard gray or black sealant.

2.02 PRIMERS

Use only those primers that are: non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for this installation by the manufacturer of the sealant used.

2.03 BACKUP MATERIALS

- A. Use only those backup materials that are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.
- B. Acceptable types include:
 1. Closed-cell resilient urethane or polyvinyl chloride foam;
 2. Closed-cell polyethylene foam;
 3. Closed-cell sponge of vinyl or rubber;
 4. Polychloroprene tubes or beads;
 5. Polyisobutylene extrusions;
 6. Oil-less dry jute.
- C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

2.04 BOND-PREVENTATIVE MATERIALS

Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:

1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated;
2. Aluminum foil complying with MIL-A-148E;
3. Wax paper complying with Fed. Spec. UU-P-270.

2.05 JOINT PACKING

Shall be installed in all joints to receive sealant. Material shall be a resilient type such as closed cell PVC foam or as recommended by the manufacturer. Oakum or other types of absorptive materials shall not be used as packing material.

2.06 OTHER MATERIALS

- A. For masking around joints, provide masking tape complying with Fed. Spec. UU-T-106c.

- B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Concrete and ceramic tile surfaces:
 - 1. Install only on surfaces that are dry, sound, and well brushed, wiping free from dust.
 - 2. At open joints, remove dust by mechanically blown compressed air if so required.
 - 3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
 - 4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
 - 5. Remove laitance and mortar from joint cavities.
 - 6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.
- B. Steel surfaces:
 - 1. Steel surfaces in contact with sealant:
 - a. Sandblast as required to achieve acceptable surface for bonding.
 - b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
 - c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
 - 2. Remove protective coatings on steel by sandblasting or by using a solvent that leaves no residue.
- C. Aluminum surfaces:
 - 1. Remove temporary protective coatings, dirt, oil, and grease.
 - 2. When masking tape is used for protective cover, remove the tape just prior to applying the sealant.
 - 3. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

3.03 INSTALLATION OF BACKUP MATERIAL

- A. Use only the backup material recommended by the manufacturer of the sealant used, and accepted by the Architect for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.
- B. When using backup of tub or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.
- C. Interior and exterior joints where no backing has been provided or which is in excess of

3/4" deep shall be packed by this subcontractor with fiberglass or a suitable joint filler to reduce the depth to 1/2" maximum. Maximum movement: the width of the joint shall be at least four times its maximum movement.

3.04 PRIMING

- A. Use only the primer recommended by the manufacturer of the sealant, and accepted by the Architect for the particular installation, applying in strict accordance with the manufacturer's recommendations as accepted by the Architect.
- B. The priming of joints shall be by brush to reach all surfaces to which compound will be applied. Primer shall be provided on masonry, concrete and wood surfaces as recommended by sealant manufacturer. Primer shall not be applied to surfaces that will be exposed after caulking is completed.

3.05 BOND-BREAKER INSTALLATION

Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the installation recommendations as accepted by the Architect.

3.06 INSTALLATION OF SEALANTS

- A. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.
- B. Equipment:
 - 1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.
 - 2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.
- C. Thoroughly and complete mask joints where the appearance of sealant on adjacent surfaces would be objectionable.
- D. Install the sealant in strict accordance with the manufacturer's recommendations as accepted by the Architect, thoroughly filling joints to the recommended depth.
- E. Tool joints to the profile shown on the Drawings, or as otherwise required if such profiles are not shown on the Drawings.
- F. Cleaning up:
 - 1. Remove masking tape immediately after joints have been tooled.
 - 2. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.
 - 3. The excess material shall be cleaned from the surfaces adjacent to the joint, following the caulking operation and the top of the compound deposit shall be left with a smooth even finish. No material is permitted on the exposed face of aluminum sections.

*** END OF SECTION ***

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SECTION 08100
METAL DOORS AND FRAMES

PART 1 -- GENERAL

1.01 DESCRIPTION

Work included: Provide metal doors and metal door frames which are not specifically described in other Sections of these Specifications, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation. All the requirements of the Contract Documents apply to this Section.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Unless specifically otherwise accepted by the Architect, provide all products of this Section from a single manufacturer.
- C. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, comply with:
 - 1. SDI Grade II for Heavy Duty metal doors (Steel Door Institute).
 - 2. HMMA Standard CHM-1-74 (Hollow Metal Manufacturers Association).

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

- 1. List of items that will be provided under this Section.
- 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
- 3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.
- 4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

PART 2 -- PRODUCTS

2.01 MATERIALS

Doors and Frames shall be made of commercial quality, level cold rolled steel conforming to ASTM A-366, Latest Edition, and free of scale, pitting, or other surface defects. Face sheets and frames of exterior doors shall be zinc coated.

2.02 METAL DOORS

- A. Type and design: Provide full-flush polystyrene insulated design, in dimensions and types shown on the Drawings, labeled or non-labeled as indicated on the Door Schedule in the

Drawings, in 16 gage for interior doors and 16 gage for exterior doors, properly reinforced. SDI-111A shall be used as the standard for all frame details.

- B. Finish: Pre-clean and shop prime each door with rust inhibitive primer for finish painting which will be performed at the job site under Section 09900 of these Specifications. Cleaning shall include a phosphate treatment for paint adhesion and all exposed surfaces shall have a rust inhibiting primer.
- C. Acceptable products:
 - 1. Steel Craft Type L Series typically. Type B where security door called out on Drawings, gage of door to be increased to 14.
 - 2. Republic, DB Series typically. Security doors called out on plans to be increased to 14-gauge.
 - 3. Equal products of other manufacturers when accepted in advance by the Architect.
- D. Clearances: Provide single swing doors with not more than 1/8" clearance at jambs and heads, not more than 1/4" clearance at meeting edges of pairs of doors (1/8" on fire doors) and not more than 3/4" clearance at the bottom. Provide door bottom per hardware specifications. All clearance dimensions are nominal and subject to a tolerance of + 1/32". Lock edges of the door shall be designed to provide proper operating clearance conforming to dimensions noted above.

2.03 METAL FRAMES

- A. Type and design: Provide frames of the types and dimensions shown on the Drawings, labeled or non-labeled as indicated on the Schedule and Types in the Drawings, in 16 gage for interior and exterior frames, properly reinforced. SDI-111A shall be used as the standard for all frame details.
- B. Finish: Pre-clean and shop prime each door with rust inhibitive primer for finish painting which will be performed at the job site under Section 09900 of these Specifications. Cleaning shall include a phosphate treatment for paint adhesion and all exposed surfaces shall have a rust inhibiting primer.
- C. Acceptable manufacturers: See Paragraph 2.02-C above.
- D. Welded Frames. Secure headers and jambs at the corners either by internal welding of faces or by welded splice plates. Also secure joints at jambs and headers at the rabbet either by tack welding on the inside of the profile or by mechanical interlock. Form neat line joints at faces of frames at junction of head and jamb.
- E. Frame Anchors:
 - 1. Wall Conditions. Provide frames with a minimum of three anchors per jamb as required for the adjoining wall construction. Provide anchors of not less than 18 gage steel or 3/16" diameter wire adjustable.
 - 2. Floor Anchors. Provide all frames with minimum 18 gage anchors for attachment to the floor.

2.04 DOOR LOUVERS

- A. Fire-Rated Louver: Each fire-rated louver shall have the listing mark of Underwriter's Laboratories Inc. affixed to louver assembly.

All louvers in fire-rated doors shall be Model FLDL-UL, 16 gage cold rolled steel with stainless steel operating springs, as manufactured by Anemostat Products, Carson, California, or equal products of other manufacturers when accepted in advance by the Architect. Louvers shall be sight-proof per SDI-111C.
- B. Fixed-Blade Louver

1. All fixed blade louvers shall be Model FDLS, 18 gage cold rolled steel with mitered and welded frames and countersunk mounting holes, as manufactured by Anemostat Products, or equal products of other manufacturers when accepted in advance by the Architect. Louvers shall be sight-proof per SDI-111C.
2. Provide insect screen where louver occurs in exterior door.

C. Finish

Finish shall be factory painted in color selected by the Architect.

2.05 FINISH HARDWARE

Secure templates from the finish hardware supplier, and accurately install, or make provision for, all finish hardware at the factory.

2.06 INSULATION

Provide polystyrene foam insulation core typically and at all 12" high horizontal mullions and sills. Insulation shall have a minimum R factor of 7.7.

2.07 GLAZING

Non-removable glazing stops shall occur on the outside of exterior doors and the secure side of interior doors. Glazing beads on the inside of glass and louver panels shall be removable. Miter of butt joint beads at corners. Glazing beads may be either screw-on or snap-on type. Glazing systems shall be a minimum of 20-gage steel or .040" aluminum.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 FABRICATION

A. Doors:

1. All doors shall be of types and sizes on the drawings, and shall be fully welded seamless construction with no visible seams or joints on their faces or vertical edges. Doors shall be strong, rigid and neat in appearance, free from warpage or buckle. Corner bends shall be true and straight and of minimum radius for the gauge of metal used.
2. Door faces shall be joined at their vertical edges by a continuous weld extending the full height of the door. All such welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
3. Top and bottom edges shall be closed with a continuous recessed 16 gauge steel channel extending the full width and spot welded to both faces. Exterior doors shall have an additional flush closing channel at the top edge. Opening shall be provided in the bottom closer for escape of entrapped moisture.
4. Vertical edges of single acting swing doors shall be beveled 1/8" in 2".
5. Doors shall be mortised, reinforced, drilled and tapped at the factory for fully template hardware only. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only, with drilling and tapping to be done in the field. Minimum gauge of hardware reinforcing shall be as follows:

- a. Hinge: 7-gauge
 - b. Lock, flush bolts, concealed holders, and for all surface-mounted hardware: 12-gauge.
6. Allow 1/8" clearance between doors and frame at top rail and at lock and hinge stiles. At floors allow 1/2" clearance. At thresholds and curbs allow 1/4" clearance unless otherwise detailed.
 7. The Face sheets of Exterior and Security doors shall be stiffened by continuous vertical formed steel sections occupying the full thickness of the interior space between door faces. These stiffeners shall be not less than 20 gauge, spaced not more than 6" apart and securely attached to both face sheets by spot welds not more than 4" o.c. Spaces between stiffeners shall be sound deadened and insulated the full height of the door with an inorganic non-combustible batt-type material.
- B. Frames:
1. All door and louver frames shall be strong and rigid, neat in appearance, square, true and free of defects, warp and buckle. Molded members shall be clean cut, straight and of uniform profile and back-bends shall be as detailed.
 2. Corner joints shall have all contact edges closed tight, with trim faces and stops mitered and continuously welded. All welds shall be ground, filled and dressed smooth to make them invisible and provide a smooth flush surface.
 3. Hardware reinforcement shall be same as specified for door, with hinge and pivot reinforcement 1-1/2" x 10" minimum size.
 4. Unit frames for installation in stud partitions shall be provided with steel anchors of suitable design for welding to steel studs. Anchors shall be not less than 16-gauge and shall be securely welded inside each jamb. Anchors are to be spaced at 24" on center.
 5. Provide floor anchor of 14-gauge steel securely welded inside each jamb with two holes provided for floor anchorage.
 6. Dust cover boxes of not less than 26-gauge shall be provided at all hardware mortises on frames to be set in masonry or drywall partitions. All frames shall be provided with a steel spreader attached to the feet of both jambs to serve as a brace during shipping and handling.
- C. Finish: Finish shall consist of the following items:
1. Thoroughly clean all metal of rust, oil, and grease after fabrication.
 2. Bonderize all metal with bonderite solution.
 3. Baked-on coat of primer after bonderizing.
 4. Additional coat of primer prior to shipping.
- D. Labeled Doors and Frames: Labeled doors and frames shall be provided for those openings requiring fire protection ratings, as scheduled on the drawings. Such doors and frames shall be constructed as tested by the Underwriter's Laboratories, Inc., and shall bear their label for the required rating. Provide additional frame accessories as required to maintain the fire protection ratings once the frames are installed in the openings.

3.03 FIELD MEASUREMENTS

Verify all opening dimensions in the field prior to fabrication and assembly of frames.

3.04 INSTALLATION

Placing frames:

1. Where practicable, place frames prior to construction of enclosing walls and ceilings.
2. Set frames accurately into position, plumbed, aligned and braced securely until permanent anchors are set.
3. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
4. At in-place wood stud construction, set frames and secure to adjacent construction with #12 self-tapping flathead wood screws and zee clips.
5. At in-place metal stud construction, set frames and weld anchorage devices to adjacent construction.
6. When installed in prepared openings in concrete construction, provide sealant between frame and concrete in accordance with provisions of Section 07900 of these Specifications.

3.05 ADJUST AND CLEAN

A. Final adjustments:

1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
2. Leave work in complete and proper operating condition.
3. Remove defective work and replace with work complying with the specified requirements.

B. Immediately after erection, sand smooth all rusted and damaged areas of prime coat, and apply touch-up of compatible air-drying primer.

*** END OF SECTION ***

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SECTION 08200
WOOD DOORS & FRAMES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

All of the requirements of the Contract Document apply to this Section. Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, as follows:

1. Solid and Hollow Core wood doors: fire-rated and non-rated per schedule.
2. Shop Drawings.
3. Samples.

1.02 QUALITY ASSURANCE

A. Provide a written guarantee in approved form that all defective materials or workmanship reported within a period of two (2) years after final acceptance will be promptly repaired or replaced to the Owner's satisfaction. Cover the following items specifically.

1. Delamination in any degree.
2. Warp or twist of 1/4" or more.
3. Telegraphing of core unit through face veneer to cause surface variation of 1/100" in any 3" span.
4. Any defect that may affect performance or appearance.

B. Provide materials and workmanship conforming to the Wood Work Institute of California. Provide "Certified Compliance" grade stamp on every doors - Premium grade. Shop Drawings shall bear the WIC Certified Compliance Label on the first page of each set of Drawings.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items that will be provided under this Section;
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.
4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
5. Samples, approximately 4" x 4" in size, of each of the proposed door face materials.

1.05 PRODUCT HANDLING

A. Delivery:

1. Deliver doors to site after plaster and cement are dry, and after the building has reached average prevailing relative humidity for its locality.

2. Deliver doors in manufacturer's original containers, clearly marked with manufacturer's name, brand name, size, thickness, and identifying symbol on its cover.
- B. Storage:
1. Stack flat on 2" x 4" lumber, laid 12" from ends and across center.
 2. Under bottom door and over top of stack, provide plywood or corrugated cardboard to protect door surfaces.
 3. Store doors in area where there will be no great variations in heat, dryness, and humidity.
- C. Lift and carry doors into position. Do not drag doors across one another.

PART 2 -- PRODUCTS

2.01 DOORS:

- A. See Door Schedule for Types
- B. Solid Core Doors:
1. 1-3/4" thick stave lumber core. Mineral core for 60 to 90 minute rated doors. Core complied with commercial std. LS-236.
 2. Top and edge bands: Match face veneer.
 3. BTM band: Hard or soft wood.
 4. Glue: Use CS 35 Type II for bonding core, use Type 1 (fully waterproof) for all other work. Exterior doors to have only Type 1 adhesives used.
 5. Finish:
 - a. Stain Finish: plain-sliced veneer with book-matched grain for transparent finish for interior doors only. See drawings for veneer and stain type. Use red oak veneer with a transparent finish if none is indicated on the drawings.
 - b. Paint Finish: medium density hardboard overlay for smooth paint finish. See Drawing for paint type or types.
- C. Hollow Core Doors:
1. Cellular core include lock blocks, top and bottom rails.
 2. Edge bands: match face veneer.
 3. Face veneer: rotary cut red oak veneer matched grain for transparent finish.
 4. Glue: Use CS35 Type II for bonding core, use Type I for all other work.
- D. Solid Wood Stile and Rail Doors:
1. Top rail and stiles shall be minimum of 4-1/2" thickness with 9-1/2" minimum bottom rail on interior doors: exterior doors shall have 5-3/8" overall width with an 11-3/8" minimum bottom rail.
 2. Doors shall be assembled with mortise and tenon or doweled joints. All adhesives shall be Type I exterior glue.
 3. Glazing shall be safety glazing bedded in sealant squeezed out on both sides and secured in place with wood glazing beads or gasket.
 4. Hardwood doors shall be veneered with rotary cut red oak and shall have all exposed edges veneered with matched grain.

E. Plastic Laminated Wood Doors:

1. Interior construction shall be the same as for Solid Core Wood Door.
2. On both faces except for Solid Wood Stile and Rail Doors, provide 1/8" thick "Dor-Surf", No. 117, manufactured by Wilsonart Division of Ralph Wilson Plastics, or an Architect approved equal:
 - a. See Drawings for colors and patterns.
 - b. If none are indicated, Architect will select from standard colors and patterns of the accepted manufacturer as a part of the Submittals.
3. On both vertical edges, provide matching laminated plastic.
4. On tops and bottoms of doors, provide a positive sealer applied after completion of machining and fitting.
5. Where transoms occur above doors, provide same type, design thickness, construction and label as door. Bottom edge of transom shall also receive matching laminated plastic finish.

F. Manufacturers:

1. Solid Core and Hollow Core Doors:
 - a. Weyerhaeuser (800) 869-3667
 - b. Or Architect approved equal.
2. Solid Wood doors
 - a. Sun-Dor-Co (316) 284-0044
 - b. Or Architect approved equal.
3. Fire-Rated Doors and Frames
 - a. Shall be a U. L. rated assembly.

2.02 DOOR LOUVER

A. Fire Rated Louver

1. All louvers in fire rated doors shall be Model FLDL-UL, 16 gage cold rolled steel with stainless steel operating springs, as manufactured by Anemostat Products, Carson, California. (213) 775-7441.
2. Each fire rated louver shall have the listing mark of Underwriter's Laboratories Inc. affixed to louver assembly.

B. Fixed Blade Louver

1. All fixed blade louvers shall be: Model CHDL-2F, 18-gauge cold rolled steel with mitered and welded frames and countersunk mounting holes, as manufactured by Anemostat Products.
2. Provide insect screen where louver occurs in exterior door.

C. Finish

1. Finish shall be factory painted in color selected by the Architect.

2.03 VISION FRAME

A. Fire Rated Doors:

1. Vision frames for fire rated doors shall be FGS-75 with veneer to match door finish and 3/16" clear Firelite as manufactured by Anemostat Products, Carson, California in accordance with the standards set forth by NFPA-80 and bear the listing mark of Underwriter's Laboratories, Inc. or approved equal.

2. Provide sizes and designs shown on the Drawings.
- B. Unlabeled Doors: Provide Model FGS-75 or 38, as applicable, as manufactured by Anemostat Products in sizes and designs shown on the Drawings.
- C. All vision frames shall be constructed of 18-gage cold rolled steel and shall have mitered and welded corners with countersunk mounting holes.
- D. Finish: Finish shall be factory painted in color selected by the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Verify dimensions and surfaces are ready to receive work of this Section.
- B. Beginning of work signifies acceptance of surface by installer.

3.03 INSTALLATION

- A. Fitting and machining doors:
 1. Using measurements obtained in the field from installed frames, machine the doors at the factory to fit the prescribed frames with proper clearance at top, bottom, and vertical edges.
 2. Adjust for smooth and balanced door movement. Replace or re-hang doors which are hinge-bound and do not swing or operate freely.
 3. Install in accordance with ANSI/AWMA requirements.
- B. Install frames level and plumb - shim as required.
- C. Receive and retain custody of finish hardware furnished under Section 08700, if included, of these Specifications for the work of this Section and in accordance with ANSI/AWMA requirements.

3.04 ADJUST AND CLEAN

Upon completion of the installation, inspect each component.

1. Verify that each item has been fabricated and installed in accordance with the specified requirements.
2. Make necessary adjustments.
3. Touch-up as necessary to make surface blemishes permanently invisible to the unaided eye.

***** END OF SECTION *****

SECTION 08400

ALUMINUM ENTRANCE & FRAMING SYSTEMS

PART 1 -- GENERAL

1.01 SCOPE OF WORK

Furnish materials and perform labor required to execute this work as indicated on the drawings, as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. Aluminum framing systems.
2. Aluminum framed doors including push-pull bars, seals and cylinder locks for use during construction only. Verify size of opening with hardware supplier.
3. Sealant around all exterior aluminum frames.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items proposed to be provided under this Section:
2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
3. Shop Drawings showing details of each frame type, elevations of door designs, details of openings, and details of construction, installation, and anchorage.
4. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
5. Samples of material, approximately 4" x 4" in size, of each of the proposed materials.

1.04 PRODUCT HANDLING

Lift doors and carry them into position. Do not drag doors across one another.

1.05 WARRANTY

- A. Aluminum Anodized Finish: Two year warranty shall be required to cover all defects including but not limited to the following:
 1. Fading
 2. Pinholing
 3. Blistering
 4. Changes in surface appearance and characteristic
- B. Exterior storefronts: Warrant entire installation including glazing and caulking to remain watertight, airtight, and weathertight for two (2) years.
- C. Entrance Doors: Warrant against sagging or twisting as a result of normal usage for the lifetime of this installation.

1.06 GUARANTEE

Contractor guarantees the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years from the date the Owner records Notice of Completion.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. All door and frame sections shall be extruded aluminum AA-6063-T5 alloy; aluminum sheet used to complement the framing system shall be of proper alloy to receive anodic treatment and match the job finish.
- B. Finishes: All exposed surfaces shall be smooth and free of distracting scratches and blemishes. Color shall conform to Aluminum Association Standards of Architectural Class I anodic coding and shall be designated as Premium (Custom) color to be specified by Architect.

2.02 ALUMINUM STOREFRONT FRAMES

- A. Construction and Design: All mullions shall have a 2" face dimension x 4-1/2" depth and be designed for exterior glazing. At sill and intermediate horizontal locations, members shall be of two-piece constructions: a basic base member with a snap-in glass stop to facilitate glazing. Vertical mullions shall be have one or two-piece construction, located within the framing system so as to have the deep glazing pocket of the adjacent mullion. Jambs are to be open-back mullions. Continuous aluminum flashing shall be installed under all sill members. Seals shall be provided for weathertight installation of frames and doors.
- B. All frames shall be Trifab II 451 for dual paned glazing as manufactured by Kawneer Company, Inc. or approved equal.

2.03 ALUMINUM ENTRANCE

- A. All aluminum entrances shall be the 190-entrance door as manufactured by Kawneer, with 2-1/8" vertical style, 2-1/4" top rail and 12" bottom rail.
- B. Weathering shall be Kawneer, Sealair polymeric weathering system. The bottom rail shall be weathered with EPDM blade gasket sweep strip.
- C. Door shall be equipped with Panic Guard astragal with Paneline II concealed rod exit device mounted in cross-rail, unless indicated otherwise in the Hardware Specification. The cylinder mounting in the style plate to be in such a way that removal with door closed is impossible.
- D. Provide LCN 2030 concealed overhead closure with hold open, unless indicated otherwise in the Hardware Specification. Door supplier to be responsible for complete installation of all hardware on the storefront system.
- E. All vertical and horizontal door sections shall be installed so as to receive infill thicknesses as dictated in the glass and glazing sections of the Specifications. Square aluminum horizontal, snap-in glass stops and sloping, aluminum vertical snap-in glass stops, with a lock-in vinyl system, shall be provided to accommodate specified infill thickness (1" thick glazing).
- F. Hardware coordination:
 - 1. The finish hardware cylinder shall be coordinated with the hardware supplier.
 - 2. Provide a 1/2" x 6-3/4" aluminum finish threshold unless indicated otherwise in the Hardware specification.
 - 3. Hardware information shall be received prior to fabrication to insure proper detailing and scheduling.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
- B. *Field Conditions:* Verify drawing dimensions with actual field conditions prior to fabrication. Report any condition, which would prevent proper execution of this contractor's work to the project manager.

3.03 INSTALLATION OF ENTRANCE AND WINDOW FRAMING

- A. Accurately cut and install all aluminum and glass in accordance with manufacturer's instructions and with applicable requirements of "Glazing Manual", issued by Flat Glass Manufacturer's Association.
- B. Use anchorage devices to securely attach frame assembly to structure.
- C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work (0.03" per foot max. or 0.25" per 30 feet, whichever is less).
- D. Installation of structural silicone and backing materials shall be in accordance with silicone manufacturer's requirements. All joints between framing and the building structure shall be sealed in order to secure a watertight installation.
- E. Coordinate attachment and seal of air and vapor barrier materials. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- F. Install hardware and glass per other sections of these Specifications.

3.04 CLEANING AND POLISHING

- A. Care and Maintenance: It will be the responsibility of the Contractor to protect material from mortar, paint, plaster, terrazzo, etc., during construction, and to thoroughly clean doors and frames before the Owner takes possession.
- B. Remove protective material from pre-finished surfaces using a solution of mild detergent in warm water, applied with soft clean wiping cloths.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- D. Final cleaning and polishing shall be done prior to final inspection.

END OF SECTION

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SECTION 08800

GLAZING

PART 1 -- GENERAL

1.01 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.02 REFERENCES

- A. SIGMA No. 64-7-2 -- Specification for Sealed Insulating Glass Units.
- B. FGMA -- Glazing Manual, Glazing Sealing Systems Manual.

1.03 QUALITY ASSURANCE

Conform to Flat Glass Marketing Association (FGMA) for glazing installation methods.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.05 SUBMITTALS

- A. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- B. Provide data on glazing sealant. Identify colors available.
- C. Submit two samples, illustrating glass unit and coloration.

1.06 GUARANTEE

- A. Contractor shall guarantee the work covered by this specification against all defects in material and workmanship for a period of not less than two (2) years.
- B. Include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE GLASS MANUFACTURERS

- A. Insulated, Laminated, and Spandrel Glass: PPG Industries, Inc.
- B. Security Glazing: Nippon Electric Glass Company (800) 426-0279.
- C. Clear Fire-Rated Window Glazing: Pyrobel by Interedge (877) 376-3343.
- D. Clear Fire-Rated Door/Sidelight Glazing: PyroEdge or Pyrobel by Interedge (877) 376-3343.

2.02 GLASS MATERIALS (As indicated on the Window Schedule):

- A. General: Exposed "tong" marks are not acceptable.
- B. Interior Tempered Glass: Clear, Tempered 1/4" thick. Grade B (tempered), Style I (uncoated), Type I (float or plate).
- C. Insulated Glass Units: Double pane 1/4" units with edge seal; interpane 1/2" space purged with dry hermetic air; total unit thickness of 1 inch. Tempered as required by Code and indicated on drawings. Tinting as indicated on Window Schedule - tinted on inside of

outer layer only. PPG Solarban 60 (2) or (3) or equal low e coating. Performance values based on tinted product selected.

- D. Interior Wired Glass: 1/4" clear wire glass.
- E. Interior laminated glazing - one way: Two pieces of 1/8" clear float glass, tempered as required by code, laminated with .030 in. polyvinyl butyl plastic interlayer conforming to 16CFR 1201 Category II for one-way glazing.
- F. Security Glazing: 11/16" thick, glazing assembly consisting of two outer lights of 1/8" clear chemically strengthened glass with a core of two 1/8" polycarbonate sheets laminated with four inter-layers of .50 inch thick urethane.
- G. Ballistic Glazing:
15/16" thick glazing assembly certified for level-A ballistics consisting of two outer lights of 1/8" clear chemically strengthened glass with a core of two 1/8" and 1/4" polycarbonate sheets laminated with four inter-layers of .50-inch thick urethane.
- H. Clear Fire Glazing: Model as required for required Fire-Rated Assembly.

2.03 GLAZING COMPOUNDS

- A. Glazing Compound: Modified oil type, non-hardening, knife grade consistency.
- B. Butyl Sealant: Single component; Shore-A hardness of 10-20; black color; non-skinning.
- C. Acrylic Sealant: Single component, solvent curing, cured Shore hardness, non-bleeding.
- D. Silicone Sealant: Single component, non-bleeding, non-staining; Capable of water immersion without loss of properties.

2.04 GLAZING ACCESSORIES

- A. Setting Blocks: Neoprene; 80-90 Shore A durometer hardness; 4 inch minimum long x 1/4 inch thick.
- B. Spacer Shims: Neoprene; 40-50 Shore A durometer hardness; 4 inch long on 18 inch centers for wet-glazed systems.
- C. Glazing Clips: Manufacturer's standard type.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the area and conditions under which work of this Section will be performed.
- B. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.
- C. Verify surfaces of glazing channels or recesses are clean, square in plane, free of obstructions, and ready for work of this Section.
- D. Verify weep holes in exterior frame are provided.
- E. Correct conditions detrimental to timely and proper completion of the Work.
- F. Do not proceed until unsatisfactory conditions are corrected.
- G. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses.

- 3.03 EXTERIOR WET METHOD (SEALANT AND SEALANT)
- A. Place setting blocks at 1/4 points and install glass pane.
 - B. Install removable stops with pane centered in space by inserting spacer shims both sides at 18-inch intervals, 1/4 inch below sightline.
 - C. Fill gap between pane and stops with sealant to depth equal to bite of frame on pane, but not more than 3/8 inch below sightline.
 - D. Apply sealant to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth appearance. Security Glazing to be sealed with security sealant as recommended by manufacturer.
 - E. Drain or weep the sill of each opening to the outdoors at three points using 3/8-inch diameter weep holes or the equivalent.
- 3.04 INTERIOR COMBINATION METHOD (TAPE AND SEALANT)
- A. Cut glazing tape to length and install against permanent stops, project 1/16 inch above sightline.
 - B. Place setting blocks at 1/4 points.
 - C. Rest glass on setting blocks and push against tape to ensure full contact at perimeter of pane.
 - D. Install: removable stops, spacer shims between glass, and applied stops at 18-inch intervals 1/4 inch below sightline.
 - E. Fill gap between pane and applied stop with sealant to depth equal to bite of frame on pane to uniform and level line.
 - F. Trim protruding tape edge.
- 3.05 INTERIOR WET METHOD (COMPOUND AND COMPOUND)
- A. Install glass resting on setting blocks. Install applied stop and center pane by use of spacer shims at 18-inch centers, kept 1/4 inch below sightline.
 - B. Locate and secure glass pane using glaziers' clips.
 - C. Fill gaps between pane and stops with glazing compound until flush with sightline.
- 3.06 CLEANING
- A. After installation, mark pane with an "X" by using plastic tape or removable paste.
 - B. Remove glazing materials from finish surfaces.
 - C. Remove labels after work is completed.
 - D. Clean glass with solvent and normal wash. Final cleaning and polishing shall be done prior to final inspection.
 - E. Remove and replace broken, scratched, chipped or otherwise defective glass with new materials and leave the entire installation in a neat, clean, and acceptable condition.

*** END OF SECTION ***

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SECTION 09250
GYP SUM BOARD SYSTEMS

PART 1 -- GENERAL

1.01 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

A. Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. List of items to be provided under this Section.
2. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. Mock-ups:

1. At an area on the site where accepted by the Architect, provide mock-up panels as follows:
 - a. Make each mock-up panel approximately 4'-0" high and 4'-0" long.
 - b. Provide one mock-up panel for each variation of panels.
 - c. The mock-up panels may be part of the Work, and may be incorporated into the finished Work, when so accepted in advance by the Architect.
2. If the mock-up panels are not permitted to be part of the finished Work, completely demolish and remove them from the job site upon completion and acceptance of the other work of this Section.

1.04 DELIVERY AND STORAGE

Deliver all manufactured materials in original packages bearing manufacturer's name and brand. Use only one brand of each material throughout job. Store materials off ground and cover against weather. Remove any damaged materials from the site.

1.05 QUALITY ASSURANCE

- A. Comply with all applicable requirements of "American Standard Specifications for the Application and Finishing of Gypsum Wallboard", by the America Standards Association, except where more stringent requirements are called for herein, in local Codes or by manufacturer of wallboard. Do all cutting and patching required to accommodate work of other trades.
- B. Maintain temperature of drywalled spaces in range of 55 to 90 degrees F until building is entirely closed and ventilated to eliminate excessive moisture.
- C. All work herein requires coordination with trades who's Work connects with, is affected or concealed by drywall. Before proceeding with drywall Work, make certain all required inspections have been made.

- D. Inspect surfaces to receive drywall before starting Work and do not start until surfaces are acceptable. Starting Work under this Section implies acceptance of surfaces.

PART 2 -- PRODUCTS

2.01 WALLBOARD MATERIALS

- A. Gypsum Board: Conforming to ASTM C-36: 5/8" thick, maximum permissible length, ends square cut, tapered and beveled edges.
- B. Fire resistive gypsum board: Type X at all interior conditions: 5/8 inch thick x 4 feet wide. Use moisture resistant type X where used in interior wet conditions (ASTM C79).
- C. Moisture-resistant Gypsum Board, conform to ASTM C630, 5/8" thick, maximum permissible length.
- D. Exterior Cement Board: Concrete glass-fiber reinforced, 1/2" thick prefabricated panel, consisting of aggregate and Portland cement reinforced with vinyl coated woven glass fiber mesh embedded in both surfaces. Durock Tile Backer Board by USG or approved equal.

2.02 WALLBOARD ACCESSORIES

- A. Trim and Edging: 26 gauge, electro-galvanized steel, with knurled surfaces for bedding cement. Provide angle corner pieces with 1-1/4 inch legs at all external corners and channel type metal trim pieces as detailed at all gypsum board edges meeting dissimilar materials. 136#/1000 l.f.
- B. Screws: KW self-tapping sheet metal screws, blued steel, counter sunk Phillips heads, of lengths as required to accommodate thickness of drywall construction, for metal framing attachments.
- C. Expansion joints: Conspec Systems, Inc. model FWF and FWFC as applicable in field locations. Extruded clear aluminum with continuous gasket.
- D. Adhesive: Manufacturer's recommended adhesive for drywall/masonry condition.

2.03 FINISHES

- A. Typical walls and/or ceilings to be painted are to receive a medium stipple (orange peel) textured finish as approved by the Architect. Texture to be applied mechanically by this subcontractor.
- B. Sand textured walls shall have white play or plaster sand added into the mud prior to application. The application shall be troweled to simulate a smooth plaster finish.
- C. A sample of 4' x 4' is to be prepared of each texture for the Architect's approval prior to application.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. If framing members are out to alignment, bowed or warped, correct to make true surfaces before application of gypsum board. Make finish walls or ceilings plumb and level without ridges, bows or warps.
- B. Apply boards with long dimension perpendicular to framing members with all abutting ends and edges over supports. Neatly fit and stagger all end joints. Make joints occur on different studs at opposite sides of partition. Cut and fit neatly around all outlets and switches. Space fasteners 8 inches o.c. along vertical edges, and 12 inches o.c. of midpoints, 3/8 inch from edge of board. Fasten boards to backings specified (unless noted as shear walls).
- C. Erection technique shall result in plumb and straight surfaces with no waves or buckles, free of unevenness at joints.
- D. Joints wider than 1/8 inch will be cause for rejection of board surface by Architect.
- E. Provide all backing, furring, stripping, or blocking indicated or required for installation and attachment of Work of all other trades. Cut and frame all openings required by other trades. Structural members shall not be cut, notched or drilled except as shown or noted on Drawings.

3.03 TAPING AND FINISHING

- A. Mix joint and finishing compounds per manufacturer's directions.
- B. Center tape over joint and embed in uniform layer of joint compound of sufficient width and depth to provide firm and complete bond. Apply skim coat while embedding tape.
- C. Treat angles with reinforcing tape folded to conform to adjacent surfaces and straight true angles.
- D. Allow compound to thoroughly dry for at least 24 hours.
- E. Over joint compound and tape, apply coat of finishing compound. Spread evenly and feather out beyond edge of board. After first finishing coat is thoroughly dry (at least 24 hours), cover with second coat with edges feathered out slightly beyond preceding coat.
- F. Give all dimples at fastener heads and all marred spots on surface of board one coat joint compound and two coats finishing compound, applied as each coat is applied to joints.
- G. Install metal corner reinforcement at all external corners. Conceal flanges of metal reinforcement with at least two coats compound. When completed, compound shall extend approximately 8 inches to 10 inches on each side of metal nosing.
- H. After each application of joint or finishing compound has dried, lightly sand all joints. Leave all board and treated areas uniformly smooth and ready for texturing and painting.

3.04 SCHEDULE

- A. Provide fire-rated gypsum board at all firewalls and shafts as indicated on Drawings and required by code.
- B. Provide water resistant gypsum board at all bermed walls, plumbing walls - full height, and walls to receive tile finish.

3.05 CLEAN UP

- A. In addition to other requirements for cleaning, use necessary care to prevent scattering gypsum wallboard scraps and dust and to prevent tracking gypsum and joint finishing compound onto floor surfaces.
- B. At completion of each segment of installation in a room or space, promptly pick up and remove from the working area all scrap, debris and surplus material of the Section.

*** END OF SECTION ***

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SECTION 09300

TILEWORK

PART 1 -- GENERAL

1.01 DESCRIPTION

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to ceramic floor, base and wall tile and installation of stone tiles for floor. All the requirements of the Contract Documents apply to this Section.

1.02 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.
- B. Comply with recommendations of the Ceramic Tile Institute and the Tile Council of America.
- C. Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Meet with Owner and Architect prior to start of installation to review all requirements. Report to the Architect all conditions, which prevent proper execution of this work.
- D. Environmental Conditions:
 - 1. Maintain temperature at 50 degrees F. minimum during tilework and for seven (7) days after completion. Do not apply to frozen surfaces.
 - 2. Vent temporary heaters to outside to avoid carbon dioxide damage to new tilework.
 - 3. Provide adequate lighting for work and walking on newly tiled floors.
 - 4. Use kneeling boards for work and walking on newly tiled floors.
 - 5. Provide shade for all tile, materials and work area on exterior applications as required to prevent rapid evaporation caused by excessive heat.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

- 1. List of items to be provided under this Section.
- 2. Manufacturer's Specifications, catalog cuts, and other data needed to prove compliance with the specified requirements of tile, sealants, grout, trim, fasteners, adhesives and sealers.
- 3. Samples of each type, class, and color of ceramic tile required, not less than 12" square, mounted on plywood or hardboard backing, and grouted as specified. Sample shall include border pattern.

1.05 PRODUCT HANDLING

Blend all tile at factory and again on site to achieve an even color throughout to the Architect's

approval.

1.06 CLOSE-OUT

- A. Provide maintenance instructions and product for one cleaning of project subsequent to closeout.
- B. Furnish written guarantee covering workmanship and materials for one (1) year after acceptance of the buildings.

PART 2 -- PRODUCTS

2.01 CERAMIC TILE

- A. Provide ceramic tile and accessories complying with Tile Council of America Specifications 137.1, in colors and patterns selected by the Architect from standard colors and patterns of the accepted manufacturers.
- B. Material:
 - 1. Furnish: size(s), color(s), pattern(s) and shape(s) as indicated on the drawings.
 - 2. Provide standard accessory shapes as required and as accepted by Architect.
 - 3. Use appropriate trim shapes to conform to drawings.
 - 4. Metal trims shall have a clear anodized finish – protected as to resist discoloration from adhesives and grouts.
- C. Floor Tile: Provide coefficient of friction not less than 0.60 when tested in accordance with ASTM F489, ASTM F609, and the National Bureau of Standards Technical Note 895 at floor tile.
- D. Extra Stock: Supply 2% of each type of tile used in clean marked cartons for Owner.

2.02 SETTING MATERIALS

- A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installation".
- B. Dry set mortar:
 - 1. Provide a commercially prepared mixture of Portland Cement, sand, and additives imparting water retentivity, for use as a leveling / bond coat for setting interior tile floors and all exterior mortar beds.
 - 2. Comply with ANSI A118.1, except where specifically indicated on the Drawings or directed in advance by the Architect, provide conductive dry-set mortar complying with ANSI A118.2.
 - 3. Provide acrylic latex additive formulated for use with dry set mortar.
 - 4. Acceptable products:
 - a. S-759 Thin Set Mortar for floors, S-763 Thin Set for Walls and S-800 Setting Acrylic Latex Additive, as manufactured by Summitville Tiles, Inc., Summitville, Ohio 43962.
 - b. Equal products of other manufacturers when accepted in advance by the Architect.
- C. Organic Adhesive: TCA A136.1 Type 1, AO 1700 or approved equal; thin set bond for walls.

- D. Epoxy Adhesive: TCA AO 4000 AAR-11, ANSI 118.3 Epoxy resin and epoxy hardener
- E. Special tile setting mortars will be considered by the Architect when complete technical data is submitted in advance.
- F. Mortar system for thin set bond type for interior floors. Typical in all potentially wet areas such as restrooms.

2.03 GROUT

- A. Comply with pertinent recommendations contained in the Tile Council of America "Handbook for Ceramic Tile Installation" in colors selected by the Architect from standard colors available from the accepted manufacturers.
- B. Latex Portland Cement Grout:
 - 1. Provide a commercially prepared mixture of Portland cement and latex additives producing water-retentivity, and suitable for grouting all walls and floors subject to ordinary use.
 - 2. Provide a product licensed by the Tile Council of America, and bearing that license symbol.
 - 3. Acceptable products:
 - a. "S-700 Sanded Joint Filler" with "S-775 Grouting Acrylic Latex Additive", as manufactured by Summitville Tiles, Inc.
 - b. Equal products of other manufacturers when accepted in advance by the Architect.
- C. Expansion Joint: Colors to be selected by Architect.
 - 1. Provide expansion joint backing material as closed cell polyethylene foam weighing not less than 2.7 lbs. Per cubic foot and in dimension approximately 20% thicker than the width of the expansion joint in which used.
 - 2. Expansion joints in floors shall be a two component polyurethane sealant with Shore-A hardness between 35-45. Use at perimeter of all stone flooring especially when adjoining other tilework.
- D. At joints between floors and walls and at perimeter of metal doorframes, provide one-part silicone material.

2.04 PROTECTIVE MATERIALS

- A. Neutral cleaner such as Hillyard Super Shine-All.
- B. Grout release agents such as Klein Company Standard Grout Guard.
- C. Sealer: Overall the finished work of this Section, provide a sealer, cleaner or water repellent coating and apply in strict accordance with the Manufacturer's recommendations.
- D. Heavy-duty non-staining construction paper with compatible tape for securing it.

2.05 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

2.06 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the acceptance of the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Coordinate work with other trades as needed to assure that proper substrate are provided to receive work of this Section.
- B. Acceptability of Surfaces:
 - 1. Before tiling, confirm variations of surface to be tiled fall within maximum variations shown below:

	Walls	Floors
1. Cement Mortar Bed	1/4" in 8'	1/4" in 10'
2. Epoxy Adhesive	1/8" in 8'	1/8" in 10"
3. Organic Adhesive	1/8" in 8'	1/8" in 8"
 - 2. Report all unacceptable surfaces to the Architect and do not tile such surfaces until they are leveled enough to meet above requirements. Leveling cost is included in this section.
 - 3. Remove all adhesives for substrate for clean floor. Before tiling, be certain surfaces to be tiled are free from coating, curing membranes, oil, grease, wax, and dust. Scarify concrete substrate, which is hard steel trowel finished or pores filled with curing compound or other adhesive.
 - 4. Verify that grounds anchors, plugs, recess frames, bucks, electrical work, mechanical work and similar items in or behind the tile have been installed before proceeding with the installation of the mortar bed or tile.

3.03 INSTALLATION

- A. General:
 - 1. Comply with ANSI A108.1, A108.5, A108.6 and A108.10 and the "Handbook for Ceramic Tile installation" of the Tile Council of America, except as otherwise directed by the Architect or specified herein.
 - 2. Maintain minimum temperature limits and installation practices recommended by materials manufacturers.
- B. Layout:
 - 1. Determine locations of all movement joints before starting tilework.
 - 2. Layout tile work and center tile fields both direction in each space or on each wall area.
 - 3. Lay out all tilework so as to minimize cuts less than one-half tile in size.
 - 4. Locate cuts in both walls and floors so as to be least conspicuous.
 - 5. Provide uniform joint width.

6. Align all floor joints to give straight uniform grout lines, parallel with walls, base and trim.
 7. Lay tile in grid pattern unless otherwise indicated on the Drawings or directed by the Architect.
 8. Align the joints when adjoining tiles on floor, base, trim, and walls are the same size.
- C. Install the work of this Section in accordance with the following Handbook procedure:
1. Floors interior – No. F115 at porcelain / stone floors.
 2. Floors exterior – No. F101.
 3. Walls – No. W242.
- D. Limits of tile:
1. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruptions. Omit behind full width mirrors above counter lavatories to allow smooth setting of mirror.
 2. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
- E. Provide expansion and control joints where shown on the Drawings, and where otherwise recommended by the "Handbook for Ceramic Tile Installation" of the Tile Council of America, sealing in accordance with Section 07900 of these Specifications, but not less than:
1. 24'-0" to 36'-0" in each direction on interior.
 2. 12'-0" to 16'-0" in each direction on exterior.
 3. At all perimeter walls, building expansion joints and where tile abuts restraining surfaces such as walls, curbs, dissimilar floors, pipes, columns or where changes in backing materials occur.
 4. Extend joints completely through the tile, mortar, mortar bed and reinforcing.
- F. Install metal edge strips at all openings where floor tile abuts dissimilar materials and a threshold has not been called out. Grout solid all thresholds indicated adjacent to tilework.
- G. Workmanship:
1. Supply first class workmanship in all tilework.
 2. Use all products in strict accordance with recommendations and directions of manufacturer.
 3. Proportion all mixes in accordance with latest ANSI Standard Specifications.
 4. Be sure all tilework is free of grout film upon completion, conforming to ANSI A 108.5 sub-section A-4.3.4.7.
- H. Provide tile surfaces clean and free from cracked, broken, chipped, unbonded, and otherwise defective units.
- I. Provide required protection of tile surfaces to prevent damage and wear prior to acceptance of the Work by the Owner.

3.04 GROUTING

- A. Allow tile to set for a minimum of 48 hours prior to grouting. Remove all spacers, ropes, glue and foreign material prior to grouting.

- B. Follow grout manufacturer's recommendations as to grouting procedures and precautions.
 - 1. Force maximum amount of grout into joints in accordance with pertinent recommendations in ANSI 108.10.
 - 2. Fill-in joints of cushion edged tile to depth of cushion; fill square edged tile flush with surface.
 - 3. Provide hard finished grout which is smooth and without voids, pinholes or low spots.
- C. Remove all grout haze, observing grout manufacturer's recommendations as to use of acid and chemical cleaners.
- D. Use recommended sealant for perimeter grouting of stone tile to allow for movement of field.
- E. Cleaning:
 - 1. Upon completion of placing and grouting, clean the work of this Section in accordance with recommendations of the manufacturers of the materials used.
 - 2. Protect metal surfaces, cast iron, and vitreous items from effects of acid cleaning.
 - 3. Flush surfaces with clean water before and after cleaning.
 - 4. Cure the joints by keeping damp until hardened, during which time all traffic is kept off newly tiled floor areas.
 - 5. Protect grouted floors from drying out for at least three days with a layer of bituminous building paper lapped 4" and sealed against escape of moisture. Keep traffic off floor during this curing period.

3.05 PROTECTION

- A. Apply sealer over all finished surfaces of work of this Section. Use in strict accordance with manufacturer's printed instructions.
- B. Protection from Construction Dirt:
 - 1. Apply to all clean, completed tile walls and floors a protective coat of neutral cleaner solution, 1 part cleaner to 1 part water.
 - 2. In addition, cover all tile floors with heavy-duty, non-staining construction paper, masked in place.
 - 3. Just before final acceptance of tilework, remove paper and rinse protective coat of neutral cleaner from all tile surfaces.
- C. Protection from Traffic:
 - 1. Prohibit all foot and wheel traffic from using newly tiled floors for at least 3 days, preferably 7 days.
 - 2. Place large flat boards in walkways and wheel-ways for 7 days where use of newly tiled floors with cement type grout is unavoidable.

*** END OF SECTION ***

SECTION 09510
ACOUSTICAL CEILING SYSTEMS

PART 1 – GENERAL

1.01 SCOPE OF WORK

Supply and install all Acoustical Ceiling Work as shown on Drawings and as specified herein. All the requirements of the Contract Documents apply to this Section.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit complete layout of all systems including attachments, intersections of members and edge conditions.
- B. Samples: submit 2 samples of each type of unit specified herein.

1.04 QUALITY ASSURANCE

- A. Have applicators approved by manufacturer of material or system being installed.
- B. Work hereunder requires coordination with trades who's Work connects with, is affected, or concealed by acoustical units. Before proceeding with Work, make certain all required inspections have been made.
- C. Examine sub-surfaces to receive Work. Commencement of Work will be construed as acceptance of all sub-surfaces.
- D. Comply with all applicable requirements of Acoustical Materials Association, Bulletin "Architectural Acoustical Materials".

1.05 DELIVERY AND STORAGE

Deliver all manufactured materials in original containers bearing manufacturer's name and brand. Use only one brand for each type of unit throughout job. Store materials within building in locations directed.

PART 2 – PRODUCTS

2.01 GRID

- A. Ceiling Suspension Materials: Comply with ASTM C635, as applicable to the type of suspension system required for the type of ceiling units indicated. Coordinate with other work supported by or penetrating through the ceilings.
- B. Manufacturer, Type, Location, and Pattern: as indicated on the drawings.
- C. Edge Mouldings: Manufacturer's standard channel moulding for edges and penetrations of ceiling, with a single flange of moulding exposed, white baked enamel finish, unless otherwise indicated.

2.02 ACOUSTICAL TILE

Manufacturer, Type, Location, and Pattern: as indicated on the drawings.

2.03 EXTRA STOCK

Order additional 3% of each type of acoustical unit specified, for maintenance use, at no additional cost to Owner. (One box minimum.)

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Provide all materials and accessories for complete installation per Drawings and manufacturer's printed instructions and recommendations.
- B. Install units to sub-surfaces from setout points and to pattern shown on Drawings. Verify location of Work of other trades so their items occur within a whole unit or at joints as shown.
- C. Install units in place fitting snugly. Provide spacers or hold-down clips where shown or required.
- D. After installation, clean any soiled surfaces. Replace any damaged units at no additional cost to the Owner.
- E. Arrange acoustical units in the manner shown by reflected ceiling plans. Consult with Architect pertaining to any adjustments.

3.03 SUPPORT SYSTEMS FOR SUSPENDED CEILING

- A. General: Ceilings shall not support material or building components other than grills, insulation batts or light fixtures. Duct work, plumbing and like work shall have its own support system and shall not use the ceiling system or suspension wires.
- B. Vertical Support System: Suspension wires shall be a minimum of 12-gauge galvanized wire attached to the main runner at 4 ft. maximum spacing in both directions. Each wire shall be anchored to the structure above with a device capable of supporting a minimum of 75 pounds. Wires supporting fixtures shall be capable of supporting four times the fixture weight. Suspension wires shall not hang more than 1 in 6 out of plumb unless counter sloping wires are provided. Wires shall not attach to or bond around interfering material such as ductwork. Trapeze or equivalent devices shall be used where obstructions interfere with direct suspension.
- C. Horizontal Support System: The lateral support system for ceilings shall be shown in detail shop Drawings. Provisions shall be made for possible deferential movement between ceilings and sidewalls. Terminal ends of each main and each cross runner shall be wire supported; wall trim angles shall not provide primary support for runners. Lateral support of ceilings shall not be provided by the angle trim and runner shall not be riveted to wall trim.
- D. Light Fixture Support: All recessed or drop-in light fixtures shall be supported directly from the fixture housing to the structure above with a minimum of two 12 gauge wires; leveling and positioning of fixture may be provided by the ceiling grid. Fixture support wires may be slightly loose to allow fixture to seat in heavy-duty grid system only.
- E. Secure wire hangers by looping and wire tying either directly to structures or to inserts, eye-screws or other devices which are secure and appropriate for the substrate, and which will

not deteriorate or fail with age or elevated temperatures.

3.04 CLEANING AND PROTECTION

- A. Clean exposed surfaces of acoustical ceilings, including trim, edge mouldings and suspension members; comply with manufacturer's instructions for cleaning and touch-up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
- B. The installer shall advise the Contractor of required protection for the acoustical ceilings, including temperature and humidity limitations and dust control, so that the Work will be without damage and deterioration at the time of acceptance by the Owner.

***** END OF SECTION *****

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SECTION 09650
RESILIENT FLOORING

PART 1 -- GENERAL

1.01 SCOPE OF WORK

Furnish all materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to these major items:

1. Resilient tile flooring.
2. Floor substrate surface.
3. Rubber base.

1.02 REGULATORY REQUIREMENTS

Conform to applicable code for flame rating requirements of 75 or less in accordance with ASTM E84.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Provide product data on specified products, describing physical and performance characteristics.
- B. Submit two samples, illustrating color and pattern for each floor material or base, substituted for those indicated in the Drawings.
- C. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedure used on the Work.

1.05 OPERATION AND MAINTENANCE DATA

Submit cleaning and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

1.07 EXTRA MATERIALS

Provide 5% of each pattern and color of flooring and of base specified.

PART 2 -- PRODUCTS

2.01 VINYL COMPOSITION TILE

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.02 SHEET VINYL

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.03 BASE MATERIALS

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.04 ACCESSORIES

- A. Subfloor Filler: Latex cement underlayment as recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
- C. Sealer and Wax: Types recommended by flooring manufacturer.
- D. Welding rod: Use same manufacturer as flooring manufacturer and install per manufacturer's instructions. Colors to be selected from standard colors. All flooring in medical procedure rooms and in restrooms shall be heat welded.
- E. Provide other materials, not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Architect.

2.05 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Verify that surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work.
- E. Verify concrete floors are dry to the maximum moisture content of 2.5% (two and one half percent); and exhibit negative alkalinity, carbonization, or dusting. Provide test results to indicate that the substrate meets moisture requirements prior to starting work. Higher moisture content will be as accepted by manufacturer in their written warranty.
- F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to leave smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Maintain the temperature of the space to receive the flooring and the materials to be installed at a minimum of 65 degrees F and maximum of 100 degrees F for at least 48 hours prior to, during, and 48 hours after installation. Maintain a minimum temperature of 55 degrees F thereafter.
- F. Install flooring after all other trades, including painting, have been completed.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, conventional full-spread system.
- B. Spread only enough adhesive to permit installation of materials before initial set.
- C. Set flooring in place; press with heavy roller to attain full adhesion.
- D. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- E. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- F. Scribe flooring to walls, columns, permanent cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION -- BASE MATERIAL

- A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.
- B. Miter internal corners. At external corners, "V" cut back of base strip to 2/3 of thickness and fold.
- C. Install base on solid backing. Bond tight to wall and floor surfaces.
- D. Scribe and fit to doorframes and other interruptions.

3.05 PROTECTION

Prohibit traffic on floor finish for 48 hours after installation.

3.06 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean, seal, and wax floor and base surfaces in accordance with manufacturer's instructions.

*** END OF SECTION ***

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SECTION 09680

CARPET

PART 1 – GENERAL

1.01 SCOPE OF WORK

Furnish all Materials and perform labor required to execute this work as indicated on the drawings, as specified and as necessary to comply with the Contract Documents, including, but not limited to, these major items:

1. Direct glue down carpet with backing.
2. Metal edge trim and backing for carpet coved wall base if indicated on the drawings.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Provide product data on specified products, describing physical and performance characteristics: sizes, patterns, colors available, and method of installation.
- B. Submit two samples illustrating color and pattern for each carpet material specified if substituting from color board.
- C. Submit manufacturer's installation instructions. When approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on this Work.

1.04 OPERATION AND MAINTENANCE DATA

Submit operation and maintenance data maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning and shampooing.

1.05 ENVIRONMENTAL REQUIREMENTS

- A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- B. Maintain minimum 72 degrees F ambient temperature plus/minus 5 degrees with relative humidity not exceeding 65% three days prior to, during, and 72 hours after installation of materials.

1.06 EXTRA MATERIALS

Provide 5% of carpeting of each color specified.

PART 2 – PRODUCTS

2.01 CARPET

Manufacturer(s), Type(s), Location(s), Color(s), and Pattern(s) as indicated on drawings.

2.02 FLOOR BASE

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

2.03 FLOORING TRANSITIONS

Manufacturer(s), Type(s), Location(s), Finishes(s), as indicated on drawings.

2.04 OTHER ACCESSORIES

- A. Sub-Floor Filler: White premix latex; type recommended by carpet manufacturer.
- B. Primers and Adhesives: Waterproof; of types recommended by carpet manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8 inch in 10 ft. and are ready to receive work. Have all previous adhesives removed.
- D. Verify concrete floors are dry to a maximum moisture content of 7 percent; and exhibit negative alkalinity, carbonization, or dusting. Provide test results to prove compliance prior to initiating installation.
- E. Do not proceed until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with sub-floor filler.
- B. Apply, trowel, and float filler to leave smooth, flat, hard surface.
- C. Prohibit traffic until filler is cured.
- D. Vacuum floor surface.

3.03 INSTALLATION

- A. Apply carpet and adhesive in accordance with manufacturers' instructions. Direct glue-down.
- B. Lay out rolls of carpet.
- C. Verify carpet match before cutting to ensure minimal variation between dye lots.
- D. Locate seams in area of least traffic. Carpet shall be installed in full lengths wherever possible.
- E. Fit seams straight, not crowded or peaked, free of gaps.
- F. Lay carpet on floors with run of pile in same direction as anticipated traffic. Lay carpet so that seams perpendicular to a wall do not occur at door openings in that wall.
- G. Do not change run of pile in any room where carpet is continuous through a wall opening into another room. Locate change of color or pattern between rooms under door centerline.
- H. Cut and fit carpet around interruptions.
- I. Fit carpet tight to intersection with vertical surfaces without gaps.
- J. All seams shall be beaded and sealed with "seam sealer". The seam sealer shall be applied to the cut edge of the carpet at the level of the carpet backing.
- K. No stretching will be permitted.

- L. Unroll carpet face up and cut the lengths required with pile-lay runs in the same direction. Check starting wall for squareness and allow for off-square walls. Strike chalk line the entire length of area where seam falls.
- M. Place two lengths in proper position for installing; trim salvage, and line up seam edge with chalk line. Lay carpet perfectly flat and tension free.
- N. Roll both widths back 3' from seam area the entire length of carpet.
- O. Spread adhesive from approximate center towards each end.
- P. When sufficient floor area has been covered with adhesive, drop or roll first width into place. Apply coating of edge sealer to seam edge of first width. Follow this procedure on each succeeding width at seam. Drop or roll second width into position and fit the seam in tightly using knee-kicker if necessary. Brush or roll looseness and air bubbles away from seam.
- Q. Fold or roll the remaining portion of the first width from the wall. Apply adhesive to the floor and drop or roll carpet into place.
- R. Roll or fold back dry portion of second width towards seam; spread adhesive and place carpet 3' from where next seam will fall.
- S. Brush or roll out looseness and air bubbles as carpet is put into place. Repeat above procedure on continuing widths. Trim carpet at wall using razor blade knife or suitable wall trimmer.

3.04 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean and vacuum carpet surfaces.

3.05 PROTECTION

- A. Prohibit traffic from carpet areas for 24 hours after installation.
- B. Cover with non-staining building paper, firmly fastened down to protect floor surfaces.
- C. Near completion of the project, remove paper, clean and vacuum carpet.

*** END OF SECTION ***

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SECTION 09900

PAINTING

PARTS 1 -- GENERAL

1.01 SUMMARY:

- A. Section Includes: Painting and finishing of all interior and exterior items and surfaces, unless otherwise indicated or listed under exclusions below:
1. Paint all exposed surfaces, except as otherwise indicated, whether or not colors are designated.
 2. Include field painting of exposed exterior and interior structural steel, plumbing, mechanical and electrical work, except as indicated below.
 3. Paint exterior plaster where indicated on Drawings.
- B. Work Included:
1. The intent and requirements of this section is that all work, items and surfaces which are normally painted and finished in a building of this type and quality, shall be so included in this contract, whether or not said work, item or surface is specifically called out and included in the schedules and notes on the drawings, or is, or is not, specifically mentioned in these specifications.
 2. All the requirements of Division Zero and Division One apply to this Section.
- C. The following general categories of work and items that are included under other sections, shall not be a part of this section:
1. Shop prime painting of structural and miscellaneous iron or steel.
 2. Shop prime painting of hollow metal work.
 3. Shop finished work and items.
 4. Any drywall or plaster permanently concealed from view.
 5. Any factory finished equipment and other materials with a complete factory applied finish.
 6. Finish hardware except where primed for paint finish.
 7. Any glass, plastics, floor tiles and sheet vinyl coved or vinyl top set bases.
 8. Plumbing fixtures: Toilet room accessories.
 9. Lighting fixtures except as noted on drawings or specified.
 10. Any acoustical surfaces; unless otherwise specified.
- D. The Room Finish Schedules indicated on the drawings, indicates the location of interior room surfaces to be painted or finished. The schedule indications are general and do not necessarily define the detail requirements. Include all detailed refinements and further instructions as may be given for the required complete finishing of all spaces and rooms.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS:

- A. Product Data: Submit complete manufacturer's descriptive literature and specifications in compliance with pertinent provisions of Article 5 of the General Conditions.

1. Materials List: Submit complete lists of materials proposed for use, giving the manufacturer's name, catalog number, and catalog cut for each item when applicable. When required, provide a list of paint and coating materials proposed for use, which equates such materials with the design-basis products specified.
- B. Samples: In accordance with provisions of Article 5 of the General Conditions, submit, on 8-1/2 inch by 11 inch hardboard, samples of each color, gloss, texture and material selected by the Architect from standard colors available for the coatings required.
 1. For natural and stained finishes, provide sample on each type and quality of wood used on the project.
- C. Manufacturer's Instructions: Submit the manufacturer's current recommended methods of installation, including relevant limitations, safety and environmental cautions, application rates, and composition analysis.

1.04 QUALITY ASSURANCE:

- A. Regulatory Requirements: Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal. Where those requirements conflict with this Specification, comply with the more stringent provisions.

Regulatory changes may affect the formulation, availability, or use of specified coatings. Confirm availability of coatings to be used prior to job going out to bid and before start of painting project.

 1. Comply with the current applicable regulations of the California Air Resources Board (CARB) and the Environmental Protection Agency (EPA).
- B. Field Sample: When and as directed by the Architect, apply one complete coating system for each color, gloss and texture required. When approved, the sample panel areas will be deemed incorporated into the Work and will serve as the standards by which the subsequent Work of this Section will be judged.

1.05 DELIVERY, STORAGE, AND HANDLING:

- A. Storage and Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.
- B. Deliver materials to job site in new, original, and unopened containers bearing manufacturer's name and trade name. Store where directed in accordance with manufacturer's instructions.

1.06 PROJECT CONDITIONS:

Do not apply exterior materials during fog, rain or mist, or when inclement weather is expected within the dry time specified by the manufacturer. No exterior or interior painting shall be done until the surfaces are thoroughly dry and cured. Do not apply paint when temperature is below 50° F. Avoid painting surfaces when exposed to direct sunlight.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS:

Manufacturer's catalog names and number of paint types in this Section herein are based on products of Dunn-Edwards Corporation and is the standard of quality against which the Architect will judge equivalency. The quantity of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are a few of the criteria which will be used by the Architect in determining equivalency of materials.

2.02 ACCEPTABLE ALTERNATES

The following is a list of acceptable alternate manufacturers:

1. ICI Paints
2. Sherwin Williams
3. Vista Paint
4. Frazee Paints

2.03 MATERIALS:

- A. **Paints:** Provide Ready-Mixed, except field catalyzed coatings. Pigments shall be fully ground maintaining soft paste consistency, capable of being readily and uniformly dispersed to complete homogeneous mixture. Paints shall have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.
- B. **Accessory Materials:** Linseed oil, shellac, solvents, and other materials not specified but required to achieve required finishes shall be of high quality and approved by manufacturer.
- C. **Colors** shall be selected from color chip samples provided by manufacturer of paint system approved for use. Match approved samples for color, texture and coverage.

2.04 MIXES:

Mix, prepare, and store painting and finishing materials in accordance with manufacturer's directions.

PART 3 -- EXECUTION

3.01 EXAMINATION:

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Examine surfaces to be painted before beginning painting work. Work of other trades that has been left or installed in a condition not suitable to receive paint, stain, other specified finish shall be repaired or corrected by the applicable trade before painting. Painting of defective or unsuitable surface implies acceptance of the surfaces.
- C. Beware of a condition known as "critical lighting". This condition causes shadows that accentuate even the slightest surface variations. A pigmented sealer will provide tooth for succeeding decorative coating, but "does not" equalize smoothness or surface texture. Any corrective action to gypsum board/drywall must be done by the drywall contractor prior to decorating.
- D. Correct conditions detrimental to timely and proper completion of the Work.
- E. Do not proceed until unsatisfactory conditions are corrected.
- F. Beginning of installation means acceptance of conditions.

3.02 PROTECTION:

- A. Protect previously installed work and materials, which may be affected by Work of this Section.
 - a. Protect prefinished surfaces, lawns, shrubbery and adjacent surfaces against paint and damage.
 - b. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or splatter from fouling surfaces not being painted.
 - c. Protect surfaces, equipment, and fixtures from damage resulting from use of fixed, movable and hanging scaffolding, planking, and staging.

- B. Provide WET PAINT signs, barricades, and other devices required to protect newly finished surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.03 PREPARATION:

- A. Perform preparation and cleaning procedures in strict accordance with coating manufacturer's instructions for each substrate condition.
- B. Concrete and masonry surfaces shall be dry, clean, and free of dirt, efflorescence, encrustation, and other foreign matter. Glazed surfaces on concrete shall be roughened or etched to uniform texture.
- C. Ferrous metal shall be cleaned of oil, grease, and foreign matter with solvent. Prime within 3 hours after preparation.
- D. Sand and scrape metal to remove loose primer and rust.
- E. Galvanized metal shall be chemically or solvent cleaned and then retreated with an etching-type solution if recommended by the finish manufacturer. Cleaned and retreated galvanized metal shall be primed the same day that cleaning has been performed.
- F. Remove dust, grit and foreign matter from wood surfaces. Sand surfaces and dust clean. Spot coat knots, pitch streaks, and sappy section with pigmented stain sealer when surfaces are to be painted. Fill nail holes, cracks and other defects after priming and spot prime repairs when fully cured.
- G. Remove hardware and accessories, machined surfaces, plates, lighting fixtures and similar items in place and not-to-be-finish painted, or provide surface-applied protection. Reinstall removed items upon completion of work in each area.
- H. Existing surfaces to be recoated shall be thoroughly cleaned and deglossed by sanding or other means prior to painting. Patched and bare areas shall be spot primed with same primer as specified for new work.
- I. Thoroughly backpaint all surfaces of exterior and interior finish lumber and millwork, including doors and window frames, trim, cabinetwork, etc., which will be concealed after installation. Backpaint items to be painted or enameled with the priming coat. Use a clear sealer for backpriming where transparent finish is required.
- J. Bar and covered pipes, ducts, hangers, exposed steel and ironwork, and primed metal surfaces of equipment installed under mechanical and electrical work shall be cleaned prior to priming.
- K. Preparation of other surfaces shall be performed following specific recommendations of the coatings manufacturer.
- L. Bond breakers and curing agents must be removed and the surface cleaned before primers, sealers or finish paints can be applied.
- M. All drywall surfaces must be completely dry and dust free before painting. Skim coated drywall must be sealed with an alkyd based sealer or a waterborne sealer recommended by the paint manufacturer for this surface. Use the appropriate light or medium tack masking tape.

3.04 APPLICATION:

- A. Apply painting and finishing materials in accordance with the manufacturer's submittals, as approved. Use applicators and techniques best suited for the material and surfaces to which applied.
 - 1. The number of coats specified is the minimum that shall be applied. Apply additional coats when undercoats, stains or other conditions show through final paint coat, until paint film is of uniform finish, color and appearance.

2. All undercoats shall be tinted slightly to approximate the color of the finish coat.
- B. Apply each material at not less than the manufacturer's recommended spreading rate:
 1. Provide a total dry film thickness of not less than 1.2 mils for each required coat.
- C. Apply prime coat to surface, which is required to be painted or finished.
- D. Finish exterior doors on tops, bottoms, and edges same as exterior faces, after fitting.
- E. Sand lightly and dust clean between succeeding coats.

3.05 CLEANING, TOUCH-UP AND REFINISHING:

- A. Carefully remove all spattering, spots and blemishes caused by work under this section from surfaces throughout the project.
- B. Upon completion of painting work remove all rubbish, paint cans, and accumulated materials resulting from work in each space or room. All areas shall be left in a clean, orderly condition.
- C. Runs, sags, misses, holidays, stains and other defects in the painted surfaces, including inadequate coverage and mil thickness shall be satisfactorily touched up, or refinished, or repainted as necessary.

3.06 FINISH SCHEDULE

- A. Apply the following finishes to the surfaces specified and/or as on the finish schedule on the Drawings. Apply all materials in accordance with manufacturer's instructions on properly prepared surfaces and foundation coats. All intermediate undercoats must be tinted to approximate the final color.
 1. Architect will issue a color schedule prior to start of painting to designate the various colors and locations required for the work.
- B. Exterior Systems:
 1. Stucco & Plaster

Flat – 100% Acrylic

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709) OR SUPER-LOC Two Component Waterborne Epoxy
Masonry Sealer (W 718)	
Second Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
OR	
Second Coat	ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)
Third Coat	ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)
 2. Concrete Tilt-Up

Flat – 100% Acrylic

First Coat	EFF-STOP, Acrylic Masonry Primer/Sealer (W 709) OR SUPER-LOC Two Component Waterborne Epoxy Masonry Sealer (W 718)
Second Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
OR	
Second Coat	ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)
Third Coat	ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)

3. Brick Masonry

Flat – 100% Acrylic

- First Coat EFF-STOP, Acrylic Masonry Primer/Sealer (W 709)
 OR SUPER-LOC, Two Component Waterborne Epoxy Masonry
 Sealer (W 718)
- Second Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
 OR
- Second Coat ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)
Third Coat ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)

B. Exterior Systems: (Continued)

4. Concrete Block

a. Flat – 100% Acrylic

- First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
 OR
- Second Coat ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)
Third Coat ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)

b. Semi-Gloss – 100% Acrylic

- First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)
Third Coat PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)

c. Gloss – 100% Acrylic

- First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)
Third Coat PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)

d. High Gloss, High Performance – Acrylic/Urethane

- First Coat **RUST-OLEUM SIERRA GRIPTEC S30 Primer**
Second Coat **RUST-OLEUM SIERRA BEYOND Multi-Purpose Acrylic
Enamel**
Third Coat **RUST-OLEUM SIERRA BEYOND Multi-Purpose Acrylic
Enamel**

5. Ferrous Metal

a. Flat – Alkyd/Acrylic

- First Coat BLOC-RUST, Red Oxide Alkyd Rust Preventative Primer (43-4)
 OR
 CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat EVERSIELD, 100% Acrylic Exterior Masonry Finish (W 701V)

b. Semi-Gloss – Alkyd/Acrylic

First Coat	BLOC-RUST, Red Oxide Alkyd Rust Preventative Primer (43-4)
OR	CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat	PERMASHEEN, Int/Ext. 100% Acrylic Semi-Gloss Enamel (W901V)
Third Coat	PERMASHEEN, Int/Ext. 100% Acrylic Semi-Gloss Enamel (W 901V)

B. Exterior Systems: (continued)

5. Ferrous Metal (continued)

c. Gloss – Alkyd/Acrylic

First Coat	BLOC-RUST, Red Oxide Alkyd Rust Preventative Primer (43-4)
OR	CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W960V)
Third Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W960V)

d. Gloss – Rust Preventative Alkyd

First Coat	SYN-LUSTRO Rust-Preventative Acrylic Primer (W8)
Second Coat	SYN-LUSTRO Rust-Preventative Acrylic Gloss (W10)
Third Coat	SYN-LUSTRO Rust-Preventative Acrylic Gloss (W10)

e. Matte, Industrial High Performance – Inorganic Zinc/Epoxy/Acrylic

First Coat	CARBOLINE CARBOZINC 859 VOC
Second Coat	CARBOLINE CARBOGUARD 890 VOC
Third Coat	CARBOLINE CARBOCRYLIC 3359 MC

f. Matte, Industrial High Performance – Epoxy Primer/Epoxy/Acrylic

First Coat	CARBOLINE CARBOGUARD 890 VOC
Second Coat	CARBOLINE CARBOGUARD 890 VOC
Third Coat	CARBOLINE CARBOCRYLIC 3359 MC

g. High Gloss, Industrial High Performance – Inorganic Zinc/Epoxy/Urethane

First Coat	CARBOLINE CARBOZINC 859 VOC
Second Coat	CARBOLINE CARBOGUARD 890 VOC
Third Coat	CARBOLINE CARBOTHANE 134 VOC

h. High Gloss, Industrial High Performance – Epoxy Primer/Epoxy/Urethane

First Coat	CARBOLINE CARBOGUARD 890 VOC
Second Coat	CARBOLINE CARBOGUARD 890 VOC
Third Coat	CARBOLINE CARBOTHANE 134 VOC

B. Exterior Systems: (continued)

6. Galvanized Metal

a. Flat – Alkyd/Acrylic

Pretreatment	GALVA-ETCH, Etching Liquid (GE 123)
First Coat	GALV-ALUM Epoxy Galvanized/Aluminum Metal Primer (43-7)
Second Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)
Third Coat	EVERSHIELD, 100% Acrylic Exterior Masonry Finish (W 701V)

b. Semi-Gloss – Alkyd/Acrylic

Pretreatment	GALVA-ETCH, Etching Liquid (GE 123)
First Coat	GALV-ALUM Epoxy Galvanized/Aluminum Metal Primer (43-7)
Second Coat	PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)
Third Coat	PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)

c. Gloss – Alkyd/Acrylic

Pretreatment	GALVA-ETCH, Etching Liquid (GE 123)
First Coat	GALV-ALUM Epoxy Galvanized/Aluminum Metal Primer (43-7)
Second Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)
Third Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)

d. Gloss – Rust Preventative Alkyd

Pretreatment	GALVA-ETCH, Etching Liquid (GE 123)
First Coat	SYN-LUSTRO Rust-Preventative Acrylic Primer (W8)
Second Coat	SYN-LUSTRO Rust-Preventative Acrylic Gloss (W10)
Third Coat	SYN-LUSTRO Rust-Preventative Acrylic Gloss (W10)

e. Matte, Industrial High Performance – Epoxy Primer/Acrylic

First Coat	CARBOLINE CARBOGUIDE 890 VOC
Second Coat	CARBOLINE CARBOCRYLIC 3359 MC
Third Coat	CARBOLINE CARBOCRYLIC 3359 MC

f. High Gloss, Industrial High Performance – Epoxy Primer/Urethane

First Coat	CARBOLINE CRABOGUARD 890 VOC
Second Coat	CARBOLINE CARBOTHANE 134 VOC
Third Coat	CARBOLINE CARBOTHANE 134 VOC

B. Exterior Systems: (continued)

1. Wood – Paint Finish

a. Semi-Gloss – Acrylic

First Coat	E-Z PRIME, Ext. 100% Acrylic Wood Primer (W 708)
Second Coat	PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)
Third Coat	PERMASHEEN, 100% Acrylic Semi-Gloss Enamel (W 901V)

b. Gloss – Acrylic

First Coat	E-Z PRIME, Ext. 100% Acrylic Wood Primer (W 708)
Second Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)
Third Coat	PERMAGLOSS, 100% Acrylic Gloss Enamel (W 960V)

2. Wood – Stain Finish – Opaque:

Two Coats ACRI-FLAT, Exterior 100% Acrylic Flat Finish (W 704V)

3. Wood – Stain Finish – Semi-Transparent:

One Coat OKON Weather Pro Tinted (WPT-3)

C. Interior Systems:

1. Gypsum Board

a. Flat - Acrylic

First Coat VINYLASTIC, Interior Pigmented Sealer (W 101)*
Second Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)
Third Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)

b. Low Sheen – Acrylic

First Coat VINYLASTIC, Interior Pigmented Sealer (W 101V)*
Second Coat SUPREMA, Latex Low Sheen Enamel (W411V)
Third Coat SUPREMA, Latex Low Sheen Enamel (W411V)

c. Eggshell – Acrylic

First Coat VINYLASTIC, Interior Pigmented Sealer (W 101V)*
Second Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)
Third Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)

C. Interior Systems: (continued)

1. Gypsum Board (continued)

d. Semi-Gloss - Acrylic

First Coat VINYLASTIC, Interior Pigmented Sealer (W 101V)*
Second Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)
Third Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)

e. Gloss – Acrylic

First Coat VINYLASTIC, Interior Pigmented Sealer (W 101V)*
Second Coat PERMAGLOSS, Acrylic, Int. Gloss Enamel (W901V)
Third Coat PERMAGLOSS, Acrylic, Int. Gloss Enamel (W901V)

f. Gloss– Industrial High Performance – Waterborne Epoxy

First Coat **RUST-OLEUM SIERRA S70 Industrial Epoxy Primer**
Second Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**
Third Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**

g. High Gloss – Industrial High Performance – Waterborne Epoxy/Urethane

First Coat **CARBOLINE CARBOGUARD 890 VOC**
Second Coat **CARBOLINE CARBOTHANE 134 VOC**

Third Coat **CARBOLINE CARBOTHANE 134 VOC**
2. Concrete & Plaster:

a. Flat – Acrylic Copolymer

First Coat SUPER-LOC, Two Component Waterborne Epoxy Sealer (W718)
OR EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)
Third Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)

b. Low Sheen – Acrylic Copolymer

First Coat SUPER-LOC, Two Component Waterborne Epoxy Sealer (W718)
OR EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat SUPREMA, Latex Low Sheen Enamel (W411V)
Third Coat SUPREMA, Latex Low Gloss Enamel (W 411V)

C. Interior Systems: (continued)

2. Concrete & Plaster:

c. Eggshell – 100% Acrylic

First Coat SUPER-LOC, Two Component Waterborne Epoxy Sealer (W718)
OR EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)
Third Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)

d. Semi-Gloss – 100% Acrylic

First Coat SUPER-LOC, Two Component Waterborne Epoxy Sealer (W718)
OR EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)
Third Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)

e. Gloss – 100% Acrylic

First Coat SUPER-LOC, Two Component Waterborne Epoxy Sealer (W718)
OR EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat PERMAGLOSS, Acrylic, Int. Gloss Enamel (W960V)
Third Coat PERMAGLOSS, Acrylic, Int. Gloss Enamel (W960V)

f. Gloss – Industrial High Performance - Waterborne Epoxy

First Coat **RUST-OLEUM SIERRA S70 Industrial Epoxy Primer**
Second Coat **RUST-OLEUM SIERRA S50 Industrial Gloss Enamel**
Third Coat **RUST-OLEUM SIERRA S50 Industrial Gloss Enamel**

g. High Gloss- Industrial High Performance - Epoxy/Urethane

First Coat **CARBOLINE CARBOGUARD 890 VOC**
Second Coat **CARBOLINE CARBOTHANE 134 VOC**
Third Coat **CARBOLINE CARBOTHANE 134 VOC**

3. Brick

a. Flat – Acrylic Copolymer

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat	DECOVEL, Interior Velvet Flat Wall Finish (W 401V)
Third Coat	DECOVEL, Interior Velvet Flat Wall Finish (W 401V)

C. Interior Systems: (continued)

3. Brick

b. Low Sheen – Acrylic Copolymer

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat	SUPREMA, Latex Low Sheen Enamel (W411V)
Third Coat	SUPREMA, Latex Low Sheen Enamel (W411V)

c. Eggshell – 100% Acrylic

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat	DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)
Third Coat	DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)

d. Semi-Gloss – 100% Acrylic

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat	PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)
Third Coat	PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)

e. Gloss – 100% Acrylic

First Coat	EFF-STOP, Acrylic Masonry Primer (W 709)
Second Coat	PERMAGLOSS, Acrylic, Int. Gloss Enamel (W960V)
Third Coat	PERMAGLOSS, Acrylic, Int. Gloss Enamel (W960V)

f. Gloss – Industrial High Performance - Waterborne Epoxy

First Coat	RUST-OLEUM SIERRA S70 Industrial Epoxy Primer
Second Coat	RUST-OLEUM SIERRA S50 Industrial Gloss Enamel
Third Coat	RUST-OLEUM SIERRA S50 Industrial Gloss Enamel

g. Gloss – Industrial High Performance - Waterborne Epoxy

First Coat	RUST-OLEUM SIERRA S70 Industrial Epoxy Primer
Second Coat	RUST-OLEUM SIERRA S50 Industrial Gloss Enamel
Third Coat	RUST-OLEUM SIERRA S50 Industrial Gloss Enamel

h. High Gloss- Industrial High Performance - Epoxy/Urethane

First Coat	CARBOLINE CARBOGUARD 890 VOC
Second Coat	CARBOLINE CARBOTHANE 134 VOC
Third Coat	CARBOLINE CARBOTHANE 134 VOC

C. Interior Systems:(continued)

4. Concrete Block

a. Flat – Acrylic Copolymer

First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)
Third Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)

b. Low Sheen – Acrylic Copolymer

First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat SUPREMA, Latex Low Sheen Enamel (W411V)
Third Coat SUPREMA, Latex Low Sheen Enamel (W411V)

c. Eggshell – 100% Acrylic

First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)
Third Coat DECOSHEEN, Acrylic Eggshell Enamel ((W 440V)

d. Semi-Gloss – 100% Acrylic

First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)
Third Coat PERMASHEEN, Acrylic, Int. Semi-Gloss Enamel (W901V)

e. Gloss – 100% Acrylic

First Coat BLOCFIL, Concrete Block Filler, Smooth (W 305)
Second Coat PERMAGLOSS, Acrylic Int. Gloss Enamel (W960V)
Third Coat PERMAGLOSS, Acrylic Int. Gloss Enamel (W960V)

f. Gloss – Industrial High Performance - Waterborne Epoxy

First Coat **BLOCFIL, Concrete Block Filler, Smooth (W 305)**
Second Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**
Third Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**

g. High Gloss- Industrial High Performance – Acrylic/Urethane

First Coat **CARBOLINE SANITILE 100**
Second Coat **CARBOLINE CARBOTHANE 134 VOC**
Third Coat **CARBOLINE CARBOTHANE 134 VOC**

C. Interior Systems:(continued)

5. Ferrous Metal

c. Flat – Acrylic Copolymer

First Coat CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)
Third Coat DECOVEL, Interior Velvet Flat Wall Finish (W 401V)

d. Low Sheen – Alkyd/Acrylic Copolymer

First Coat CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat SUPREMA, Int. Latex Low Sheen Enamel (W411V)
Third Coat SUPREMA, Int. Latex Low Sheen Enamel (W411V)

e. Eggshell – Alkyd/100% Acrylic

First Coat CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat DECOSHEEN, Int. Acrylic Eggshell Enamel ((W 440V)
Third Coat DECOSHEEN, Int. Acrylic Eggshell Enamel ((W 440V)

f. Semi-Gloss – Alkyd/100% Acrylic

First Coat CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat PERMASHEEN, Acrylic Semi-Gloss Enamel (W901V)
Third Coat PERMASHEEN, Acrylic Semi-Gloss Enamel (W901V)

g. Semi-Gloss –Rust Preventative Alkyd

First Coat **SYN-LUSTRO W8 Rust-Preventative Acrylic Primer**
Second Coat **SYN-LUSTRO, W9 Rust-Preventative Acrylic Semi-Gloss Enamel**
Third Coat **SYN-LUSTRO, W9 Rust-Preventative Acrylic Semi-Gloss Enamel**

h. Gloss – Alkyd/100% Acrylic

First Coat CORROBAR, White Alkyd Rust Preventative Primer (43-5)
Second Coat PERMAGLOSS, Acrylic Gloss Enamel (W960V)
Third Coat PERMAGLOSS, Acrylic Gloss Enamel (W960V)

i. Gloss –Rust Preventative Alkyd

First Coat **SYN-LUSTRO W8 Rust-Preventative Acrylic Primer**
Second Coat **SYN-LUSTRO, W10 Rust-Preventative Acrylic Gloss Enamel**
Third Coat **SYN-LUSTRO, W10 Rust-Preventative Acrylic Gloss Enamel**

C. Interior Systems: (continued)

5. Ferrous Metal

c. Gloss – Industrial High Performance - Waterborne Epoxy

First Coat **RUST-OLEUM SIERRA S70 Industrial Epoxy Primer**
Second Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**
Third Coat **RUST-OLEUM SIERRA S50 Industrial Epoxy Gloss Enamel**

d. High Gloss – Industrial High Performance - Epoxy/Urethane

First Coat **CARBOLINE CARBOGUARD 890 VOC**

Third Coat DECOLAC, High Solid Flat Lacquer, Clear **N/A**
Fourth Coat DECOLAC, High Solid Flat Lacquer, Clear **N/A**

b. Semi-Gloss

First Coat STAINSEAL, Interior Wiping Oil Stain **V-YBQ**
Filler PASTE WOOD FILLER (PWF 2703)
Second Coat 550 **CONTRACTORS EDGE** High Solids Lacquer Sanding
 Sealer, Clear **CE550PRO-SS**
Third Coat 550 **CONTRACTORS EDGE**, High Solids Semi-Gloss Lacquer,
 Clear **CE550PRO60**
Fourth Coat 550 **CONTRACTORS EDGE**, High Solids Semi-Gloss Lacquer,
 Clear **CE550PRO60**

c. Gloss

First Coat STAINSEAL, Interior Wiping Oil Stain **V-YQB**
OR
Filler PASTE WOOD FILLER (PWF 2703)
Second Coat 550 DECOLAC, High Solids Lacquer Sanding Sealer, Clear
 CE550PRO-SS
Third Coat 550 DECOLAC, High Solids Gloss Lacquer, Clear **CE550PRO90**
Fourth Coat 550 DECOLAC, High Solids Gloss Lacquer, Clear **CE550PRO90**

* Dunn-Edwards does not recommend VINYLASTIC, Interior Pigmented Sealer (W 101) on drywall where "Prep Coat", "First Coat", or other skim coat type materials have been applied. For enamel finishes, use WALLTONE, Flat Wall Finish (W 420) for the first coat. For flat finishes, use two coats of the flat finish material only.

**Yellowing of white and off-white alkyd enamels may occur because of government regulatory limits on solvent content. Substitution of latex enamels would avoid this problem, but may not provide comparable performance.

END OF SECTION

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SECTION 10100
PROJECTION SCREENS

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Projection Screen.
- B. All accessories and hardware for a complete and proper installation.

1.02 RELATED WORK

- A. Documents affecting this Work include: General Conditions, Special Conditions, and Sections of Division 1 of these Specifications.
- B. Gypsum Systems.
- C. Finish Carpentry.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Submit manufacturer's installation instructions under pertinent provisions of Article 5 of the General Conditions. When approved, these instructions shall become the basis for accepting or rejecting the actual installation of the Work.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Da-lite: Model C manual projection screen.
- B. Substitutions under provision of Section 01000.

2.02 FABRICATION

- A. 6'-0" x 8'-0" projection screen recess ceiling mounted.
- B. Screen Fabric: Flame retardant, mildew resistant fiberglass; glass beaded picture surface with black masking borders. Fabric to be permanently attached to roller.
- C. Case: 22 ga. steel case with black enamel finish and end caps.

PART 3 -- EXECUTION

3.01 PREPARATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify adequate support of wood encasement by finish carpenter.
- C. Correct conditions detrimental to timely and proper complete of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Coordinate with other Sections to provide necessary support during the proper sequence of Work.
- B. Install in accordance with manufacturer's instructions.
- C. Install case and screen level and plumb.
- D. Verify smooth operation of all components.

3.03 CLEANING

- A. Leave work clean and operating smoothly.
- B. Wipe clean case after installation.
- C. Clean screen of any marring during installation.

***** END OF SECTION *****

SECTION 10200

LOUVERS

PART 1 -- GENERAL

1.01 DESCRIPTION

Work included: Provide metal louvers and vents as required by the Drawings, as specified herein, and as needed for a complete and proper installation. All of the requirements of the Contract Documents apply to this Section.

1.02 QUALITY ASSURANCE

Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods for proper performance of the work of this Section.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

Product data: Within 35 calendar days after the Contractor has received the Owner's Notice to Proceed, submit:

1. Materials list of items that will be provided under this Section.
2. Manufacturer's Specifications and other data needed to prove compliance with the specified requirements.
3. Shop Drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades.
4. Samples of the proposed products, showing profiles, joining, and finish.
5. Manufacturer's recommended installation procedures which, when accepted by the Architect, will become the basis for accepting or rejecting actual installation procedures for the Work.

PART 2 -- PRODUCTS

2.01 METAL LOUVERS

A. Provide metal louvers in the arrangements and dimensions shown on the Drawings, and with the following attributes:

1. High Performance Fixed Drainage Louver, 4" deep. Frames and blades to be 6063-T5 alloy 0.081" (2.06mm) thick. Mullions to be sliding interlock type with integral internal drain. Jamb and mullion drains to be open on front face in order to direct water away from inside of louver. Blades to be one-piece extrusions with gutters designed to catch and direct water to jamb and mullion drains. Fasteners to be aluminum or stainless steel. Louvers to have framed mesh removable mill finish aluminum insect screens.
2. Thin line Louver, 2" deep. Frames and blades to be 6063-T5 alloy 0.050" (1.27mm) thick. Fasteners to be aluminum or stainless steel. Louvers to have framed 18 x 14 aluminum 0.0123" (0.312mm) diameter mesh mill finish aluminum insect screens. All frames to be mitered at corners and reinforced with corner brackets.

3. Finish - Kynar. 500 coating in color selected by the Architect from the manufacturer's color selections.
- B. Acceptable products:
1. High Performance Fixed Drainable Louver, Model 4097 & Thinline Louver, Model 2322A, as manufactured by Construction Specialties, Inc.
 2. Equal products of other manufacturers when accepted in advance by the Architect.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Verify all opening dimensions in field prior to fabrication and installation of louvers.
- E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the accepted Shop Drawings, and the manufacturer's recommended installation procedures as accepted by the Architect, anchoring all components firmly into position in true alignment within a tolerance of one in 1000 vertically and horizontally.
- C. Dissimilar Materials:
 1. Where aluminum surfaces come in contact with metals other than stainless steel, zinc, or white bronze of small area, isolate the aluminum by one of the following methods:
 - a. Paint the dissimilar metal with a prime coat of zinc-chromate primer, followed by two coats of aluminum metal-and-masonry paint.
 - b. Paint the dissimilar metal with a coating of heavy-bodied bituminous paint.
 - c. Apply a good quality sealant material between the aluminum and the dissimilar metal.
 - d. Isolate the dissimilar metals with non-absorptive tape or gaskets.

3.03 CLEANING

Prior to completion of the Work, Contractor shall thoroughly clean all exposed surfaces of louvers.

1. Use only the cleaning materials and techniques recommended by the manufacturer of the material being cleaned.
2. Do not scratch or otherwise damage the finish.

***** END OF SECTION *****

SECTION 10400
IDENTIFYING DEVICES

PART 1 – GENERAL

1.01 SCOPE OF WORK

- A. Molded plastic signs.
- B. Aluminum free-standing signs.
- C. Aluminum channel letters.

1.02 RELATED WORK

- A. Documents affecting this Work include: General Conditions, Special Conditions, and Sections of Division 1 of these Specifications.
- B. Reinforced masonry systems: Monument signs.
- C. Wood doors.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit two samples illustrating full size sample sign, of type, style and color specified including method of attachment.
- B. Submit manufacturer's installation instructions.
- C. Include installation template and hardware.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Package signs, labeled in name groups.
- B. Store adhesive tape at ambient room temperatures.

1.06 ENVIRONMENTAL REQUIREMENTS

Do not install signs when ambient temperature is below 70 degrees F. Maintain this minimum during and after installation of signs.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Mohawk Sign Systems: Aluminum & Plastic Signs.
- B. A.R.K. Ramos Architectural Signage Systems; Aluminum Channel Letter.
- C. Substitutions: Under provisions of Section 01000.

2.02 MATERIALS – ALUMINUM CHANNEL LETTERS

- A. Aluminum letters: 8", 7" and 2", Helvetica Medium.
- B. Brackets: PPM-1 bracket sleeved stud.
 - 1. Set in adhesive in masonry.
 - 2. Attach to support in framed wall.

2.03 MATERIALS – MOLDED PLASTIC SIGNING SYSTEM

- A. 1/8" thick ES Plastic. Color to be selected by Architect.
- B. Graphics to be vinyl die-cut. 3/4" Helvetica Medium caps.
- C. Adhesive mounting.
- D. All signs to have 1/2" Radius corners.
- E. See Schedule for types.

2.04 MATERIALS -- ALUMINUM FREE-STANDING SIGN

- A. Provide 1/8" thick aluminum sign, on 1-3/4" x 1-3/4" x 1/8" x 7' post; black duranodic aluminum tubing and sign.
- B. Signs are to be 22" x 17" and 9" x 18" as shown on the Drawings.
- C. Letters are to be vinyl die-cut. Test shall conform to access requirements of the CBC.
- D. Color to be black anodized with white lettering.
- E. Signs are to be sleeve mounted in concrete footings.
- F. Signs shall be located per Drawing for Handicap Parking.

2.05 ACCESSORIES

- A. Mounting Hardware: Chrome screws; base sleeve and studs per manufacturer's recommendations.
- B. Tape Mount: Double sided tape, permanent adhesive.
- C. Adhesive: Silastic adhesive as recommended by manufacturer.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify adequate support for Building Signs. Coordinate footings with other trades.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install signs after doors and surfaces are finished, in locations indicated.
 - 1. Furnish and install all anchorage devices required to install the item and its appurtenances complete. Provide anchorage in ample time when required to be built in by other trades.
 - 2. All wall-mounted items shall be securely fastened to solid backing or blocking.
- C. Center plastic signs on doors, level.
- D. Anchor all components firmly into position for long life under hard use.
- E. Clean and polish.

3.03 SCHEDULES

- A. Exterior building signs:

1. Handicap signs per CBC requirements and as shown on Drawings.
 2. Monument sign: 2" and 7" letters as detailed on both sides of the sign.
- B. Interior signs:
1. Handicap restrooms 12" triangle for men and 12" circle for women per Title 24 - mounted on each restroom door.
 2. Office and restrooms ES Plastic: 4" x length required -- 7 doors. Text to be determined by Owner. Mount beside each door with the code required Braille designations on the sign. Copy to be in two lines as possible.

*****END OF SECTION*****

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SECTION 10520
FIRE PROTECTION SPECIALTIES

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Provide and install all Fire extinguishers and Cabinets as shown on the documents and as required by the local Fire Marshall.
- B. Accessories as required for a complete and proper project.

1.02 RELATED WORK

- A. Documents affecting this Work include: Sections of Division 1 of these Specifications.
- B. Gypsum Systems: Roughed-in wall openings.
- C. Painting: Field paint finish.

1.03 QUALITY ASSURANCE

- A. Conform to NFPA 10 requirements for extinguishers.
- B. Provide fire extinguishers, cabinets, and accessories by single manufacturer.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.05 SUBMITTALS

- A. Include physical dimensions, operational features, color and finish, wall-mounting brackets with mounted measurements, anchorage details, rough-in measurements, location, and details.
- B. Submit manufacturer's installation instructions.
- C. Submit manufacturer's operation and maintenance data.
- D. Include test, refill or recharge schedules, procedure, and re-certification requirements.

1.06 ENVIRONMENTAL REQUIREMENTS

Do not install extinguishers when ambient temperatures may cause freezing.

PART 2 -- PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Larsen's Manufacturing Company.

2.02 EXTINGUISHERS

Multi-Purpose Chemical Type: Larsen's Steel tank, Model MP 5, with pressure gage, and UL Rating 2A-10B:C or approved equal.

2.03 CABINETS

Typical Extinguisher Cabinet:

- 1. Provide Larsen's 2409-5R Vertical Duo Panel cabinet.
- 2. Primer finish.

2.04 ACCESSORIES

- A. Mounting Hardware: Appropriate to cabinet - see manufacturer's installation instructions.
- B. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.05 FABRICATION

- A. Form body of cabinet with tight inside corners and seams.
- B. Pre-drill holes for anchorage.
- C. Form perimeter trim and door stiles by welding, filling, and grinding smooth.
- D. Hinge doors for 180 degree opening.
- E. Glaze doors with resilient channel gasket glazing.

2.06 FINISHES

- A. Extinguisher: Red enamel.
- B. Cabinet Trim and Door: Primed to be painted to match adjacent surface.
- C. Cabinet Interior: Enamel white.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that rough openings for cabinet are correctly sized and located.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. Install cabinets plumb and level in wall openings so that there is 54 inches from finished floor to door handle.
- B. Secure rigidly in place in accordance with manufacturer's instructions.

***** END OF SECTION *****

SECTION 10800
TOILET AND BATH ACCESSORIES

PART 1 – GENERAL

1.01 SCOPE OF WORK

All of the requirements of the Contract Documents apply to this Section.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Provide, within 35 days of Notice to Proceed, product data on accessories describing size, finish, details of function, attachment methods.
- B. Submit shop drawings, manufacturer's literature and brochures, and catalog cuts, showing complete details of all manufactured and fabricated items. Do not purchase items until the shop drawings have been approved. See Section "Samples and Shop Drawings" for number and manner of submittals.

1.04 KEYING

Supply two (2) keys for each accessory to Owner. Master Key all accessories.

1.05 REGULATORY REQUIREMENTS

Conform to Title 24 and City codes for installing work in conformance with ANSI A117.1.

1.06 SEQUENCING AND SCHEDULING

Coordinate the work of this Section with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

Bobrick Washroom Equipment Company.

2.02 MATERIALS

- A. Stainless Steel Sheet: ASTM A167, Type 304.
- B. Tubing: ASTM A269, stainless steel.
- C. Fasteners, Screws, and Bolts: Hot dip galvanized as recommended by manufacturer.
- D. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.03 PRODUCTS

As indicated on the Drawings.

2.04 FACTORY FINISHING

Stainless Steel: No. 4 satin luster finish.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Verify that site conditions are ready to receive work and dimensions are as instructed by the manufacturer.
- C. Correct conditions detrimental to timely and proper completion of the Work.
- D. Do not proceed until unsatisfactory conditions are corrected.
- E. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Deliver inserts and rough-in frames to site at appropriate time for building-in.
- B. Provide complete information, diagrams, templates, and instructions for the installation of all items, in sufficient time so that all backing, blocking, framing and formwork can be properly installed, and so that the work of other trades will not be delayed.
- C. Verify exact location of accessories for installation.

3.03 INSTALLATION

- A. Install the work of this Section in strict accordance with the manufacturer's recommended installation procedures as approved by the Architect, anchoring all components firmly into position for long life under hard use.
 - 1. Furnish and install all anchorage devices required to install the item and its appurtenances complete. Provide anchorage in ample time when required to be built in by other trades.
 - 2. All wall-mounted items shall be securely fastened to solid backing or blocking.
- B. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- C. Install plumb and level, securely and rigidly anchored to substrate.

***** END OF SECTION *****

SECTION 12500
WINDOW TREATMENT

PART 1 -- GENERAL

1.01 SCOPE OF WORK

- A. Furnish and install all vertical blinds at all windows and sliding doors.
- B. Provide complete with brackets, cornices, control wands and accessories.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit samples for color selection.
- B. Submit product data, configuration and locations and manufacturer's installation instructions.

1.04 DELIVERY, STORAGE, AND HANDLING

Deliver and store products in a manner to prevent warping, twisting or other damage.

PART 2 -- PRODUCTS

2.01 APPROVED MANUFACTURERS

Levelor, Louver Drape, or approved equal.

2.02 MATERIALS -- TRACK

- A. Head shall be of extruded aluminum alloy minimum .44" thick.
- B. Carrier Slides: shall have hanger gear carries vane and can be rotated a full 180 degrees.
- C. Blinds shall be one-way draw stack.

2.03 MATERIALS -- VANES

- A. Vanes shall be 3-1/2" wide and overlap at least 3/8".
- B. Vanes shall be fabric with aluminum backing (Amalfi).
- C. Vanes shall be fire resistant and meet fire code requirements.
- D. Vanes shall be treated with Scotchgard fabric protector. Color selected by Architect.

2.04 CORNICE

- A. Cornice shall be coordinated with vanes.
- B. Brackets shall be included and fully concealed.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.
- D. Beginning of installation means acceptance of conditions.

3.02 PREPARATION

- A. Verify all dimensions in the field.
- B. Verify sufficient backing and support has been coordinated.
- C. Verify all wall and window surfaces are finished.

3.03 INSTALLATION

- A. Use anchorage devices appropriate for system and expected usage.
- B. Install items in accordance with manufacturer's instructions.
- C. Install all tracks and blinds level and plumb.
- D. Verify smooth operation of all blinds.

3.04 CLEANING

- A. Vacuum clean blinds and spot clean as required.
- B. Provide manufacturer's cleaning information to Owner.

***** END OF SECTION *****

SECTION 15010
BASIC MECHANICAL REQUIREMENTS

PART 1 -- GENERAL

1.01 SECTION INCLUDES

Basic Mechanical Requirements specifically applicable to Division 15 Sections, in addition to Division 1 - General Requirements.

1.02 DESCRIPTION

Furnish materials and perform labor required to execute this work as indicated on the drawings, as specified and as required to complete the work of this section, except as otherwise herein specifically excluded.

1.03 WORK INCLUDED

The complete Heating, Ventilating and Air Conditioning (HVAC) and Plumbing systems (including Medical Gas and Fire Protection systems), including but not limited to these major items.

1. Coordinate work of this Section with related trades.
2. Verify applicable dimensions at the jobsite.
3. Duct systems; supply, return and exhaust complete with fire dampers, combination fire-smoke dampers, and manual dampers.
4. Diffusers and registers.
5. Exhaust supply, return fans and air curtains.
6. Furnishing and installation of miscellaneous hangers, supports, sleeves, inserts, anchors and other auxiliary equipment for systems under this Division.
7. Duct lining and insulation.
8. Soil waste and vent system inside and outside the building including connections to fixtures, equipment, sewer connections, clean-outs.
9. Water piping systems inside and outside the building, including connections to fixtures, equipment, water meters and vaults; pressure regulating stations, backflow preventers.
10. Interruptible and non-interruptible fuel gas systems inside and outside the building, including connections, gas meters, earthquake valves, and pressure regulating stations.
11. Plumbing fixtures, carriers, fittings, trim, hose bibs, wall hydrants, and accessories.
12. Installation and connection of Owner furnished equipment.
13. Water heating systems, including water heating equipment, circulating pumps, connections.
14. Shop drawings.
15. Equipment identification.
16. Equipment and systems adjustments and balancing.
17. Air, water and gas systems testing, adjusting and balancing.
18. Written operating and maintenance instructions.
19. Record drawings.

20. Guarantee

1.04 WORK SPECIFIED ELSEWHERE

Concrete, Architectural Sheet Metal, Door and Exterior Wall Louvers, Painting and Electrical.

1.05 SITE INSPECTION

Contractor shall familiarize himself with the conditions at the site. No allowance will be made subsequently for any error through negligence in observing the site conditions. Contractor shall observe and make cost allowance for any mechanical and/or electrical items that must be relocated to accommodate the installation or servicing of any item covered under this contract.

1.06 ORDINANCES, REGULATIONS AND CODES

A. References to Technical Societies, Trade Organizations, Governmental Agencies is made in Division 15 in accordance with the following abbreviations.

1. AFI - Air Filter Institute
2. AMCA - Air Moving & Conditioning Association
3. ARI - Air Conditioning & Refrigeration Institute
4. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
5. ASME - American Society of Mechanical Engineers
6. ASTM - American Society of Testing Materials
7. AWS - American Welding Society Code
8. ANSI - American National Standards Institute
9. CBC - California Building Code
10. CCR - California Code of Regulations
11. CEC - California Electrical Code
12. CFC - California Fire Codes
13. CMC - California Mechanical Code
14. CPC - California Plumbing Code
15. FIA - Factory Insurance Association
16. NAFM - National Association of Fan Manufacturers
17. NEMA - National Electrical Manufacturer's Association
18. NFPA - National Fire Protection Association
19. ORS - Office of Regulatory Services
20. SCAQMD - South Coast Air Quality Management District
21. SMACNA - Sheet Metal and Air Conditioning Contractors National Association
22. UFC - Uniform Fire Code
23. UL - Underwriter's Laboratories
24. UPC - Uniform Plumbing Code

B. Requirements of Regulatory Agencies: Materials and installation shall comply with applicable local, state, and national codes and ordinances. Rulings and interpretations of

the enforcing agencies shall be considered as part of the local codes. No extras will be permitted for furnishing items required by the local codes but not specified or shown on the drawings.

C. Codes and Standards:

1. UBC and California Amendments (California Building Code - Part 2, Title 24, CCR).
2. UMC and California Amendments (California Mechanical Code - Part 4, Title 24 CCR).
3. UPC and California Amendments (California Plumbing Code - Part 5, Title 24 CCR).
4. Uniform Fire Code with State Amendments (California Fire Code - Part 9, Title 24 CCR).
5. National Fire Protection Associations - National Fire Code.

D. Nothing in these drawings and specifications is to be construed to permit work in violation thereof. Ordinances, regulations and codes are to be construed as minimum requirements.

E. The responsibility of the Architect to conduct construction reviews of the Contractor's performance is not intended to include the adequacy of the Contractor's safety measures in, on, or near the construction site.

F. Ventilating, refrigeration and electrical equipment and appliances are required to be approved by the Underwriters' Laboratories, Inc., or other nationally recognized testing agency and installed per the testing agency's specifications.

1.07 PERMITS, FEES AND INSPECTIONS

Obtain and pay for all necessary permits, fees, assessments, complimentary drawings, required by any legally constituted public authorities having jurisdiction.

1.08 DRAWINGS AND SPECIFICATIONS

- A. The Architect's decision will be final on interpretation of the Drawings and Specifications.
- B. The Drawings and Specifications are complimentary. Any work called for on the Drawings and not mentioned in the Specifications, or vice versa, shall be performed as though fully set forth in both.
- C. Piping, ductwork and other equipment shown as existing has been taken from the Owner's drawings. Contractor shall verify exact location in field before proceeding with the work.
- D. Where codes, standards, drawings or specifications conflict, the most stringent shall prevail, unless prior approval for variance is obtained. Specific details on the drawings shall supercede the specification in the event of a conflict.
- E. Alternate support or seismic detail shall have prior approval by the Architect; and the Contractor shall obtain agency approval without any additional cost or time to the contract and without any time penalty on the work schedule.

1.09 SUBMITTALS

- A. Before starting work, the Contractor shall furnish for the approval of the Architect, shop drawings and itemized equipment lists, complete in all details that he proposes to install. All items shall be submitted at the same time. Conform to Section 01300.
- B. Submittals must be specific to this project with respect to model number, capacities,

performance, etc., generic submittals will not be accepted.

- C. Variations or deviations on submitted items from that specified must be clearly tagged or identified
- D. Submittals shall include, but not necessarily be limited to the following which are mandatory:
 - 1. Draw Equipment Layouts to ¼" scale, including equipment, piping accessories, and showing clearances for operating and servicing.
 - 2. Pumps, pump characteristic curves.
 - 3. Schedule of pipe, fittings, valves, with manufacturer and catalog number.
 - 4. Specialties, valves, gauges and thermometers of all types.
 - 5. Foundations, supports, hangers, inserts.
 - 6. Earthquake supports and calculations.
 - 7. Expansion loops, expansion joints, guides, and anchors.
 - 8. Insulation.
 - 9. Ventilation and air conditioning equipment, specialties and the air control systems.
 - 10. Fans, fan characteristic curves, fan tests.
 - 11. Dampers, louvers, grilles, registers, diffusers.
 - 12. Shop fabrication drawings and installation drawings of ductwork and piping layouts. Submit for approval prior to fabrication. Drawings shall indicate dimensions from bottom of piping and ductwork to finish floor level.
 - 13. Wiring diagrams, control panel board, motor starters and controls for electrically operated equipment furnished by mechanical trades.
 - 14. Automatic control system diagrams.
 - 15. Underground and above ground tanks, accessories.
 - 16. Exhaust, supply and return fans.
 - 17. Access panels.
 - 18. Backflow preventers.
 - 19. Clean-outs
 - 20. Fixture carriers.
 - 21. Interceptors
 - 22. Hangers, inserts, supports, anchors.
 - 23. Hose bibs.
 - 24. Hot water circulators.
 - 25. Pipe, fittings and specialties.
 - 26. Pipe isolators.
 - 27. Plumbing fixtures, fittings, trim, drains and receptors.
 - 28. Fire protection system shop drawings.

29. Pressure regulators.
30. Roof flashing.
31. Sleeves, escutcheons, caulking, waterproofing, fireproofing.
32. Strainers
33. Water hammer arrestors.
34. Water heating equipment.
35. Expansion joints, guides and anchors.
36. Shop fabrications drawings and calculations.
37. Special and miscellaneous products furnished under this section and not listed herein.

1.010 RECORD DRAWINGS AND MANUALS

- A. Record Set During the Work: At site, maintain at least one set of Drawings as a Field Record Set. Also maintain at least one copy of all Addenda, Modifications, approved submittals, correspondence, and transmittals at site. Keep Drawings and data in good order and readily available to Architect and Owner.
- B. Changes: Clearly and correctly mark Record Drawings to show changes made during the construction process at the time the changed work is installed. No such changes shall be made in the work unless authorized by the Architect.
- C. Final Record Drawings: Conform to Division 1 requirements.
- D. Preparation of Final Record Drawings: Contractor shall transfer recorded changes in the work indicated on the Field Record Set to the record set. Changes shall be neatly and clearly drawn and noted by skilled draftsmen, and shown technically correct.
- E. Approval: Prior to Architect's inspection for Substantial Completion, submit the Final Record Drawings to the Architect for review, and make such revisions as may be necessary for Final Record Drawings to be a true, complete, and accurate record of the work.
- F. Manuals: Obtain data from the various manufacturers and submit instruction, operation, and maintenance manuals as required and to the extent required under other Sections.
- G. Contents: Each manual shall have an index listing the contents. Information in the manuals shall include not less than:
 1. General introductions and overall equipment description, purpose, functions and simplified theory of operation.
 2. Specifications
 3. Installation instructions, procedures, sequences, and precautions, including tolerances for level, horizontal and vertical alignment.
 4. Grouting requirements.
 5. List showing lubricants for each item of mechanical equipment and recommended lubrication intervals.
 6. Start-up and beginning operation procedures.
 7. Operational procedures.
 8. Shutdown procedures.

9. Maintenance and calibration procedures
 10. Parts lists
 11. Name, address and telephone number of each manufacturer's local representative.
- H. Manual Submittals: Unless otherwise specified, each submittal shall include two copies of each manual, one of which will be returned to the Contractor, marked to show the required review. When approved, deliver four copies to Architect unless otherwise specified.
- I. "As-Built" drawings of ductwork and piping, including all elbows, transitions, damper and valve locations shall be provided prior to commencement of air and water balance.

1.011 QUALITY OF EQUIPMENT, MATERIALS AND WORKMANSHIP

Unless otherwise specified, equipment and materials used in the installation shall be new and in perfect condition when installed. Articles provided for the same general purpose or use shall be of the same make. Workmanship shall be of the best quality and none but competent mechanics skilled in their trades shall be employed. Furnish the services of an experienced superintendent, who shall be constantly in charge of the work, together with all necessary journeymen, helpers and laborers required.

1.012 SEISMIC DESIGN

Contractor shall be responsible for anchors and connections of mechanical work to the building structure including calculations for approval by OSHPD or for approval by ORS/DSA, as applies, for items or work, where approval by OSHPD is deferred or where alternate support or anchorage detail is proposed to prevent damage as a result of an earthquake, including manufactured equipment, the connection and integrity of shop fabricated and field fabricated materials and equipment. The anchorage of all pipes, ducts, conduits, fixtures, equipment, etc. shall withstand the lateral forces and shall accommodate calculated building displacement as required by the California Building Code, and local city/county codes. (Building equipment and connections therefore shall be designed to resist lateral seismic forces equal to 1.0 of equipment weight to working allowable stress. Cantilever posts supporting equipment shall be designed to resist lateral seismic forces equal to 0.5 of equipment weight to allowable working stress. Conform to the following:

1. In accordance with Title 24, 1998 CBC Section 1632A and Table No. 16A-O, details shall be provided for the seismic anchorage of all mechanical and electrical equipment, anchorage details shall be based upon appropriate design calculations.
2. For equipment weighing 400 pounds or more anchorage details and appropriate design calculations shall be submitted as part of the mechanical and electrical drawings. "Deferred Approval" items will not be permitted unless specifically approved by the plan check supervisor.
 - a. Exception: Attachments of equipment weighting less than 400 pounds and supported directly on the floor or roof structure, furniture, or temporary or movable equipment and equipment weighing less than 20 pounds that is supported by vibration isolation devices suspended from the roof, wall or floor, need not be detailed on the plans provided the following notes are included on the mechanical and electrical plans.
3. The seismic anchorage of mechanical and electrical equipment shall conform to C.C.R. Title 24, 1998 CBC Section 1632A and Table 16A-O. Anchorage details for roof/floor-mounted equipment shall be shown on plans.

1.013 SUBSTITUTIONS AND CHANGES

- A. Substitutions will be considered per Article 5.3 of the General Conditions.
- B. The design has been based on data from certain manufacturers, suitable for each application. Recommendations for alternative manufacturers are made for each product, except when "no substitutions permitted" is indicated.
- C. It is the intent of the Owner to have this project constructed with materials, products and system originally designed and specified into the project.
- D. Alternatives that may require the modification, realignment and/or adjustment of other associated components, including impact on other trades, shall be accomplished at no additional cost or time to the contract and shall have the approval of the Architect.
- E. Substitutions shall be submitted addressing all features listed in the specifications. Features that deviate from the plans and specifications shall be clearly identified including justification for deviations. Design West Engineers will review initial submittal on substitutes only. Subsequent submittals made to correct deficiencies in original submittals will be reviewed at Contractor's expense based on Design West Engineer's hourly rate for engineering services.
- F. Should the Contractor elect to propose substitutions for the Owner's interest, the substitutions shall be in compliance with Section 01340.

1.014 APPROVALS

The Architect will have the right to accept or reject equipment, materials, workmanship, tests and determine when the Contractor has complied with the requirements herein specified.

1.015 SELECTION AND ORDERING OF EQUIPMENT AND MATERIALS

Immediately after award of the Contract and after the approval of submittals by the Architect, the Contractor shall arrange for the purchase and delivery of equipment and materials required, in ample quantities and at the proper time. He shall deliver to the Architect a complete list of equipment and materials ordered, giving descriptions, plate numbers, brochures, name of the wholesalers, date of the orders and approximate delivery dates.

1.016 LOCATIONS AND ACCESSIBILITY

- A. Drawings show pipe and ductwork diagrammatically. Conform to Drawings as closely as possible in layout work. Vary run of piping, run and shape of ductwork and make offsets during progress of work as required to meet structural and other interferences as approved by Architect. Install piping and ductwork to best suit field conditions after coordinating with other trades. Run exposed piping and ductwork parallel to, or at right angle to, building walls. Keep horizontal lines as close to bottom of structures as possible. Conform to ceiling heights established on Drawings.
- B. Install equipment in such a manner as to be readily accessible for maintenance and repairs. Install piping, ducts and conduit in such a manner as to preserve headroom, avoid obstructions and keep openings and passageways clear.
- C. Installation at valves, thermometers, gauges, cleanouts, dampers, controls, steam and water specialties, duct access doors or any other indicating equipment or specialties requiring reading, adjustment, inspection, maintenance shall be conveniently and accessible located with reference to the finished building.
- D. Where wall and ceiling access doors are required but not shown, such doors shall be furnished under other sections and as directed by the Architect. Coordinate this requirement with appropriate trade.
- E. If changes in the indicated locations or arrangements are required, they shall be made without additional charges.

- F. In an existing area, where required, remove, reinstall, reconnect or replace, etc., any existing work to accommodate new work without any additional cost to the Owner. Material shall match existing, unless otherwise specified or approved in writing by the Architect.
- G. Provide sheaves and belts if required, to Test, Adjust and Balance Agency, to allow air moving equipment to meet flow requirements specified at no additional cost to the Owner.

1.017 COORDINATION OF TRADES

- A. Contractor shall coordinate all trades in the interest of obtaining the most practical overall arrangement of equipment, piping, conduit, and ducts and to maintain maximum headroom and accessibility.
- B. No extras will be allowed for changes made necessary by interference between trades.
- C. Submit Composite Drawings in accordance with Special Conditions. Include dimensioned plans, elevations, sections and details and give complete information particularly as to the kinds and types of materials and equipment, size and location of sleeves, inserts, attachments, chases, openings, conduits, ducts, boxes, lighting, structural interferences. Coordinate these Composite Drawings and field layouts in the field for proper relationship to work of applicable trades based on field conditions. Contractor shall have competent personnel readily available for coordinating, checking, and supervision of field layouts. The procedures for submittals and resubmittals, and final distribution shall be as specified in Section 01300. Do not start installation of work involved under Composite Drawings until the Architect reviews applicable submittal. Discrepancies between the Drawings and Composite Drawings shall be specifically noted and identified on the Composite Drawings. Drawings for the various trades involved shall be submitted as required and reviewed prior to preparation of Composite Drawings.
 - 1. Equipment Foundations and Bases: Furnish certified details and drawings for approval before fabrication. Furnish parts necessary for each foundation sub base and support.
 - 2. Pipe Sleeves and Inserts: Furnish and install pipe sleeves and pipe support inserts before concrete is poured.
 - 3. Roof, Wall and Floor Openings: Furnish Shop Drawings showing exact locations and sizes of openings through roofs, walls and floors.
 - 4. Concrete: Conform to Concrete Section of the Specifications.

1.018 GUARANTEES

- A. Contractor shall guarantee workmanship, equipment and materials installed under his contract for a period of not less than one (1) year from the date of Substantial Completion. Should any defects occur during this period, the Contractor shall promptly repair or replace the defective item and any other damage caused to the building free of charge to the Owner, including cost of labor and materials.
- B. Guarantee included in this section to cover:
 - 1. Faulty or inadequate design of equipment or material installed
 - 2. Improper assembly or erection
 - 3. Defective workmanship or material
 - 4. Incorrect or inadequate operation or other failure
- C. He shall guarantee the complete and perfect operation of the entire system and that equipment will be supported in such a way as to be free of objectionable vibration and

noise

- D. Furnish the parts and labor to replace any items found to be defective in the refrigeration equipment with the guarantee period
- E. In addition to other guarantees, furnish free maintenance for the refrigeration equipment, including replacement of refrigerant and oil, for a period of one (1) year. This shall include regular monthly maintenance and "On Call" service if required.
- F. For equipment bearing a manufacturer's warranty in excess of one year, furnish a copy of the warranty to the Owner, who shall be named as beneficiary.

1.019 PROTECTION OF EQUIPMENT AND MATERIALS

Provide adequate storage facilities for equipment and materials on the site and shall make provisions to protect such materials and equipment from damage.

1.020 CLOSING-IN OF UNINSPECTED WORK

Contractor shall not allow or cause any of the work, specifically ductwork and piping, to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Should any of work be covered up or enclosed before such inspection and test, he shall at his own expense, uncover the work and after it has been inspected, tested, and approved, make repairs with such materials as may be necessary to restore work to its original and proper condition.

1.021 BUILDING FOOTING CLEARANCES

Under no circumstances shall pipes, ducts, or conduits penetrate footings. They shall cross below footings or through sleeves above footings. Those running parallel to footings shall have the minimum clearance from the cone of influence indicated on the Drawings or as required by Code.

1.022 DAMAGE BY LEAKS

Contractor shall be responsible for all damage to any part of the premises caused by rain leaks through or around ducts or pipes, leaks or breaks in piping, equipment or fixtures furnished or installed by him for a period of one (1) year from the date of Substantial Completion.

1.023 EQUIPMENT LABELS

Equipment provided under this Section shall be provided with the manufacturer's metal identification labels attached to each individual piece of equipment showing complete performance characteristics, size, model and serial number.

1.024 EXCAVATION, TRENCHING AND BACKFILLING

- A. Excavating, trenching and backfilling for utilities within the building area shall be done in conformity with Division 2 - Sitework. Piping shall be installed promptly after excavation in order to keep the trenches open as short a time as possible.
- B. Excavating, trenching and backfilling for utilities outside the building area shall be done in conformity with Division 2 - Site work.
- C. Any existing underground piping and conduit that is encountered shall be properly shored and protected from damage. Active piping shall be left intact and undamaged.

1.025 PRELIMINARY OPERATION

Should the Owner request that any portion of the plant, apparatus, or equipment be operated for the Owner's beneficial use prior to the final completion and acceptance of the work, the Contractor shall conform to Beneficial Occupancy Provisions of the General Conditions. Such operation shall be under the supervision and direction of the Contractor. Such preliminary operation shall not be construed as an acceptance of any of the work.

1.026 MAINTAINING EXISTING SERVICES

- A. The premises and existing building at the site will be in use at the time the work of this Section is in progress. Contractor shall conduct his work so as to cause no inconvenience or danger to the personnel on the premises.
- B. He shall maintain continuity of service to the existing mechanical systems, except for designated intervals during which connections can be made. The scheduling of the shut down period shall be at a time directed by the Architect.
- C. In some instances, it may be necessary to defer work in certain areas and locations until such time as existing facilities can be relocated or rearranged by the Owner. Therefore, whenever it becomes necessary for the Contractor to perform work under this contract in areas in which the Owner's work is being performed. This contractor shall advise the Architect relative to this requirement and shall follow closely the directive issued by the Architect insofar as time and procedure are concerned. Allow Owner 72 hours prior notice.
- D. This contractor shall include in his bid all premium time to which he may be subjected for performing work in such procedure and at such time as may be necessary to cause the least interference with the function of the Owner.

1.027 ELECTRICAL WORK

- A. Coordinate with Division 16 in making the line and low voltage electrical connections and be responsible for the operation of the equipment furnished under this section.
- B. Voltage for electrical work will be included in Division 16. However, any control wiring which is required that is not shown on the control diagram shall be as described under this Section. In the event that the Contractor chooses to provide equipment that requires extra expense in the power or control wiring, he shall pay additional electrical costs.
- C. Safety switches, starters, circuit breakers, unless provided as a portion of package equipment, and the electrical connections of mechanical equipment to the electrical power service shall be provided under Division 16.
- D. Interconnecting wiring, safety switches, relays, controllers and motor starters which are integral components of packaged equipment shall be provided as an integral part of that equipment.
- E. All interconnecting power wiring and conduits shall be provided by Division 16.
- F. Control wiring shall be provided by Division 15, unless otherwise indicated on the drawings.
- G. Conduit for control wiring shall be provided by Division 16.

END OF SECTION

SECTION 15075
MECHANICAL IDENTIFICATION

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Nameplates.
- B. Tags.
- C. Stencils.
- D. Pipe Markers.

1.02 REFERENCE STANDARDS

ASME A13.1 - Scheme for the Identification of Piping Systems; The American Society of Mechanical Engineers; 2007.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions..

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. List: Submit list of wording, symbols, letter size, and color coding for mechanical identification.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Brady Corporation: www.bradycorp.com.
- B. Champion America, Inc: www.Champion-America.com.
- C. Seton Identification Products: www.seton.com/aec.

2.02 NAMEPLATES

Description: Laminated three-layer plastic with engraved letters.

- 1. Letter Color: White.
- 2. Letter Height: 1/4 inch.
- 3. Background Color: Black.

2.03 TAGS

Metal Tags: Brass with stamped letters; tag size minimum 1-1/2 inch diameter with smooth edges.

2.04 STENCILS

- A. Stencils: With clean cut symbols and letters of following size:
 - 1. 3/4 to 1-1/4 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 1/2 inch high letters.

2. 1-1/2 to 2 inch Outside Diameter of Insulation or Pipe: 8 inch long color field, 3/4 inch high letters.
 3. 2-1/2 to 6 inch Outside Diameter of Insulation or Pipe: 12 inch long color field, 1-1/4 inch high letters.
 4. 8 to 10 inch Outside Diameter of Insulation or Pipe: 24 inch long color field, 2-1/2 inch high letters.
 5. Over 10 inch Outside Diameter of Insulation or Pipe: 32 inch long color field, 3-1/2 inch high letters.
 6. Ductwork and Equipment: 2-1/2 inch high letters.
- B. Stencils shall be identified as indicated below including direction of flow
1. Refrigerant Suction Line - R.S.L.
 2. Refrigerant Liquid Line - R.L.L.
 3. Control Compressed Air - C.C.A.
 4. Gravity Condensate - G.C.
 5. Domestic Cold Water - D.C.W.
 6. Domestic Hot Water - D.H.W.
 7. Domestic Hot Water Return - D.H.W.R.
 8. Fire Protection - F.S.
- C. Stencil Paint: As specified in Section 09900, semi-gloss enamel, colors conforming to ASME A13.1.

2.05 PIPE MARKERS

- A. Comply with ASME A13.1.
- B. Underground Plastic Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

PART 3 -- EXECUTION

3.01 PREPARATION

- A. Degrease and clean surfaces to receive adhesive for identification materials.
- B. Prepare surfaces in accordance with Section 09900 for stencil painting.

3.02 INSTALLATION

- A. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive. Apply with sufficient adhesive to ensure permanent adhesion and seal with clear lacquer.
- B. Install plastic pipe markers in accordance with manufacturer's instructions.
- C. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.
- D. Install underground plastic pipe markers 6 to 8 inches below finished grade, directly above buried pipe.

- E. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates. Small devices, such as in-line pumps, may be identified with tags.
- F. Identify control panels and major control components outside panels with plastic nameplates.
- G. Identify thermostats relating to terminal boxes or valves with nameplates.
- H. Identify valves in main and branch piping with tags.
- I. Identify air terminal units and radiator valves with numbered tags.
- J. Tag automatic controls, instruments, and relays. Key to control schematic.
- K. Identify piping, concealed or exposed, with plastic pipe markers. Use tags on piping 3/4 inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and Tee, at each side of penetration of structure or enclosure, and at each obstruction.

*****END OF SECTION*****

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SECTION 15086
DUCT INSULATION

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Duct insulation.
- B. Duct Liner.
- C. Insulation jackets.

1.02 REFERENCE STANDARDS

- A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2007.
- B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric]; 2007.
- C. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2004.
- D. ASTM C 553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2002.
- E. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2004.
- F. ASTM C 1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material); 2005.
- G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2008.
- H. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- I. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.
- J. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; 2003.

1.03 SUBSTITUTIONS

Submit under pertinent provisions of Article 5 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.
- C. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.05 QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept materials on site in original factory packaging, labelled with manufacturer's identification, including product density and thickness.
- B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.
- B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 -- PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

- A. Manufacturer:
 - 1. Johns Manville Corporation: www.jm.com.
 - 2. Owens Corning Corp: www.owenscorning.com.
 - 3. CertainTeed Corporation: www.certainteed.com.
- B. Insulation: ASTM C 553; flexible, noncombustible blanket.
 - 1. 'K' value: 0.25 at 75 degrees F, when tested in accordance with ASTM C 518.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E 96/E 96M.

2.03 GLASS FIBER, RIGID

- A. Manufacturer:
 - 1. Johns Manville Corporation: www.jm.com.
 - 2. Owens Corning Corp: www.owenscorning.com.
 - 3. CertainTeed Corporation: www.certainteed.com.
- B. Insulation: ASTM C 612; rigid, noncombustible blanket.
 - 1. 'K' value: .16 at 75 degrees F, when tested in accordance with ASTM C 518.
- C. Vapor Barrier Jacket:
 - 1. Kraft paper with glass fiber yarn and bonded to aluminized film.
 - 2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E 96/E 96M.

2.04 JACKETS

- A. Canvas Jacket: UL listed 6 oz/sq yd plain weave cotton fabric treated with dilute fire retardant lagging adhesive.
- B. Mineral Fiber (Outdoor) Jacket: Asphalt impregnated and coated sheet, 50 lb/square.
- C. Aluminum Jacket: ASTM B 209 (ASTM B 209M).
 - 1. Thickness: 0.016 inch sheet.

2.05 DUCT LINER

- A. Manufacturers:
 - 1. Johns Manville Corporation: www.jm.com.
 - 2. Owens Corning Corp: www.owenscorning.com.
 - 3. CertainTeed Corporation: www.certainteed.com.
- B. Insulation: Incombustible glass fiber complying with ASTM C 1071; flexible blanket, rigid board, and preformed round liner board; impregnated surface and edges coated with poly vinyl acetate polymer, or acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM G 21.
 - 1. Apparent Thermal Conductivity: Maximum of .24 at 75 degrees F.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Verify that ducts have been tested before applying insulation materials.
- B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install in accordance with NAIMA National Insulation Standards.
- C. Insulated ducts conveying air below ambient temperature:
 - 1. Finish with tape and vapor barrier jacket.
 - 2. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
- D. Insulated ducts conveying air above ambient temperature:
- E. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with with calked aluminum jacket with seams located on bottom side of horizontal duct section.
- F. External Duct Insulation Application:
 - 1. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
 - 2. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
- G. Duct and Plenum Liner Application:
 - 1. Secure insulation with mechanical liner fasteners. Refer to SMACNA HVAC Duct Construction Standards - Metal and Flexible for spacing.

2. Seal and smooth joints. Seal and coat transverse joints.
3. Duct dimensions indicated are net inside dimensions required for air flow. Increase duct size to allow for insulation thickness.

*****END OF SECTION*****

SECTION 15145
PLUMBING PIPING

PART 1 -- GENERAL

1.01 SECTION INCLUDES

Pipe, pipe fittings, valves, and connections for piping systems.

1. Sanitary sewer and vent.
2. Domestic water.
3. Storm water.
4. Natural Gas.

1.02 REFERENCE STANDARDS

- A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems; 1999, and addenda A&B (R2004).
- B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005) (ANSI B16.18).
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005).
- E. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings - DWV; The American Society of Mechanical Engineers; 2002.
- F. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; The American Society of Mechanical Engineers; 2006.
- G. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV; The American Society of Mechanical Engineers; 2001.
- H. ASME B31.1 - Power Piping; The American Society of Mechanical Engineers; 2007 (ANSI/ASME B31.1).
- I. ASME B31.2 - Fuel Gas Piping; The American Society of Mechanical Engineers; 1968.
- J. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2004 (ANSI/ASME B31.9).
- K. ASME (BPV IV) - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; The American Society of Mechanical Engineers; 2007.
- L. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers; 2007.
- M. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.
- N. ASTM A 234/A 234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2007.
- O. ASTM B 32 - Standard Specification for Solder Metal; 2004.
- P. ASTM B 42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2002.

- Q. ASTM B 88 - Standard Specification for Seamless Copper Water Tube; 2003.
- R. ASTM B 88M - Standard Specification for Seamless Copper Water Tube (Metric); 2005.
- S. ASTM C 425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings; 2004.
- T. ASTM C 564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings; 2003a.
- U. ASTM D 1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2006.
- V. ASTM D 2239 - Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter; 2003.
- W. ASTM D 2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2004.
- X. ASTM D 2661 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) Schedule 40 Plastic Drain, Waste, and Vent Pipe and Fittings; 2008.
- Y. ASTM D 2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 2008.
- Z. AWS A5.8/A5.8M - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; 2004 and errata.
- AA. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; American Water Works Association; 2005 (ANSI/AWWA C105/A21.5).
- AB. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; Cast Iron Soil Pipe Institute; 2005.
- AC. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; Cast Iron Soil Pipe Institute; 2004.
- AD. MSS SP-67 - Butterfly Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc.; 2002a.
- AE. NFPA 54 - National Fuel Gas Code; National Fire Protection Association; 2006.
- AF. ASME - Boiler and Pressure Vessel Code
- AG. AGA - American Gas Association Code

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.
- C. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with State of California, standards.
 - 1. Maintain one copy on project site.

- B. Valves: Manufacturer's name and pressure rating marked on valve body.
- C. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.
- D. Welder Qualifications: Certified in accordance with ASME (BPV IX).
- E. Identify pipe with marking including size, ASTM material classification, ASTM specification, potable water certification, water pressure rating.

1.06 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with State of California plumbing code.
- B. Conform to applicable code for installation of backflow prevention devices.
- C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 -- PRODUCTS

2.01 SANITARY SEWER PIPING, ABOVE GRADE

Cast Iron Pipe: CISPI 301, hubless, service weight.

- 1. Fittings: Cast iron.
- 2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

2.02 WATER PIPING, ABOVE GRADE

Copper Tube: ASTM B 88 (ASTM B 88M), Type K (A), Drawn (H).

- 1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
- 2. Joints: ASTM B 32, alloy Sn95 solder.

2.03 FLANGES, UNIONS, AND COUPLINGS

Unions for Pipe Sizes 3 Inches and Under:

- 1. Copper tube and pipe: Class 150 bronze unions with soldered joints.

2.04 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Drain, Waste, and Vent:

- 1. Conform to ASME B31.9.
- 2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

B. Plumbing Piping - Water:

1. Conform to ASME B31.9.

2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Malleable iron, adjustable swivel, split ring.

3. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.

4. Hangers for Hot Pipe Sizes 2 Inches to 4 Inches: Carbon steel, adjustable, clevis.

2.05 GLOBE VALVES

Manufacturers:

1. Nibco, Inc: www.nibco.com.

2. Milwaukee Valve Company: www.milwaukeevalve.com.

3. Stockham: www.stockham.com

4. Substitutions: See Section 01600 - Product Requirements.

2.06 BALL VALVES

Manufacturers:

1. Nibco, Inc: www.nibco.com.

2. Milwaukee Valve Company: www.milwaukeevalve.com.

3. Stockham: www.stockham.com

2.07 BUTTERFLY VALVES

A. Manufacturers:

1. Hammond Valve: www.hammondvalve.com.

2. Crane Co.: www.cranevalve.com.

3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Construction 1-1/2 Inches and Larger: MSS SP-67, 200 psi CWP, cast or ductile iron body, nickel-plated ductile iron disc, resilient replaceable EPDM seat, wafer ends, extended neck, 10 position lever handle.

C. Provide gear operators for valves 8 inches and larger, and chain-wheel operators for valves mounted over 8 feet above floor.

2.08 FLOW CONTROLS

A. Manufacturers:

1. ITT Bell & Gossett: www.bellgossett.com.

2. Griswold Controls: www.griswoldcontrols.com.

3. Taco, Inc: www.taco-hvac.com.

B. Construction: Class 125, Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet, blowdown/backflush drain.

C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure

3.5 psi psi.

2.09 SPRING LOADED CHECK VALVES

A. Manufacturers:

1. Hammond Valve: www.hammondvalve.com.
2. Crane Co.: www.cranevalve.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.

B. Class 125, iron body, bronze trim, stainless steel springs, bronze disc, Buna N seals, wafer style ends.

2.010 WATER PRESSURE REDUCING VALVES

Manufacturers:

1. Wilkins Water Control Products: www.zurn.com.
2. Cla-Val Co: www.cla-val.com.
3. Watts Regulator Company: www.wattsregulator.com.

2.011 RELIEF VALVES

A. Pressure Relief:

1. Manufacturers:

- a. Cla-Val Co: www.cla-val.com.
- b. Henry Technologies: www.henrytech.com.
- c. Watts Regulator Company: www.wattsregulator.com.

2. AGA Z21.22 certified, bronze body, teflon seat, steel stem and springs, automatic, direct pressure actuated.

B. Temperature and Pressure Relief:

1. AGA Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F, capacity ASME (BPV IV) certified and labelled.

PART 3 -- EXECUTION

3.01 EXAMINATION

Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

- C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- D. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 15122.
- G. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08710.
- H. Install valves with stems upright or horizontal, not inverted.
- I. Install water piping to ASME B31.9.
- J. Pipe Hangers and Supports:
 - 1. Install in accordance with ASME B31.9.
 - 2. Support horizontal piping as scheduled.
 - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
 - 4. Place hangers within 12 inches of each horizontal elbow.
 - 5. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

3.04 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install globe valves for throttling, bypass, or manual flow control services.
- C. Provide spring loaded check valves on discharge of water pumps.

3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

Prior to starting work, verify system is complete, flushed and clean.

3.06 SERVICE CONNECTIONS

- A. Provide new sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.
- B. Provide new water service complete with approved reduced pressure backflow preventer and water meter with by-pass valves, pressure reducing valve, and sand strainer.
- C. Provide new gas service complete with gas meter and regulators. Gas service distribution piping to have initial minimum pressure of 7 inch wg. Provide regulators on each line serving gravity type appliances, sized in accordance with equipment.

*****END OF SECTION*****

SECTION 15146
PLUMBING SPECIALTIES

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Cleanouts.
- B. Hose bibbs.
- C. Backflow preventers.
- D. Water hammer arrestors.
- E. Thermostatic mixing valves.

1.02 REFERENCE STANDARDS

- A. ASME A112.6.3 - Floor and Trench Drains; The American Society of Mechanical Engineers; 2001 (R2007).
- B. ASSE 1011 - *Hose Connection Vacuum Breakers*; American Society of Sanitary Engineering; 2004 (ANSI/ASSE 1011).
- C. ASSE 1012 - *Backflow Preventer with Intermediate Atmospheric Vent*; American Society of Sanitary Engineering; 2002 (ANSI/ASSE 1012).
- D. ASSE 1013 - *Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers*; American Society of Sanitary Engineering; 2005.
- E. ASSE 1019 - *Vacuum Breaker Wall Hydrants, Freeze Resistant Automatic Draining Type*; American Society of Sanitary Engineering; 2004, and Errata 2005 (ANSI/ASSE 1019).
- F. PDI-WH 201 - *Water Hammer Arresters*; Plumbing and Drainage Institute; 2006.

1.03 SUBSTITUTIONS

Substitutions will be considered per article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Certificates: Certify that oil interceptors meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than three years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

Accept specialties on site in original factory packaging. Inspect for damage.

PART 2 -- PRODUCTS

2.01 DRAINS

Manufacturers:

1. Josam Company: www.josam.com.
2. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
3. Zurn Industries, Inc: www.zurn.com.

2.02 CLEANOUTS

Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Josam Company: www.josam.com.
3. Zurn Industries, Inc: www.zurn.com.

2.03 WATER HAMMER ARRESTORS

Manufacturers:

1. Precision Plumbing Products: www.pppinc.com.
2. Watts Regulator Company: www.wattsregulator.com.
3. Zurn Industries, Inc: www.zurn.com.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
- C. Install floor cleanouts at elevation to accommodate finished floor.
- D. Install approved portable water protection devices on plumbing lines where contamination of domestic water may occur; on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibbs.
- E. Pipe relief from backflow preventer to nearest drain.

*****END OF SECTION*****

SECTION 15300
FIRE PROTECTION SYSTEM

PART 1 -- GENERAL

1.01 DESCRIPTION

- A. Furnish all tools, labor, materials and equipment and perform all operations in connection with the Fire Protection Work, complete as indicated and specified.
- B. Work Included:
 - 1. General requirements, general materials, equipment and installation shall be as herein after specified in Section 15010, Mechanical Scope and General Requirements and Materials and Installation, insofar as same are applicable to the work of this Section.
 - 2. The fire service and automatic fire sprinkler system minimally consists of detector check meters, piping, valves, alarm valve assemblies, fire sprinkler heads, fire department connections, hangers, sway bracing and other equipment herein specified.
 - 3. Materials, equipment and installation, as specified in this Section for the Fire Protection System, shall take precedence over that elsewhere specified.
 - 4. This specification represents the County's minimum requirements for a complete, proper, approved and operating Fire Protection System. Contractor shall be responsible for a design-build Fire Protection System including compliance with all applicable codes and requirements of the agency having jurisdiction (County of Riverside Fire Dept). Contractor to create required drawings and submit to the agency having jurisdiction for plan check and approval and shall acquire a permit and perform all installation, coordination, inspections and testing, as well as provide all materials and services necessary for a complete, approved and operational Fire Protection System.
 - 5. Other materials, equipment and installation shall be as herein specified.
 - 6. The automatic fire sprinkler system shall be designed and installed complying with NFPA 13 occupancy requirements. Nothing in these Specifications is to be construed to permit work in violation of the Standard.

1.02 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Three (3) copies of operating and maintenance manuals for systems specified in this Section shall be delivered to the Owner.
- B. The Contractor shall instruct the Owner's Representative who will operate the system, about the operation and maintenance of the equipment.
- C. An affidavit by the Owner's Representative certifying that the above requirements have been complied with shall be submitted to the Architect.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- PRODUCTS

2.01 MATERIALS AND EQUIPMENT OF EQUAL MANUFACTURER

In addition to manufacturers specified, the following shall also be considered equal, provided corresponding models meet specification requirements. The equivalent equipment names shall be submitted to the Architect for approval.

1. Detector Check: Hersey.
2. Valves: Mueller, Stockham, Kennedy, Nibco, Jenkins.
3. Fire Dept. Connections: Potter-Roemer, Grinnell, and Sierra.
4. Alarm Valve Assemblies: Grinnell, Viking, Globe.
5. Pressure Gauges: Potter-Roemer, Grinnell.
6. Access Boxes: Brooks, Christy.
7. Sprinkler Heads: FlexHead (800) 829-6975.
8. Pipe Markers: Brady, Standard.
9. Tamper Switch: Potter-Roemer.
10. Flow Switches: Potter-Roemer.

2.02 MATERIALS

A. Piping:

1. In Building: Schedule 40 black pipe with 125# black banded cast iron screwed fittings and couplings. At Contractor's option, piping may be Schedule 40 black steel grooved pipe with Victaulic U.L. listed black grooved fittings and Victaulic No 77 U.L. listed malleable iron couplings with Grade H white gasket. Thin wall steel piping shall not be used.
2. Outside Building - Below Ground: PVC (polyvinyl chloride pipe), Type I, Grade Class 315, SDR 14, 2DD psi working pressure at 73 degrees F meeting ASTM D2241. Pipe shall be U.L. and State Fire Marshal approved and installed in accordance with AWWA C900 PVC plastic fittings and couplings.

B. Pipe Hangers, Supports and Attachments:

1. Pipe Hangers: U.L. listed complying with N.F.P.A. Standard No.13.
2. Pipe Sway Bracing: Complying with N.F.P.A. Standard No.13.
3. Powder actuated tools shall not be used.
4. Steel construction fireproofing damaged by the pipe hanger attachment installation shall be repaired as approved by the Architect.

C. Valves:

1. Building Installed Shut-Off Valves: Mueller A-2073-6, 17511-flanged I.B.B.M., U.L. listed gate valve with double disc and O.S.&Y.
2. Post Indicator Valves:
 - a. Valve: Mueller A-2052-6, 175# flanged I.B.B.M., U.L. listed gate valve with double disc, inside screw, N.R.S. and indicator post flanged.
 - b. Post Indicator: Mueller A-20801 U.L. listed assembly with cast iron body, telescopic barrel with bottom flanged for bolting to valve indicator post flange, locking device and operating wrench; assembly shall be painted in accordance with the requirements of the Fire Department.
3. Check Valves: Mueller A-212D-6, 175# flanged I.B.B.M., U.L. listed valve with bolted bonnet. Wafer type check valve shall not be used.

4. Globe Valves: Nibco T-211-Y, 200# W.O.G. screwed all bronze valves with screwed bonnet and renewable Teflon disc.
 5. Angle Valves: Nibco T-311-Y, 200# W.D.G. screwed all bronze valves with screwed bonnet and renewable Teflon disc.
 6. Detector Check Assembly: Hersey Model DDC 11 unit with automatic lever check valves, 3/4" by-pass disc meter and two I.B.B.M., O.S. & Y. flanged gate valves, the entire assembly shall be U.L. listed.
 7. Concrete Vault:
 - a. Brooks 900 Series size as indicated on the drawings, open bottom vault with 6" thick walls assembled at the site. Asphalt coated inside and out.
 - b. Rebar sizes and arrangement shall be as indicated on Brooks Drawing 900-673.
 - c. Knockouts shall be provided as required for the piping installation.
 - d. Top of vault shall be provided with galvanized armor to receive 3/8" thick galvanized floor plate; floor plate shall be furnished in three sections, shall be provided with lift holes and shall be bolted down.
 - e. Vault shall be set with finished gate.
- D. Fire Department Connections:
1. Potter-Roemer No.5763 UL Listed cast brass body with drop clappers unit with two (2) 2-112" inlets and one (1) 6" outlet and two (2) chained brass pin plugs. Polished brass plate with the letters "AUTO SPRINKLER" in it. Overall height 24".
- E. Alarm Valve Assembly: Potter-Roemer No.6200 Series tamper proof switch. Housing with flow paddle.
- F. Accessories:
1. Pressure Gauges: Potter-Roemer No.6240, U.L. listed gauge with 3-1/2" diameter polished brass case and glass protected dial with 0 psi. to 300 psi. pressure range.
 2. Access Boxes: Brooks No. 3-RT open bottom concrete box with cast iron frame and cover with the word "SPRINKLERS" cast in cover.
- G. Fire Sprinkler Heads:
- 2.01 FlexHead U.L. listed fusible link type heads with 165 degrees F. ordinary rating, unless otherwise required by the Fire Department or authorities having jurisdiction.
 - 2.02 Rooms with Finished Ceilings: "Duraspeed" recessed plate pendent head; both head and plate furnished in plain finish.
 - 2.03 Attic: "Duraspeed" pendent and upright heads furnished in plain finish.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Examine the areas and conditions under which work of this Section will be performed.
- B. Correct conditions detrimental to timely and proper completion of the Work.
- C. Do not proceed until unsatisfactory conditions are corrected.

D. Beginning of installation means acceptance of conditions.

3.02 INSTALLATION

- A. The Contractor shall do all necessary excavation, shoring and backfilling required for the proper installation of buried pipelines and related material and equipment.
- B. The Contractor shall maintain temporary barricades, warning lights, covers, railings and other protection or warning devices while the trenches are open.
- C. Piping installation and trench backfilling shall be done promptly after the trenching has been completed in order to keep the trenches open as short a time as possible; however, no backfilling will be permitted until the piping installation has been reviewed by the Fire Department for compliance with the Contract Documents. Piping shall be buried below the freezing line.
- D. Upon completion of the work, the Contractor shall remove from the premises all surplus material, rubbish and debris resulting from his operation. The premises shall be left in a clean and neat condition.
- E. Pipelines shall be constructed of full-length sections of specified pipe except where length of run is less than full pipe length.
- F. Unless otherwise indicated or required, piping shall be concealed in finished portions of the buildings.
- G. Unless otherwise hereinafter specified, polished chrome plated cast brass hinged split flanged escutcheons with setscrew shall be provided at all points where pipes pierce finished surfaces.
- H. Unless specifically approved by the Architect, piping shall clear beams, columns, and other structural members.
- I. Pipe size reductions shall be made with reducing fittings. Unless specifically approved by the Architect, bushings shall not be used.
- J. Welding saddles may be used for branch pipes two pipe sizes smaller than main pipe; however, for cross configuration, welding saddles may be used for branch pipes three pipe sizes smaller than main pipe.
- K. Close nipples and street elbows shall not be used.
- L. A certified welder shall perform pipe welding; a laboratory approved by the Architect shall issue certificate.
- M. Fire sprinkler heads shall be located in straight lines parallel to the walls.
- N. Fire sprinkler heads shall be located not less than 12 inches from the ceiling T-Bars
- O. Concrete paving shall be cut with saw; concrete walls and floors shall be cored.
- P. Underground piping shall be installed as follows:
 - 1. Trenches shall be not less than 12 inches wider than the greatest diameter of the pipe.
 - 2. Bottom of the trenches, 36" minimum, shall be excavated to a depth of three inches (3") below the bottom of the piping, and the space shall be filled with three inch (3") deep layer of clean sand which shall be well tamped.
 - 3. Upon installation of the piping, the pipe shall be covered with three-inch (3") deep layer of clean sand, which shall be well tamped.
 - 4. Should it be required to lay pipe on fill, the fill shall be first compacted as specified in Section 02223.

- Q. Trench backfilling shall be done as required by Section 02223.
- R. Clamps and/or concrete thrust blocks shall be provided at dead ends, bends, tees or other points where separation and/or change of direction might occur in cast iron piping, or polyvinyl chloride piping. Thrust block sizes shall be sized, using Manville "Transite Ring-Tite" Pressure Pipe Installation Guide Book for Class 150 pipe, 200 psi. pressure and 2,000-lb./sq. ft. soil bearing capacity.
- S. Buried valves shall be anchored with two 5/8" inverted U-type bent anchor rods imbedded in concrete
- T. Flanged connections below ground shall be made with stainless steel bolts, nuts and washers.
- U. Access boxes shall be set flush with finished grade.
- V. Main piping shall be flushed in compliance with N.F.P.A. Standard No.24.
- W. Pipe flushing and test shall be witnessed by the Fire Department.
- X. The Fire Department shall be notified forty-eight (48) hours prior to the schedule flushing and testing.
- Y. Shop drawings of the entire automatic fire sprinkler system approved by the Fire Department shall be submitted to the Architect for review prior to the Start of Construction; after the Architect's Review, the shop drawings shall be submitted for approval to the State Fire Marshal. The approved shop drawings shall become an integral part of the Contract Document.
- Z. Prior to preparation of the shop drawings, the Contractor shall coordinate his work with work of other sections especially the ductwork and lighting.
- AA. The Contractor shall deliver to the Architect record drawings as specified in Section 01700.

3.03 PIPING IDENTIFICATION

- A. All exposed piping and all piping above the T-Bar ceiling shall be identified with Brady B-500 vinyl cloth pressure sensitive markers secured in place with 3/4" wide vinyl cloth pressure sensitive tape wrapped around the pipe one complete turn.
- B. Pipe markers shall be applied to a dry and clean surface.
- C. Pipe markers shall have the words "FIRE SPRINKLER" with white letters on red background.
- D. Pipe markers shall be provided not more than three feet (3') from the following:
 - 1. Tee (all three sides)
 - 2. Wall
- E. Pipe markers shall be spaced not more than fifteen feet (15') apart measured along the pipe run.
- F. Flow direction arrows of the same material and color, as the pipe markers shall be provided downstream of and adjacent to all pipe markers.
- G. Pipe markers shall be readily visible to a person standing on the floor in normal access space to the piping.

3.04 TEST

Piping shall be tested hydrostatically under 200 psi. pressure for not less than two (2) hours

*** END OF SECTION ***

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SECTION 15410
PLUMBING FIXTURES

PART 1 -- GENERAL

1.01 REFERENCE STANDARDS

- A. ANSI Z124.2 - American National Standard for Plastic Shower Units; 1995.
- B. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; The American Society of Mechanical Engineers; 1997 (Reaffirmed 2002).
- C. ASME A112.18.1 - Plumbing Supply Fittings; The American Society of Mechanical Engineers; 2005.
- D. ASME A112.19.1M - Enameled Cast Iron Plumbing Fixtures; The American Society of Mechanical Engineers; 1994 (R2004).
- E. ASME A112.19.2 - Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals; The American Society of Mechanical Engineers; 2003.
- F. ASME A112.19.3 - Stainless Steel Plumbing Fixtures (Designed for Residential Use); The American Society of Mechanical Engineers; 2001 (R2004).
- G. ASME A112.19.4M - Porcelain Enameled Formed Steel Plumbing Fixtures; The American Society of Mechanical Engineers; 1994 (R2004).

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- C. Samples: Submit two lavatory supply fittings.
- D. Manufacturer's Instructions: Indicate installation methods and procedures.
- E. Maintenance Data: Include fixture trim exploded view and replacement parts lists.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.05 REGULATORY REQUIREMENTS

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept fixtures on site in factory packaging. Inspect for damage.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 WARRANTY

- A. See Section 01800- Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for electric water cooler.

PART 2 -- PRODUCTS

2.01 SEE PLUMBING DRAWINGS FOR FIXTURE SPECIFICATIONS

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.
- B. Verify that electric power is available and of the correct characteristics.
- C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

- A. Install each fixture with trap, easily removable for servicing and cleaning.
- B. Install components level and plumb.
- C. Install and secure fixtures in place with wall carriers and bolts.
- D. Seal fixtures to wall and floor surfaces with sealant as specified in Section 07900, color to match fixture.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

3.05 ADJUSTING

Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

Clean plumbing fixtures and equipment.

3.07 PROTECTION

- A. Protect installed products from damage due to subsequent construction operations.
- B. Do not permit use of fixtures by construction personnel.
- C. Repair or replace damaged products before Date of Substantial Completion.

*****END OF SECTION*****

SECTION 15430
PLUMBING EQUIPMENT

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Water Heaters.

1.02 REFERENCE STANDARDS

- A. ANSI Z21.10.1 - Gas Water Heaters - Volume I - Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less; 2004 (with Addendum B).
- B. ANSI Z21.10.3 - Gas Water Heaters - Volume III - Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous Water Heaters; 2004.
- C. UL 174 - Standard for Household Electric Storage Tank Water Heaters; Underwriters Laboratories Inc.; 2004.
- D. UL 1453 - Standard for Electric Booster and Commercial Storage Tank Water Heaters; Underwriters Laboratories Inc.; 2004.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions..

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data:
 - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.
 - 2. Indicate pump type, capacity, power requirements.
 - 3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
 - 4. Provide electrical characteristics and connection requirements.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.

1.06 CERTIFICATIONS

- A. Water Heaters: NSF approved.
- B. Gas Water Heaters: Certified by CSA International to ANSI Z21.10.1 or ANSI Z21.10.3, as applicable.
- C. Electric Water Heaters: UL listed and labeled to UL 174 or UL 1453.
- D. Products Requiring Electrical Connection: Listed and classified by Underwriters

Laboratories Inc., as suitable for the purpose specified and indicated.

1.07 WARRANTY

- A. See Section 01800 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year manufacturer warranty for domestic water heaters.

PART 2 -- PRODUCTS

2.01 POINT OF USE WATER HEATER MANUFACTURERS

- A. Chronomite Tankless Water Heaters: www.chronomite.com.
- B. Stiebel Eltron Water Heaters: www.stiebel-eltron-usa.com.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related fuel piping work to achieve operating system.
- C. Domestic Water Storage Tanks:
 - 1. Provide steel pipe support, independent of building structural framing members.
 - 2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

*****END OF SECTION*****

SECTION 15810

DUCTS

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Metal ductwork.
- B. Nonmetal ductwork.
- C. Casing and plenums.
- D. Duct cleaning.

1.02 REFERENCE STANDARDS

- A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel; 2005.
- B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2007.
- C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2002.
- D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association; 2006.
- E. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association; 2008.
- F. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association; 1985, First Edition.
- G. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.
- H. SMACNA (FGD) - Fibrous Glass Duct Construction Standards; Sheet Metal and Air Conditioning Contractors' National Association; 2003.
- I. UL 181 - Standard for Factory-Made Air Ducts and Air Connectors; Underwriters Laboratories Inc.; 2005.

1.03 PERFORMANCE REQUIREMENTS

No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.04 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.05 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.06 REGULATORY REQUIREMENTS

Construct ductwork to NFPA 90A standards.

1.07 FIELD CONDITIONS

- A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.
- B. Maintain temperatures within acceptable range during and after installation of duct sealants.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Galvanized Steel Ducts: Hot-dipped galvanized steel sheet, ASTM A 653/A 653M FS Type B, with G60/Z180 coating.
- B. Flexible Ducts:
 - 1 UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire.
 - a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - b. Maximum Velocity: 4000 fpm.
 - c. Temperature Range: -20 degrees F to 210 degrees F.
- C. Insulated Flexible Ducts:
 - 1 UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring steel wire; fiberglass insulation; polyethylene vapor barrier film.
 - a. Pressure Rating: 10 inches WG positive and 1.0 inches WG negative.
 - b. Maximum Velocity: 4000 fpm.
 - c. Temperature Range: -20 degrees F to 210 degrees F.
- D. Joint Sealers and Sealants: Non-hardening, water resistant, mildew and mold resistant.
 - 1 Type: Heavy mastic or liquid used alone or with tape, suitable for joint configuration and compatible with substrates, and recommended by manufacturer for pressure class of ducts.
 - 2 VOC Content: Not more than 250 g/L, excluding water.
 - 3 Surface Burning Characteristics: Flame spread of zero, smoke developed of zero, when tested in accordance with ASTM E 84.
- E. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.02 DUCTWORK FABRICATION

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows must be used, provide air foil turning vanes. Where acoustical lining is indicated, provide turning vanes of perforated metal with glass fiber insulation.

- C. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
- D. Provide standard 45 degree lateral wye takeoffs unless otherwise indicated where 90 degree conical tee connections may be used.
- E. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.03 DUCT MANUFACTURERS

- A. Metal-Fab, Inc: www.mtffab.com.
- B. SEMCO Incorporated: www.semcoinc.com.
- C. United McGill Corporation: www.unitedmcgill.com.

2.04 MANUFACTURED METAL DUCTWORK AND FITTINGS

Manufacture in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

2.05 CASINGS

- A. Fabricate casings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and construct for operating pressures indicated.
- B. Mount floor mounted casings on 4 inch high concrete curbs. At floor, rivet panels on 8 inch centers to angles. Where floors are acoustically insulated, provide liner of 18 gage galvanized expanded metal mesh supported at 12 inch centers, turned up 12 inches at sides with sheet metal shields.
- C. Fabricate acoustic casings with reinforcing turned inward. Provide 16 gage back facing and 22 gage perforated front facing with 3/32 inch diameter holes on 5/32 inch centers. Construct panels 3 inches thick packed with 4.5 lb/cu ft minimum glass fiber media, on inverted channels of 16 gage.

2.06 FIBROUS GLASS DUCTS

- A. Fabricate in accordance with SMACNA Fibrous Glass Duct Construction Standards, except as indicated.
- B. Machine fabricate fibrous glass ducts and fittings. Make only minor on site manual adjustments.
- C. Staple duct joints and tape with 3 inch wide 2 mil thick or 2 inch wide 3 mil thick aluminum pressure sensitive tape, UL approved.
- D. Do not use fibrous glass ducts within 12 inches of electric or fuel fired heaters.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

- C. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
- D. Install fibrous glass ducts in accordance with SMACNA Fibrous Glass Duct Construction Standards. Obtain manufacturer's inspection and acceptance of fabrication and installation at beginning of installation.
- E. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
- F. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
- H. Use double nuts and lock washers on threaded rod supports.
- I. Connect terminal units to supply ducts with one foot maximum length of flexible duct. Do not use flexible duct to change direction.
- J. Connect diffusers or light troffer boots to low pressure ducts with 7 feet maximum length of flexible duct held in place with strap or clamp.
- K. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- L. At exterior wall louvers, seal duct to louver frame and install blank-out panels.

3.02 CLEANING

Clean duct system and force air at high velocity through duct to remove accumulated dust. To obtain sufficient air, clean half the system at a time. Protect equipment that could be harmed by excessive dirt with temporary filters, or bypass during cleaning.

3.03 SCHEDULES

A. Ductwork Material:

- 1 Low Pressure Supply (Heating Systems): Steel, Aluminum, Fibrous Glass.
- 2 Low Pressure Supply (System with Cooling Coils): Steel, Aluminum, Fibrous Glass.
- 3 Return and Relief: Steel, Aluminum.
- 4 General Exhaust: Steel, Aluminum.
- 5 Kitchen Hood Exhaust: Steel, Stainless Steel.
- 6 Outside Air Intake: Steel.
- 7 Combustion Air: Steel.
- 8 Evaporative Condenser Intake and Exhaust: Steel.
- 9 Emergency Generation Ventilation: Steel.

B. Ductwork Pressure Class:

- 1 Supply (Heating Systems): 1/2 inch
- 2 Supply (System with Cooling Coils): 1/2 inch.

- 3 Return and Relief: 1/2 inch.
- 4 Outside Air Intake: 1/2 inch.
- 5 Combustion Air: 1/2 inch.
- 6 Emergency Generation Ventilation: 1/2 inch

*****END OF SECTION*****

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SECTION 15820
DUCT ACCESSORIES

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Air turning devices/extractors.
- B. Backdraft dampers.
- C. Combination fire and smoke dampers.
- D. Duct access doors.
- E. Duct test holes.
- F. Fire dampers.
- G. Flexible duct connections.
- H. Smoke dampers.
- I. Volume control dampers.

1.02 REFERENCE STANDARDS

- A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association; 2002.
- B. NFPA 92A - Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences; 2006.
- C. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.
- D. UL 33 - Heat Responsive Links for Fire-Protection Service; Underwriters Laboratories Inc.; 2003.
- E. UL 555 - Standard for Fire Dampers; Underwriters Laboratories Inc.; 2006.
- F. UL 555S - Standard for Leakage Rated Dampers for Use in Smoke Control Systems; Underwriters Laboratories Inc.; 1999.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide for shop fabricated assemblies including volume control dampers, duct access doors, and hardware used. Include electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions: Provide instructions for fire dampers and combination fire and smoke dampers.

1.05 QUALITY ASSURANCE

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

RIVERSIDE CENTRE: 5TH FLOOR RENOVATION PROJECT
COUNTY OF RIVERSIDE
ECONOMIC DEVELOPMENT AGENCY

SECTION - 15820 DUCT ACCESSORIES

1 OF 4

Protect dampers from damage to operating linkages and blades.

PART 2 -- PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

A. Manufacturers:

- 1 Krueger: www.krueger-hvac.com.
- 2 PCI Industries, Inc; Pottorff Brand: www.portorff.com.
- 3 Ruskin Company: www.ruskin.com.
- 4 Titus: www.titus-hvac.com.

B. Multi-blade device with radius blades attached to pivoting frame and bracket, steel construction, with worm drive mechanism with removable key operator.

2.02 BACKDRAFT DAMPERS

A. Manufacturers:

- 1 Louvers & Dampers, Inc: www.louvers-dampers.com.
- 2 Nailor Industries Inc: www.nailor.com.
- 3 PCI Industries, Inc; Pottorff Brand: www.portorff.com.
- 4 Ruskin Company: www.ruskin.com.

B. Gravity Backdraft Dampers, Size 18 x 18 inches or Smaller, Furnished with Air Moving Equipment: Air moving equipment manufacturer's standard construction.

2.03 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:

- 1 PCI Industries, Inc; Pottorff Brand: www.portorff.com.
- 2 Ruskin Company: www.ruskin.com.

B. Fabricate in accordance with NFPA 90A, UL 555, UL 555S, and as indicated.

C. Provide factory sleeve and collar for each damper.

D. Operators: UL listed and labelled spring return electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. Locate damper operator on interior of duct and link to damper operating shaft.

2.04 DUCT ACCESS DOORS

A. Manufacturers:

- 1 Nailor Industries Inc: www.nailor.com.
- 2 Ruskin Company: www.ruskin.com.
- 3 SEMCO Incorporated: www.semcoinc.com.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

2.05 DUCT TEST HOLES

Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs,

threaded plugs, or threaded or twist-on metal caps.

2.06 FIRE DAMPERS

A. Manufacturers:

- 1 PCI Industries, Inc; Pottorff Brand: www.pottorff.com.
- 2 Ruskin Company: www.ruskin.com.

B. Fabricate in accordance with NFPA 90A and UL 555, and as indicated.

C. Ceiling Dampers: Galvanized steel, 22 gage frame and 16 gage flap, two layers 0.125 inch ceramic fiber on top side and one layer on bottom side for round flaps, with locking clip.

D. Horizontal Dampers: Galvanized steel, 22 gage frame, stainless steel closure spring, and lightweight, heat retardant non-asbestos fabric blanket.

E. Fusible Links: UL 33, separate at 160 degrees F with adjustable link straps for combination fire/balancing dampers.

2.07 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Flexible Duct Connections: Fabric crimped into metal edging strip.

2.08 SMOKE DAMPERS

A. Manufacturers:

- 1 PCI Industries, Inc; Pottorff Brand: www.pottorff.com.
- 2 Ruskin Company: www.ruskin.com.

B. Fabricate in accordance with NFPA 90A and UL 555S, and as indicated.

2.09 VOLUME CONTROL DAMPERS

A. Manufacturers:

- 1 Louvers & Dampers, Inc: www.louvers-dampers.com.
- 2 Nailor Industries Inc: www.nailor.com.
- 3 PCI Industries, Inc; Pottorff Brand: www.pottorff.com.
- 4 Ruskin Company: www.ruskin.com.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

D. Quadrants:

- 1 Provide locking, indicating quadrant regulators on single and multi-blade dampers.
- 2 On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
- 3 Where rod lengths exceed 30 inches provide regulator at both ends.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 15810 for duct construction and pressure class.
- B. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.
- C. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, combination fire and smoke dampers, and elsewhere as indicated. Provide for cleaning kitchen exhaust ducts in accordance with NFPA 96. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated. Provide 4 x 4 inch for balancing dampers only. Review locations prior to fabrication.
- D. Provide duct test holes where indicated and required for testing and balancing purposes.
- E. Provide fire dampers, combination fire and smoke dampers, and smoke dampers at locations indicated, where ducts and outlets pass through fire rated components, and where required by authorities having jurisdiction. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- F. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92A.
- G. Demonstrate re-setting of fire dampers to Owner's representative.
- H. At fans and motorized equipment associated with ducts, provide flexible duct connections immediately adjacent to the equipment.
- I. At equipment supported by vibration isolators, provide flexible duct connections immediately adjacent to the equipment; see Section 15072.
- J. Provide balancing dampers on duct take-off to diffusers, grilles, and registers, regardless of whether dampers are specified as part of the diffuser, grille, or register assembly.

*****END OF SECTION*****

SECTION 15850
AIR OUTLETS AND INLETS

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Diffusers.
- B. Registers/grilles.
- C. Door grilles.
- D. Louvers.

1.02 REFERENCE STANDARDS

- A. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc.; 2007.
- B. ARI 890 - Standard for Air Diffusers and Air Diffuser Assemblies; Air-Conditioning and Refrigeration Institute; 2001.
- C. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.; 2006.
- D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association; 2005.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.05 QUALITY ASSURANCE

Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Krueger; www.krueger-hvac.com.
- B. Titus; www.titus-hvac.com.

2.02 RECTANGULAR CEILING DIFFUSERS

- A. Type: Square and rectangular, adjustable pattern, multi-louvered diffuser to discharge air in 360 degree pattern with sectorizing baffles where indicated.
- B. Frame: Surface mount type. In plaster ceilings, provide plaster frame and ceiling frame.
- C. Fabrication: Aluminum with baked enamel off-white finish.

2.03 CEILING SUPPLY REGISTERS/GRILLES

- A. Type: Streamlined and individually adjustable curved blades to discharge air along face of grille, two-way deflection.
- B. Frame: 1 inch margin with countersunk screw mounting and gasket.
- C. Fabrication: Aluminum extrusions with factory off-white enamel finish.
- D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face.

2.04 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

- A. Type: Streamlined blades, 3/4 inch minimum depth, 3/4 inch maximum spacing, with blades set at 45 degrees, vertical face.
- B. Frame: 1 inch margin with countersunk screw mounting.
- C. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

2.05 DOOR GRILLES

- A. Type: V-shaped louvers of 20 gage thick steel, 1 inch deep on 1/2 inch centers.
- B. Frame: 20 gage steel with auxiliary frame to give finished appearance on both sides of door, with factory prime coat finish.

2.06 LOUVERS

- A. Type: 4 inch deep with blades on 45 degree slope with center baffle and return bend, heavy channel frame, 1/2 inch square mesh screen over exhaust and 1/2 inch square mesh screen over intake.
- B. Fabrication: 12 gage thick extruded aluminum, welded assembly, with factory prime coat finish color to be selected.
- C. Mounting: Furnish with interior flat flange for installation.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- C. Install diffusers to ductwork with air tight connection.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

*****END OF SECTION*****

SECTION 15928
INSTRUMENTS AND CONTROL ELEMENTS

PART 1 -- GENERAL

1.01 SECTION INCLUDES

- A. Thermostats.
- B. Automatic dampers.
- C. Damper operators.
- D. Time clocks.
- E. Miscellaneous accessories.

1.02 REFERENCE STANDARDS

- A. AMCA 500-D - Laboratory Methods for Testing Dampers for Rating; Air Movement and Control Association International, Inc.; 2007.
- B. NEMA DC 3 - Residential Controls - Electrical Wall-Mounted Room Thermostats; National Electrical Manufacturers Association; 2003.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Product Data: Provide description and engineering data for each control system component. Include sizing as requested. Provide data for each system component and software module.
- C. Manufacturer's Instructions: Provide for all manufactured components.
- D. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.
 - 1. Revise shop drawings to reflect actual installation and operating sequences.
- E. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

1.05 WARRANTY

See Section 01800 – Supplemental Warranty List, for additional warranty requirements.

PART 2 – PRODUCTS

2.01 EQUIPMENT - GENERAL

Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

2.02 CONTROL PANELS

Unitized cabinet type for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gages, pilot lights, push buttons and switches flush on cabinet panel face.

2.03 DAMPERS

- A. Performance: Test in accordance with AMCA 500-D.
- B. Frames: Galvanized steel, welded or riveted with corner reinforcement, minimum 12 gage.
- C. Blades: Galvanized steel, maximum blade size 8 inches wide, 48 inches long, minimum 22 gage, attached to minimum 1/2 inch shafts with set screws.
- D. Jamb Seals: Spring stainless steel.
- E. Leakage: Less than one percent based on approach velocity of 2000 ft/min and 4 inches wg.

2.04 DAMPER OPERATORS

- A. General: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
 - 1 Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
 - 2 Provide one operator for maximum 36 sq ft damper section.
- B. Inlet Vane Operators:
 - 1 High pressure with pilot positioners and sufficient force to move vanes when fan is started with vanes in closed position. Return vane operator to closed position on fan shutdown.
 - 2 Product:

2.05 INPUT/OUTPUT SENSORS

- A. Temperature Sensors:
 - a. Room Sensors: With locking cover matching pneumatic thermostats used, span of 10 to 60 percent relative humidity.
- B. Static Pressure Sensors:
 - 1 Unidirectional with ranges not exceeding 150 percent of maximum expected input.
 - 2 Temperature compensate with typical thermal error or 0.06 percent of full scale in temperature range of 40 to 100 degrees F.
 - 3 Accuracy: One percent of full scale with repeatability 0.3 percent.
- C. Equipment Operation Sensors:
 - 1 Status Inputs for Fans: Differential pressure switch with adjustable range of 0 to 5 inches wg.
 - 2 Status Inputs for Pumps: Differential pressure switch piped across pump with adjustable pressure differential range of 8 to 60 psi.
 - 3 Status Inputs for Electric Motors: Current sensing relay with current

transformers, adjustable and set to 175 percent of rated motor current.

- D. Damper Position Indication: Potentiometer mounted in enclosure with adjustable crank arm assembly connected to damper to transmit 0 - 100 percent damper travel.

2.06 THERMOSTATS

A. Pneumatic Room Thermostats:

- 1 Adjustable proportioning type, single setpoint, containing single bimetallic element for heating or cooling only. Service: cooling and heating.
- 2 Set Point Adjustment: Minimum 10 degrees F set point adjustment and adjustable dead band.

B. Room Thermostat Accessories:

- 1 Insulating Bases: For thermostats located on exterior walls.
- 2 Thermostat Guards: Metal mounted on separate base.
- 3 Aspirating Boxes: Where indicated for thermostats requiring flush installation.

2.07 TIME CLOCKS

Seven day programming switch timer with synchronous timing motor and seven day dial, continuously charged Ni-cad battery driven power failure 8 hour carry over and multiple switch trippers to control systems for minimum of two and maximum of eight signals per day with two normally open and two normally closed output switches.

PART 3 -- EXECUTION

3.01 EXAMINATION

- A. Verify that systems are ready to receive work.
- B. Beginning of installation means installer accepts existing conditions.
- C. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.
- D. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.
- E. Ensure installation of components is complementary to installation of similar components.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount compressor and tank unit on vibration isolation consisting of springs, with minimum 1 inch static deflection and 1 inch clearance to floor. Isolate air supply with wire-braid reinforced rubber hose or polyethylene tubing. Pipe manual and automatic drains to nearest floor drain.
- C. Locate refrigerated air dryer in discharge air line from tank. Mount dryer on wall on rubber in shear mounts. Install pressure regulator downstream of dryer. Pipe automatic drain to nearest floor drain.
- D. Check and verify location of thermostats with plans and room details before installation. Locate 60 inches above floor. Align with lighting switches and humidistats. Refer to Section 16140.

- E. Provide mixing dampers of opposed blade construction arranged to mix streams. Provide pilot positioners on mixed air damper motors. Provide separate minimum outside air damper section adjacent to return air dampers with separate damper motor.
- F. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
- G. Provide conduit and electrical wiring in accordance with Section 16155. Electrical material and installation shall be in accordance with appropriate requirements of Division 16.

*****END OF SECTION*****

SECTION 15950
TESTING, ADJUSTING, AND BALANCING

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Testing, adjustment, and balancing of air systems.
- B. Testing, adjustment, and balancing of refrigerating systems.

1.02 REFERENCE STANDARDS

- A. AABC MN-1 - AABC National Standards for Total System Balance; Associated Air Balance Council; 2002.
- B. ASHRAE Std 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.; 1988, with 1997 Errata.
- C. SMACNA (TAB) - HVAC Systems Testing, Adjusting, and Balancing; Sheet Metal and Air Conditioning Contractors' National Association; 2002.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Qualifications: Submit name of adjusting and balancing agency and TAB supervisor for approval within 30 days after award of Contract.
- C. TAB Plan: Submit a written plan indicating the testing, adjusting, and balancing standard to be followed and the specific approach for each system and component.
 - 1 Submit to Holt Architects.
 - 2 Include certification that the plan developer has reviewed the contract documents, the equipment and systems, and the control system with Holt Architects and other installers to sufficiently understand the design intent for each system.
 - 3 Include at least the following in the plan:
 - a. List of all air flow, water flow, sound level, system capacity and efficiency measurements to be performed and a description of specific test procedures, parameters, formulas to be used.
 - b. Copy of field checkout sheets and logs to be used, listing each piece of equipment to be tested, adjusted and balanced with the data cells to be gathered for each.
 - c. Identification and types of measurement instruments to be used and their most recent calibration date.
 - d. Discussion of what notations and markings will be made on the duct and piping drawings during the process.
 - e. Final test report forms to be used.

- f. Expected problems and solutions, etc.
- g. Criteria for using air flow straighteners or relocating flow stations and sensors; analogous explanations for the water side.
- h. Details of how TOTAL flow will be determined; for example:
 - 1) Air: Sum of terminal flows via control system calibrated readings or via hood readings of all terminals, supply (SA) and return air (RA) pitot traverse, SA or RA flow stations.
 - 2) Water: Pump curves, circuit setter, flow station, ultrasonic, etc.
- i. Specific procedures that will ensure that both air and water side are operating at the lowest possible pressures and methods to verify this.
- j. Confirmation of understanding of the outside air ventilation criteria under all conditions.
- k. Method of verifying and setting minimum outside air flow rate will be verified and set and for what level (total building, zone, etc.).
- l. Time schedule for deferred or seasonal TAB work, if specified.
- m. False loading of systems to complete TAB work, if specified.
- n. Exhaust fan balancing and capacity verifications, including any required room pressure differentials.
- o. Procedures for field technician logs of discrepancies, deficient or uncompleted work by others, contract interpretation requests and lists of completed tests (scope and frequency).
- p. Procedures for formal progress reports, including scope and frequency.
- q. Procedures for formal deficiency reports, including scope, frequency and distribution.

D. Progress Reports.

E. Final Report: Indicate deficiencies in systems that would prevent proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.

- 1. Revise TAB plan to reflect actual procedures and submit as part of final report.
- 2. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Holt Architects and for inclusion in operating and maintenance manuals.
- 3. Include actual instrument list, with manufacturer name, serial number, and date of calibration.
- 4. Form of Test Reports: Where the TAB standard being followed recommends a report format use that; otherwise, follow ASHRAE Std 111.
- 5. Units of Measure: Report data in both I-P (inch-pound) and SI (metric) units.
- 6. Include the following on the title page of each report:
 - a. Name of Testing, Adjusting, and Balancing Agency.
 - b. Address of Testing, Adjusting, and Balancing Agency.
 - c. Telephone number of Testing, Adjusting, and Balancing Agency.
 - d. Project name.

- e. Project location.
- f. Project Holt Architects.
- g. Project Engineer.

PART 2 -- PRODUCTS - NOT USED

PART 3 -- EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Perform total system balance in accordance with one of the following:
 - 1 AABC MN-1, AABC National Standards for Total System Balance.
 - 2 SMACNA HVAC Systems Testing, Adjusting, and Balancing.
 - 3 Maintain at least one copy of the standard to be used at project site at all times.
- B. Begin work after completion of systems to be tested, adjusted, or balanced and complete work prior to Substantial Completion of the project.
- C. Where HVAC systems and/or components interface with life safety systems, including fire and smoke detection, alarm, and control, coordinate scheduling and testing and inspection procedures with the authorities having jurisdiction.
- D. TAB Agency Qualifications:
 - 1 Company specializing in the testing, adjusting, and balancing of systems specified in this section.
 - 2 Certified by the following:
 - a. AABC, Associated Air Balance Council: www.aabchq.com; upon completion submit AABC National Performance Guaranty.
- E. TAB Supervisor and Technician Qualifications: Certified by same organization as TAB agency.

3.02 EXAMINATION

- A. Verify that systems are complete and operable before commencing work. Ensure the following conditions:
 - 1 Systems are started and operating in a safe and normal condition.
 - 2 Temperature control systems are installed complete and operable.
 - 3 Proper thermal overload protection is in place for electrical equipment.
 - 4 Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5 Duct systems are clean of debris.
 - 6 Fans are rotating correctly.
 - 7 Fire and volume dampers are in place and open.
 - 8 Air coil fins are cleaned and combed.

- 9 Access doors are closed and duct end caps are in place.
 - 10 Air outlets are installed and connected.
 - 11 Duct system leakage is minimized.
 - 12 Proper strainer baskets are clean and in place.
 - 13 Service and balance valves are open.
- B. Submit field reports. Report defects and deficiencies that will or could prevent proper system balance.
 - C. Beginning of work means acceptance of existing conditions.
- 3.03 PREPARATION
- Provide additional balancing devices as required.
- 3.04 ADJUSTMENT TOLERANCES
- A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.
 - B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.
- 3.05 RECORDING AND ADJUSTING
- A. Field Logs: Maintain written logs including:
 - 1 Running log of events and issues.
 - 2 Discrepancies, deficient or uncompleted work by others.
 - 3 Contract interpretation requests.
 - 4 Lists of completed tests.
 - B. Ensure recorded data represents actual measured or observed conditions.
 - C. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
 - D. Mark on the drawings the locations where traverse and other critical measurements were taken and cross reference the location in the final report.
 - E. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
 - F. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
- 3.06 AIR SYSTEM PROCEDURE
- A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities.
 - B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.
 - C. Measure air quantities at air inlets and outlets.
 - D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

- E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for 50 percent loading of filters.
- G. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- H. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- I. Where modulating dampers are provided, take measurements and balance at extreme conditions.

*****END OF SECTION*****

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SECTION 16050
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 – GENERAL

1.01 OVERVIEW

- A. This section supplements all Sections of this Division and shall apply to all phases of Work specified, indicated and required to successfully perform this building contract.
- B. All contractors bidding on this project is required to visit the jobsite and to familiarize themselves with the physical requirement and restraint of the existing building conditions. No extras will be allowed for failure to comply with these stipulations.

1.02 QUALITY ASSURANCE

- A. General Requirements
 - 1. Work performed under this Division shall be installed by craftsmen skilled in the trade involved, and apprentices as indicated in General Conditions.
- B. Requirements of Regulatory Agencies
 - 1. Codes and Ordinances: All Work shall meet the requirements of the codes as listed.
 - 2. Materials shall bear the Underwriters' Laboratories, Inc. (UL) label.
- C. Factory Tests
 - 1. See each Section for the required factory tests and their procedures.
 - 2. Test reports shall include:
 - a. Description of equipment tested.
 - b. Description of tests.
 - c. Test results.
- D. Electrical Acceptance Tests
 - 1. General Scope
 - a. A testing agency is only required when stated directly on the design documentation and shall conform to the following requirements.
 - b. As part of the contract, the services of a recognized testing agency shall be provided for the purpose of performing inspections and tests of installed Work as herein specified and specified in other Sections of Division 16 of these Specifications.
 - c. The testing agency shall provide all materials, equipment, labor and technical supervision to perform such tests and inspections.
 - d. All tests shall be performed in compliance with the recommendations and requirements of the National Electrical Testing Association, Inc., (NETA), and applicable codes and standards.
 - e. Upon completion of the tests and inspections noted in these Specifications, a label shall be attached to all serviced devices. These labels shall indicate date serviced and the service company responsible.
 - f. The tests and inspections shall determine suitability for continued reliable operation.

g. All tests shall be conducted in the presence of the Owner's Authorized Representative.

2. Qualifications of Testing Agency

a. The testing agency shall meet the Federal Occupational Safety and Health Administration (OSHA) criteria for accreditation of testing laboratories, Title 29, Part 1907. The Testing Agency and all personnel employed to perform testing shall have a minimum of 5 years experience in similar work.

b. Proof of the above qualifications shall be submitted.

c. All instruments used to evaluate electrical performance shall meet NETA's Specifications for Test Instruments.

3. Test reports shall include:

a. Description of equipment tested.

b. Description of test.

c. Test results.

d. Conclusions and recommendations.

e. Appendix, including appropriate test forms.

f. List of test equipment used and calibration date.

E. All major equipment including but not limited to the following items shall be inspected for compliance with the reviewed shop drawings and requirements of the contract documents. Contractor shall notify the Owner's Authorized Representative upon arrival of the equipment to the job site and provide all assistance for such inspection prior to the equipment installation.

1. Switchboard, panel boards, transformers, motor control centers, etc. specifically noted on plans to be tested.

2. Emergency and standby power systems including generators and entire control system.

3. Grounding.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

A. Shop Drawings and Product Data and Samples

1. Submit under pertinent provisions of Article 5 of the General Conditions.

2. Submit to the Owner's Authorized Representative six (6) certified copies of the following:

a. Manufacturer's printed instructions for operation and maintenance of electrical equipment, including replacement parts lists. Each set to be bound in an indexed loose leaf ring binder with permanent cover and permanent identification on edge.

b. Service and Operating Manuals for all equipment.

c. Grounding systems tests.

d. Test reports.

- e. Factory tests.
 - 3. Samples will not be returned, unless otherwise noted.
 - B. Qualifications of Electrical Testing Agency
 - C. Documentation showing training of Owner's personnel.
- 1.05 EXCAVATION, CUTTING AND PATCHING
- A. All excavating, trenching and backfilling required for this Division shall be done in accordance with the applicable requirements in Division 2. All excavating and backfilling, repaving all cuts, and providing and maintaining all protective measures for the excavation shall be in accordance with Division 2.
 - B. Field verify all openings indicated on the Drawings. Provide all cutting and patching required for Electrical Work.
- 1.06 LOCATION AND ROUTING
- A. The Drawings indicate diagrammatically the desired location or arrangement of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Judgment must be exercised in executing the Work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference with structural conditions. The Contract Documents are not intended to show every detail part, support, final connection, accessory, or every structural difficulty that may be encountered during the Work. Except as otherwise indicated, locations of items are approximate only. Exact locations necessary to secure proper conditions and results shall be determined at Project Site and shall be approved by the Owner's Authorized Representative.
 - B. Verify dimensions and the correct location of equipment and coordinate with other trades for any requirement before proceeding with the roughing-in of connection.
 - C. All scaled and figured dimensions are approximate of typical equipment of the class indicated. Before proceeding with any Work, carefully check and verify all dimensions, sizes, etc., with the Drawings to see that the equipment being installed will fit into the spaces provided.
 - D. Locations of Openings: Locate all chases, shafts and openings required for the installation of the electrical Work during framing of the structure. Do any cutting and patching required due to improperly located or omitted openings with the approval of the Owner's Authorized Representative, who must also approve any additional charges resulting from relocation or omission of openings. Cutting or drilling in any structural member is prohibited without prior written approval of the Owner's Authorized Representative.
 - E. Access to Equipment: Locate starters, switches, receptacles, cable tray and pull boxes to provide easy access for operation, repair, and maintenance, and if concealed, provide access doors.
 - F. The Contractor shall be responsible for verifying that equipment being provided by him will fit dimensionally in locations shown on Drawings.
- 1.07 MATERIALS STANDARDS
- A. Materials and equipment shall be new.
 - B. All Work shall meet the requirements of the governing codes as listed in the GENERAL REQUIREMENTS, and the requirements of the following:
 - 1. National Electrical Manufacturer's Association (NEMA).
 - 2. American National Standards Institute (ANSI).
 - 3. Institute of Electrical and Electronic Engineers (IEEE).
 - 4. Institute of Cable Engineers Association (ICEA).

5. National Electrical Contractors' Association Standards for Construction (NECA).
 6. Underwriters' Laboratories, Inc. (UL).
 7. California Administrative Codes (CAC) Titles 8, 19, 22 and 24.
 8. California State and Local Fire Marshal.
 9. Instrument Society of America (ISA).
 10. National Electrical Code (T-24 Part 3), latest edition, (NEC).
 11. National Fire Protection Association (NFPA).
 12. State Industrial Accident Commission.
 13. Uniform Building Code, latest edition (UBC).
 14. Occupational Safety and Health Appeals Board (OSHA).
 15. American Disabilities Act.
- C. Items for similar application shall be of the same manufacturer.
 - D. The label of listing by UL shall appear on all materials and equipment for which standards have been established by the agency.
 - E. Where codes as listed in Section General Requirement Section of the Specifications that establish label or approved requirements, furnish all materials and equipment with either the required labels affixed or the necessary written approval.
 - F. Provide the type and quantity of electrical materials and equipment necessary to complete Work and all systems in operation, tested and ready for use.
 - G. Provide and install all incidental items that belong to the Work described and which are required for complete systems.
 - H. All switchboards, distribution boards, panel boards and circuit breakers shall be of the same manufacturer.
 - I. All wiring devices such as switches and receptacles shall be of the same manufacturer.

1.08 TESTING

- A. Upon completion of the Work and adjustment of all equipment, conduct an operating test for each system approval. 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. The Owner's Authorized Representative shall be notified fourteen days in advance of when tests will be performed.
- B. Product resistance to ground tests by Journeymen Electricians and the required number of Apprentices to measure resistance to ground at all grounding electrodes. Make tests before slabs of affected areas are poured in order that corrective measures, if required, may be taken. If the resistances exceed values specified in Section 16450, perform all corrective measures as approved by the Owner's Authorized Representative.
- C. Prior to energizing any motors, measure the service voltage for phase balance and report immediately to the Owner's Authorized Representative if unbalance exceeds 1% from mean.
- D. Measure the three-phase voltage at no load and at maximum load conditions.
- E. Complete all tests prior to final field observation of Project, including corrective Work based on the results of the tests.

1.09 TRAINING

Provide the necessary training program and instructions to the selected Owner's employees for the electrical system for the entire building in addition to what is specified in each section.

1.010 JOB CONDITIONS

Notify the Owner's Authorized Representative in writing of dimensional discrepancies and other conditions detrimental to proper performance of the Work.

1.011 DEFINITIONS

Certain terms in these Specifications, or on Drawings, shall be defined as follows:

- A. "Provide" - Furnish and install complete and ready for service.
- B. "Utility Area": Electrical, Mechanical, and Telecommunication Room.
- C. "Exposed" - Exposed to view after construction is completed.

1.012 TEMPORARY FACILITIES

- A. Unless otherwise included in the Drawings, Contractor shall provide a separate line item in the electrical bid for the following:
 - B. Temporary Light and Power
 - 1. The Contractor shall provide temporary service arranged to serve the lighting and power requirements for construction.
 - 2. All temporary electrical work shall be installed and removed in accordance with the latest edition National Electrical Code, Articles 305 and 230.
 - 3. Electric power service shall be 3 phase 4 wire, 120/208 volt. Method of terminating and running electric service shall be reviewed with the owner's authorized representative
 - 4. Branch circuits for power shall be terminated on 20 amperes ground fault circuit interrupter personnel type circuit breakers.
 - C. All temporary facilities shall be removed at completion of project.

1.013 WARRANTY

Provide at least a one (1) year warranty for all materials and labor for the entire electrical system installed and provided under this contract including any equipment that has been modified or in any way affected by this scope of work. No exclusions will be accepted unless documented and understanding of the documentation has been acknowledged by the Owner's Authorized Representative.

PART 2 -- MATERIALS

Use only prime quality, new materials, apparatus, and equipment.

PART 3 -- EXECUTION

3.01 INSTALLATION OF EQUIPMENT

- A. Rough-in locations for electrical equipment shall be determined from the unit itself or from the manufacturers shop drawings.
- B. Provide all necessary anchoring devices and supports (refer to 3.02 Seismic Protection).
 - 1. Use structural supports suitable for equipment, or as indicated, and per California Title 24.
 - 2. Check loadings and dimensions of equipment with shop drawings.
 - 3. Do not cut or weld to building structural members.

- C. Arrange for necessary openings to allow for admittance of equipment. Where equipment cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves, or other devices to allow later installation.
- D. Install equipment to permit easy access for normal maintenance.
 - 1. Maintain easy access to switches, motors, drives, pullboxes, receptacles, etc.
 - 2. Notify Owner's Authorized Representative in writing of relocation items which interfere with access.
- E. Provide concrete foundations or pads required for electrical equipment, as follows or as otherwise indicated on Drawings.
 - 1. Refer to Division 3, Section 3.02 Seismic Protection and Structural Drawing, for requirements.
 - 2. Provide housekeeping concrete pads up to 3-inch wide edges and 3-inch high for indoor or 4-inch high for outdoor. Contractor is responsible for design built all pads for all electrical equipment.
 - 3. All generator pads shall be isolated concrete pads.
 - 4. Set anchor bolts for equipment.
- F. Locate exit signs and fire alarm flashing lights so that both signs are visible from all corridor locations. In open areas, relocate signs as requested by Owner's Authorized Representative who must approve any relocation in writing to Contractor.
- G. No material, device or equipment shall be shipped to site unless shop drawings have been approved for such, prior to shipment.

3.02 SEISMIC PROTECTION

- A. Seismic Protection Criteria: All Electrical Equipment shall be seismically braced for zone four requirements. The Contractor shall be responsible for the design of his own seismic restraint systems. He shall supply to the Owner's Authorized Representative details of the forces exerted by his restraints, anchorages, and other points of attachment. Seismic protection, labor, materials and design shall be included in the Contract Sum.
- B. Electrical and Mechanical equipment shall be installed in accordance with the following guidelines:
 - 1. SMACNA publication: Guidelines for Seismic Restraints of Mechanical Systems.
 - 2. California Building Code (CBC), Title 24, 2001
- C. Construction of all electrical equipment such as switchboard, motor control center, panel boards, transformer and similar equipment shall meet seismic zone 4 requirement.
- D. Conduit cable rack and cable support: Contractor shall provide shop drawing for support conduit cable rack, and cable tray, for project Structural Engineer review.

3.03 SETTING OF PROTECTIVE DEVICE

Prior to final completion of the Project, set all protective device relays and internal settings to provide adjustment between upstream and downstream protective devices. Setting shall be based on the accepted coordination study.

3.04 IDENTIFICATION

- A. The Contractor shall identify all piping, conduit, machinery, and equipment in accordance with the Owner's Standard Safety Color Code if available, and in addition as specified in Section 16141.
- B. The Contractor shall submit a schedule for equipment identification.

3.05 CUTTING AND PATCHING

- A. Sleeves and inserts: Provide all sleeves, inserts, and openings necessary for the installation of the Electrical Work. Provide sleeves in all floors and concrete walls.
- B. Openings
 - 1. Special forming, recesses, chases, and curbs, for the receptions and installation of the electrical equipment, as shown on the Drawings, is specified in other divisions.
 - 2. Ascertain that provisions have been made for the Work.
- C. Penetrations: All Penetrations through fire rated walls to be sealed with fire stopping. Refer to Division 1.

3.06 OPERATIONAL TESTS

- A. Before acceptance tests are performed, demonstrate to the Owner's Authorized Representative that all systems and components are complete and fully operational.
- B. Perform operational tests on all equipment to determine compliance with Specifications.

*****END OF SECTION*****

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SECTION 16110
CONDUITS AND RACEWAYS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide conduits and raceways as shown on Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Rigid Metallic Conduit: Provide standard weight steel that is hot-dipped galvanized, and sherardized both inside and out after threading, with threaded connectors and couplings. Electrogalvanizing is not permitted. Intermediate Metal Conduit, IMC, will not be permitted.
- B. Rigid Steel Conduit Fittings: Fitting shall be zinc coated, ferrous metal and threaded type.
- C. Electric Metallic Tubing (EMT): Provide tubing of high grade steel electrically welded with exterior protective coating of hot galvanized zinc, applied by the electrogalvanized process. Interior of surface coated with aluminum lacquer or enamel. EMT shall be dipped in a chromic acid bath to chemically form a corrosion-resistant protective coating of zinc chromate over galvanized surface.
- D. EMT Fittings: Fitting shall be watertight steel, gland ring compression type (or set screw type), wrench tightened connectors and coupling.
- E. Aluminum Conduit: If aluminum conduits are favorable to use in place of steel conduits, a price alternate shall be provided during bid and only installed with written authorization. No grounding systems shall be degraded due to the use of aluminum conduit. Alternate (additional) grounding wires shall be installed to meet grounding requirements. Aluminum conduit shall not be used as a grounding path.
- F. Flexible Steel Conduit: Provide conduit manufactured from single strip, standard weight steel hot-dipped galvanized on all four sides prior to conduit fabrication. Flexible aluminum and flexible light-weight steel conduit will not be allowed.
- G. Flexible Conduit Connectors and Couplings: Provide die cast fittings of the type that screw into the inside of the conduit with threaded edges at 90 degrees to the fitting body to insure a force fit. Binding screw type will not be acceptable.
- H. Flexible Liquidtight Steel Conduit: Liquid-tight conduit shall be manufactured from single strip standard weight steel, hot dipped galvanized on all four sides prior to conduit fabrication, and shall be provided with an extruded polyvinyl chloride cover. Liquidtight conduit and fittings shall provide positive ground continuity. Include a separate ground conductor for each circuit.
- I. Flexible Liquidtight Fittings: Fittings shall be malleable iron, zinc plated, with locknut and o ring seal and slim diameter with small turning radius.
- J. Metal-Clad Cable (MC Cable): MC Cable shall not be used for more than 10' lengths unless approved by Engineer of Record and Owner. Qualify alternates during bidding and shall not be accepted after contracted without prior authorization. MC Cable shall only be used in

concealed spaces and for end-of-line device connection. MC Cable shall not be used directly out of panel boards. If approved to utilize MC Cable for more than 10' lengths, bundling shall be performed in a neat fashion, straight runs, supported every 48", and clearly labeled at junction boxes and terminations for ease of future work.

- K. Rigid Plastic Conduit: Provide heavy wall, virgin polyvinyl chloride Schedule 40 and Schedule 80 with solvent welded joints, conforming to Underwriters Laboratories, Inc. (U.L.) requirements, listed for exposed and direct burial application.
- L. Rigid PVC Fittings: Fittings shall be Schedule 80 and cement shall be provided by same manufacturer. All joint shall be solvent welded in accordance with the manufacturer's recommendations.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. General

1. Deliver conduits and raceways to site in standard lengths, and store in dry and enclosed locations.
2. Installation of raceways shall be coordinated with building structure and other trades, and shall be complete with bends, fittings, junction, and pull boxes to meet codes and make complete operating systems.
3. Conduits or raceways shall not be run in foundations, columns, concrete slabs, or in the plane of concrete shear walls without written approval of Structural Engineer for each conduit run.
4. Provide the type of conduit permitted in these Specifications or required for each location or condition per applicable codes and jurisdictions whichever is more stringent.
5. Conduit shall be continuous from outlet to outlet, from outlet to cabinet, junction box, pull box and shall enter and be secured to all boxes, etc., in such a manner that each system will be mechanically and electrically continuous from service to all outlets.
6. Junction boxes or pull boxes shall be installed to avoid excessive runs and bends between outlets.
7. Conceal conduit above ceiling, below floors or in walls, unless otherwise noted.
8. A separate conduit shall be installed for each homerun indicated on the Drawings.
9. Wherever conduit extends through roof, furnish and install galvanized sheet metal flashing. Flashing shall extend six inches above roof.
10. From each panel which is flush mounted in a wall, stub from top of the panel, a minimum of four 1-inch conduits to the nearest ceiling space or other accessible location and cap for future use.
11. Paint fire alarm conduits with a 1-inch wide red band every 5 feet of run.
12. In long runs of conduit, provide sufficient pull boxes inside buildings to facilitate pulling wires and cables. Support pull boxes from structure independent of conduit supports, with spacing not to exceed 200 feet. These pull boxes are not necessarily shown on plans.

13. Conduit support shall be dedicated to support the conduit system only and shall not support any other item.

B. Size of Conduits

1. The size of the conduits for the various circuits shall be as indicated on the Drawings and not smaller than required by National Electrical Code (NEC, Chapter 9, Table 3A, based on "THW") for the size and number of conductors to be pulled therein. NEC requirements shall prevail where fill is not shown on Drawings.
2. 1/2" conduit may be used for switch leg up to 3 wires plus ground from switch to first J-box.
3. Prewired 1/2" flexible steel conduit may be used between last J-box and light fixture and from down light's J-box to next one, up to 3 wires plus ground and maximum 10' length.
4. Conduit size shall be increased to facilitate the pulling of wires.
5. Conduit size shall be increased to the next larger size when installed in slab or underground.
6. Minimum conduit size for underground shall be 1".
7. Minimum conduit for utility company primary medium voltage cable shall be 4".

C. Application

1. Provide EMT conduit for all sizes up to 2-inches in dry location as in stud partitions and furred ceiling space. EMT conduit shall not be used for underground, exterior, where it is prohibited and where rigid steel conduit is required. EMT conduit may be used up to 4-inches for Telecommunication and Voice/Data System. EMT may be used for Fire Alarm System wiring where conduit is concealed and where it is not a main run and riser, otherwise it shall be rigid steel galvanized.
2. Rigid steel conduit shall be used for the following:
 - a. Where required by Code.
 - b. In electrical, mechanical, or any machine room, up to 7'-6" above finish floor.
 - c. Where exposed to weather.
 - d. Where exposed and below 7'-6" of above finished floor.
 - e. Where in slabs and in concrete.
 - f. Where exposed to physical damage.
 - g. In corrosive area.
 - h. In damp and wet locations.
 - i. In utility area.
3. Flexible steel conduit shall be used in dry locations where indicated, and as follows:
 - a. Where required by Code.
 - b. For recessed light fixture, maximum 6'.
 - c. Where structural condition prevents the use of other type of conduit (maximum 24").
 - d. For final connection to motor, transformers, any vibrating equipment and where required for equipment serving. Maximum 36" and minimum 24".

4. Minimum length of flexible steel conduit shall be 24" and maximum 72" unless otherwise noted.
5. Flexible liquidtight conduit shall be installed in lieu of the flexible steel, as follows:
 - a. Where required by Code.
 - b. In plenum area.
 - c. In damp and wet location.
 - d. Where exposed to weather.
 - e. Between the seismic joint.
6. Minimum length of flexible liquidtight conduit shall be 24" and maximum 72" unless otherwise noted.
7. Rigid plastic conduit PVC Schedule 40 may be used as follows:
 - a. For 2" and larger size encased in concrete (see "Duct Bank" Section) at minimum 36" below grade for outside of building envelope only (5 feet outside of building line), unless otherwise noted.
 - b. For non-emergency wiring system and 1-1/2" and smaller size surrounded with 3" sand all around the conduit at minimum 24" below grade for outside of building envelope, or at minimum 12" below finished floor for inside of building envelope.
 - c. For emergency wiring system and 1-1/2" and smaller size encased in 3" concrete at minimum 24" below grade for outside of building envelope, or at minimum 12" below finished floor for inside of building envelope.
8. Rigid plastic conduit PVC Schedule 80 for 2" and larger sizes below the building shall be encased in concrete, minimum 36" below finish floor unless otherwise noted.
9. Provide a green insulated ground conductor of size as required by Code in all flexible and PVC conduit runs.
10. Flexible conduit shall not be used in lieu of EMT or rigid conduit.
11. Flexible conduit may be used concealed in wall for areas as follows:
 - a. Where permitted by code, and
 - b. Up to 72" in length, and
 - c. Only for 3/4" size, and
 - d. For 4 #12 or 4 #10 and with 1 #10 ground wire, and
 - e. Up to 180° bend, and
 - f. To be supported every 16" to 24".

D. Conduit Placement

Support conduits 1-inch and larger with pipe clamps either suspended from structural slabs with a rod at least 3/8 -inch diameter with adjustable pipe ring, or mounted on wall form channel supports. Attach to concrete with Phillips "Red Head," Hilti, or equal drilled anchors of appropriate load capacity. Where two or more conduits 3/4-inch and larger are suspended from ceiling, use trapeze type hanger suspended from rods.

Where rigid metal conduits and electrical metallic tubing are supported from Building members, supports shall be installed as follows:

- a. Conduit Sizes
- | | |
|--------------------|---|
| 3/4" to 1-1/4" | Within 18" of each outlet inclusive and on either side of couplings and fittings and at a spacing not to exceed 8 feet; |
| 1-1/2" and larger: | Within 3 feet of each junction or pullbox and terminal cabinet and at a spacing not to exceed 8 feet. |
- b. When conduits are supported from trapezes, the supports shall be spaced not more than 8 feet apart.
- c. Conduit trapezes shall consist of suitable Unistrut or Kindorf fittings, or equal, in accordance with the manufacturer's printed recommendation.
1. Secure exposed conduit runs on concrete, plaster or other construction in place with cast conduit clamps affixed with metallic expansion anchors or toggle bolts and cadmium plated machine or lag screws.
 2. All exposed conduits shall be installed parallel to and perpendicular to the building structure.
 3. Do not strap or fasten rigid conduit to mechanical equipment, or to equipment subject to vibration or mounted on shock absorbing bases.
 4. Conduits which are installed above dry type or suspended ceilings shall not be secured to ceiling support wires. Support such conduit independent of ceiling suspension systems.
 5. Support conduit to structure above suspended ceilings 8" minimum above ceiling to allow removal of ceiling tile. Do not support from T-bars or T-bar hanger wires. Maintain two inch clearance above recessed light fixtures.
 6. Support conduits adjacent to walls with preformed channels.
 7. Provide plated or galvanized hangers, rods, channels and metallic support and fastening material.
 8. Do not use perforated metal strap or wood as support material.
 9. Exposed conduit larger than 1 inch shall be suspended with pipe hangers. Pipe hangers for individual conduits shall be Grinnel #108 and #110R, Super Strut #M-718-5R, or equal, malleable iron split pipe rings, suspended from hanger rods. Rods shall be three-eighths (3/8)-inch for two (2)-inch and smaller conduits, and one-half (1/2)-inch for two and one-half (2-1/2)-inch and larger conduits. Hangers and racks shall be attached to concrete with insets, set at the time the concrete is poured, and to steel members with beam clamps or machine bolts.
 10. Conduit 1-inch and smaller, in metal and stud partitions, shall be tied to the furring channels with (2# 14) gauge galvanized tie wire spaced not more than 5 feet apart. Conduits 1 inch and smaller for service to lighting fixtures (other than home runs) may be supported in the same way.
 11. Conduit clamps and hanger rods attached to concrete structures shall be secured by machine bolts or rods screwed into anchors. Anchors not cast into the concrete shall be of the expansion shield type, Phillips "Red Head," Hilti, or equal.
 12. Provide independent support for all conduit rising from floor for motor connections if over 18 inches above floor.
 13. Do not support any conduit to motor, ductwork or mechanical equipment.

14. Conduit shall not be run closer than 12 inches to any hot water pipe, steam pipe, heater flue or vent. Maintain minimum 6" inches clearance between conduit and other piping.
15. Provide condulets as required. Conduit bends will not be permitted around the corners of beams, walls or equipment. All condulet covers shall be accessible. Condulets 2 inches or larger shall be Crouse-Hinds Type "LBD," Appleton "LBD," or equal.
16. Conduits in furred spaces shall be routed to clear access openings.
17. Where steel conduits enter a concrete floor below a surface mounted panelboard, they shall be encased in a concrete curb of sufficient height to match the height of the finished base tile.
18. Holes for conduits through existing concrete walls, manhole, or floors shall be made by the "core-drill" method. The size and location shall be approved by the structural engineer.
19. Upon completing the installation of any run of conduit, the runs shall be tested to see that they are free from all obstructions and have a smooth interior. Each end of each conduit run shall be plugged with "pennies" and bushings and left plugged until ready to pull circuit wires.

E. Cuts and Joints

1. Cut conduit squarely and ream ends to remove burrs. Close open ends of conduits, unless in a closed box or cabinet, with approved conduit caps or closures as soon as installed and keep closed until ready to pull in conductors.
2. Ream the ends of all conduits, and clean conduits before pulling conductors.
3. Use pipe joint compound (pipe dope) and oil applied to the male threads only and tighten joints securely. For underground or under slab conduits, apply a heavy coat of Pabco P & B No. 2 paint after installation to surfaces within 6" on both sides of fittings and to areas where wrenches or other tools have been applied. On exposed conduits, repair scratches and other defects with galvanizing repair stick, Enterprise Galvanizing "Galvabar", or equal.
4. Where conduit is underground, under slabs or grade, exposed to the weather, or in wet locations, make joints liquid tight and gas tight.
5. Cut threads on rigid conduit to standard taper and to length such that bare metal exposed by the threading operation will be completely covered by the couplings or fittings used. In addition, cut the lengths of the thread such that joints will become secure and wrench tight before conduit ends butt together in couplings and before conduit ends butt into the ends or shoulders or other fittings. Securely tighten threaded connections.
6. For rigid steel conduit use conduit unions to connect two rigidly held conduits. Running thread will not be accepted.
7. Right and left hand couplings shall not be used.
8. Make all fittings in plastic conduit watertight with approved solvent-weld cement specifically manufactured for the purpose and approved by PVC conduit manufacturer.
9. Secure rigid conduits to panels, pull boxes, wireways and enclosures with locknuts, inside and out, and provide high impact plastic or insulated throat steel bushings at terminations in pull boxes, wireways, signal cabinets, boxes and enclosures. For rigid

steel conduit, provide steel insulating bushings with plastic liner. For EMT provide insulated throat connectors secured with locknut on interior of box or enclosure. For flex conduit, provide insulated throat steel twist-in connectors secured with locknut on interior of the box or enclosure, or steel twist-in connectors with plastic bushing, and locknut. At panelboards, switchboards and gear specified with ground bus, terminate conduits with ground bushing bonded to ground bus with code size conductor. Use approved couplings or unions; running thread, threadless coupling, or split coupling connections are not permitted.

10. Use insulated bushings and locknuts on all conduits where entering pullboxes, junction boxes, outlet boxes, cabinets and similar enclosures, and for all signal and telephone conduit terminated in cabinets or backboards. For 1-inch or larger bushings, shall be with grounding lugs, O.Z. Type BLG. or equal. Bushings shall be installed before any wire is pulled.
11. Conduit connections to panel cabinets and pull boxes shall have grounding wedge lugs between the bushing and the box or locknuts designed to bite into the metal.
12. Where conduits or wireways cross expansion joint, provide approved expansion or deflection fittings, or combinations of fittings which allow deflection in all directions. For seismic joints provide liquidtight flex.

F. Seal

1. Conduits terminating where termination is subject to moisture or where conduit penetrates exterior wall or roof shall be sealed.
2. Seal all conduit from exterior outlets at first interior junction to prevent moisture from entering the building through the conduit.
3. Seal all conduit to sump pump motors and control panel.
4. Seal all conduit that passes through the following areas:
 - a. As indicated on the Drawings.
 - b. Classified (hazardous) area.
 - c. Refrigerated area.
5. Seal all fire rated wall or ceiling penetrations. Sealant material and method shall be UL listed.

G. Bends

1. Except as otherwise indicated on the Drawings, bends in conduit 2 inches or larger shall have a radius or curvature of the inner edge, equal to not less than ten (10) times the internal diameter of the conduit and six (6) times for other. Any deviations from this radius shall be approved by the Owner's Authorized Representative.
2. Conduit connections to junction or pull boxes shall be made with a long radius (6 times). Bends for 600-volt cable shall have a radius of not less than six to twelve (6 to 12) times the diameter of the cable. Nesting of conduits shall be made when two or more conduits are run in parallel. Medium voltage feeder conduit runs (above 600 volts), telephone and closed-circuit television conduit runs shall not have more than two 90-degree long radius bends. All other conduit runs (below 600 volts) shall not have more than three 90-degree long radius bends between pull boxes, junction boxes or terminal cabinets.
3. Keep bends and offsets in conduit runs to an absolute minimum. For the serving utilities, make large radius bends to meet their requirements.

4. For bends and offsets in conduit 1 inch and larger, use larger radius factory fittings or a hydraulic bender. Replace flattened, deformed or kinked conduit.
5. Provide bend radius for flexible conduit not less than 6 times the trade size.
6. Apply heat for bends so that conduit does not distort or discolor. Use a spring mandrel as required to assure full inside diameter at all bends.

H. Sleeve

1. Wherever conduits pass through concrete walls, suspended slabs or metal deck floors, furnish and install sleeves of ample size to permit installation of conduit. Sleeves shall be installed prior to pouring of concrete and shall have ends flush with the wall or extend 2 inches above floor surfaces. Verify locations with the Owner's Authorized Representative.
2. Finish Around Sleeves: Rough edges shall be finished smooth. Space between conduit and sleeves where conduit passes through exterior walls shall be sealed to permit movement of conduit, but prevent entrance of water. Space between conduit and sleeves where conduit passes through fire rated interior walls and slabs shall be sealed with approved materials to provide a fire barrier conforming to the requirement of the Codes as listed in General Requirements.
3. Sleeve shall be 1" to 2" bigger than conduit size.

I. Empty Conduit

1. Provide a nylon or a 1/8-inch O.D. polyethylene rope, rated at 250 pounds tensile strength, in all conduits more than 5 feet in length left empty for future use. Not less than 5 feet of rope shall be left at each end of the conduit.
2. Tag all empty conduits at each accessible end with a permanent tag identifying the purpose of the conduit and the location of the other end. In wet, corrosive outdoor or underground locations, use brass, bronze, or copper 16 gauge tags or lead tags secured to conduit ends with #16 or larger galvanized wire. Inscribe on the tags, with steel punch dies, clear and complete identifying information.
3. Cap the open ends of conduits with approved manufactured conduit seals until ready to pull in conductors.

J. Duct Bank

1. Encase all nonmetallic conduit installed underground in a 3-inch concrete envelope unless otherwise noted. Extend concrete envelopes a minimum of 3 inches beyond all external sides of all outermost conduits. Space the external surfaces of all conduit within a bank, a minimum of 3 inches apart. All signal circuits (including telephone, data, alarm, sound, etc.) contained within nonmetallic conduit shall have a minimum separation of 12 inches from any light or power circuits that parallel them within a bank.
2. Use manufactured concrete or plastic spacers to insure required concrete coverage. Concrete shall be 2500 psi. Concrete for conduit and duct banks shall be red concrete pre-mixed at factory to provide a distinctive red color to the concrete envelope. At building entry point provide tags on all conduits clearly stating "CAUTION – HORIZONTAL RUNS EXTERIOR TO BUILDING ARE PLASTIC." See Section 16141 for marker tape.
3. Duct lines shall have a continuous slope downward toward manholes and away from buildings with a pitch of not less than 4 inches in 100 feet. Changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by longsweep bends having a minimum radius of curvature of 25 feet,

except that manufactured bends may be used at ends of short runs of 100 feet or less, and then only at or close to the end of run.

4. Underground conduits, which terminate inside building below grade, or which slope so that water might flow into building, shall be sealed at termination after installation of conductors. Install plugs or caps in spare (empty) conduits. Provide 4% slope to outside the building where possible to drain the water.
5. Contractor shall provide shop drawing for all underground ductbanks.
6. Conduit stub-up for electrical or other equipment shall not be installed unless the related equipment shop drawing has been approved.

K. Seismic Bracing

1. Provide seismic bracing for conduits (3) 3/4", or (2) 1", and/or (1) 1-1/2" and larger or multi size combination, wherever conduit is suspended more than 10" to the bottom of the conduit from its anchoring point on the structure. All such bracing as described herein or below shall be run from the raceway to the structure, and anchored to the latter in an approved manner.
2. Provide diagonal bracing every 16' to the structure from hangers and changes in direction.
3. Seismic bracing shall meet and exceed Title 24 and other code requirements. Refer to 16050-3.02.
4. Seismic bracing as described above shall be provided immediately upon completion of each conduit run, to prevent obstruction of conduits by other utilities or construction work.

*****END OF SECTION*****

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SECTION 16121

CONDUCTORS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide conductors as shown on Drawings as specified.

1.02 QUALITY ASSURANCE

The Contractor shall provide a "Megger" insulation tester which applies a minimum of 500 volts direct current for the tests when requested by the Owner for specialized equipment verification at no additional cost.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS

The following list includes the required shop drawing information that shall be submitted.

1. Wire and cable.
2. Splice details.
3. Connectors.

1.05 REFERENCE

ANSI/NFPA 70-NEC.

Materials and/or installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Conductors shall have Underwriters' Laboratories, Inc. (UL) listed 600 volt insulation of type specified below or elsewhere in the Specifications. Conductor shall be copper. The use of 250 volt wiring where code permits shall be bid as an alternate and written approval by engineer of record and/or owner shall be required prior to installation.

1. Branch Circuits - Lighting and Power
 - a. #10 AWG and smaller, solid wire type THW or THHN/THWN, THHW (THHN for dry location only).
 - b. #8 AWG and larger, stranded type THW or THHN/THHW.
2. Feeders (100A and more): Type THW or XHHW.
3. Conductors installed in areas subjected to temperatures exceeding 60-degree C (140-degree F); terminating in incandescent lighting fixtures and installed through or into housing containing ballasts shall be type AVA or RHW-2.
4. For conductors installed in exposed conduit outside of Buildings, in exposed conduit and conduit within or just under roofing material, provide type THWN or XHHW.
5. Control Circuits: Use 600 volt U.L. type THHN/THWN or THWN conductors except where subject to abnormally high temperatures such as on or near boilers. Under these conditions, use UL type RHW-2.

6. Wiring through fluorescent fixtures in continuous rows shall be type THHN.
- B. Minimum Size Conductors: #12 AWG copper. Control wiring may be #14 AWG minimum except where otherwise shown.
 - C. Connectors for #10 conductor and smaller UL listed for 600 volts, UL approved for use with copper, cone shaped, expandable coil spring inset, insulated with a nylon shell and two wings placed opposite each other to serve as a "built-in" wrench. Shell shall be molded one-piece as manufactured by Ideal Industries "Wing-Nut," Minnesota, Mining and Manufacturing Co., "ScotchLok," or equal.
 - D. Connectors for #8 AWG and larger shall be screw pressure lugs made of high strength structural copper alloy and UL approved for use with copper wire as manufactured by T & B Locktite, Burndy, or equal.
 - E. Branch Circuit and Feeder Wiring for all systems shall be continuous from switch to terminal or farthest outlet. No joint shall be made except in pull, junction, or outlet boxes, or in gutters.
 - F. All systems of wiring shall be so installed that when completed the systems will be free from short circuits and from grounds, other than required grounds.
 - G. Provide all conductors used for power, lighting, control signal and communications systems, operating at 600 volts and below, with a minimum insulation rating of 600 volts.
 - H. All conductors shall be new and shall have been manufactured within 12 months of the date of delivery to the site and continuously stored where protected from the heat or weather.
 - I. Vertical cable supports shall be O.Z. type "M," Adalet "SVM" series, or equal.
 - J. All conductors shall be delivered to the site on their original cable reels or in their original unbroken packages and shall be inspected and approved by Owner before opening.
 - K. Aluminum conductor will not be allowed.
 - L. Insulating Tape - Plastic Self-adhering. Minnesota Mining and Manufacturing "Scotch" #33 Electrical tape, Manville Bulldog #166, or equal.
 - M. Conductor ties shall be plastic with cinching holders. Manufacturers: T & B "Ty-Rap," Panduit "Pan-Rap," or equal.
 - N. Conductor sealant shall be silicone type Dow-Corning #795, General Electric #SCS 1000 or equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Conductor Color Coding and Identification: Conductors larger than #10 shall have colored tape wrapped around each conductor and circuit number identification tags, in junction boxes, pull boxes, manholes, switchgear, panels, cabinets, and wherever a break or termination in the conductor occurs, etc. Conductors #10 AWG and smaller shall have color coded insulation as follows:

1.	Wire Color Code	Switch
	<u>480/277V</u>	<u>Leg. 277V</u>
Neutral	Grey	---
Phase A	Brn	Brn w/wht str
Phase B	Yel	Yel w/wht str
Phase C	Orn	Orn w/wht str
Ground	Grn	---
Switch Traveler, 3- or 4-way		Pur w/wht str
	<u>208/120V</u>	Switch
Neutral	Wht	<u>Leg. 120V</u>
Phase A	Blk	---
Phase B	Red	Blk w/wht str
Phase C	Blu	Red w/wht str
Ground	Grn	Blu w/wht str
Switch Traveler, 3- or 4-way		---
		Pur w/blk str

2. Equipment ground conductor shall be green. Isolated ground conductor shall be green with yellow stripe.
 3. Fire Alarm Conductors
 - Control Power - Black
 - Alarm Initiating - Red and Blue
 - Alarm Device - Yellow and Brown
 - Annunciators - Orange
 4. Conductors #8 and larger shall have colored tape wrapped around each conductor in J-Boxes, Pull Boxes, Manholes, Switchboard, MCCs, panels, cabinets, etc.
 5. Emergency feeders shall follow above color coding but shall be suitably tagged to indicated emergency service.
- B. Wire-pulling compounds used as lubricants in installing conductors in raceways shall only be "Polywater J". No oil, grease, graphite, or similar substances may be used. Pulling of No. 1/0 or larger conductors shall be done with an approved cable pull machine. Other methods; e.g. using vehicles, and block and tackle to install conductors are not acceptable.
 - C. Thoroughly clean conduit and wireways from all debris and moisture, and ensure all parts are completely dry before pulling wires. Do not install permanent wiring, without special permission from Owner's Authorized Representative, until plastering is done and dirt removed. Wire shall be neatly arranged and laced together.
 - D. All wires, both low and line voltage, shall be installed in code approved raceways unless exceptions are approved by the Owner's Authorized Representative in writing.
 - E. Branch Circuit Wiring Methods: Fluorescent Fixtures shall not be used as a raceway for branch circuit conductors except where installed end-to-end to form a continuous assembly and UL listed for throughwiring.
 - F. Make all branch circuit and fixture joints (splice) for #10 AWG and smaller wire with connectors.
 - G. Make all branch circuit joint of #8 AWG and larger with screw pressure lugs, and insulate with electrical tape to 150% of the insulating value of the conductor insulation.

- H. Tape all connections made with non-insulated type connectors with insulating tape to 150% of the insulating value of conductor insulation.
- I. Each circuit shall correspond to the branch circuit number indicated on the panel schedule shown on the Drawings except where departures are approved by the Owner's Authorized Representative.
- J. Where conductors in conduit pass through exterior walls, a sealing compound of moisture-resistant material shall be applied in the ends of the conduits to seal around the conductors. Sealant shall be Dow Corning #795, 3M or equal.
- K. For control wiring, conform to the wiring diagrams shown on the mechanical Drawings and the manufacturer's wiring diagrams to control the equipment in the manner specified in Division 15 of the Specifications. Color code all control wiring.
- L. Wiring within all equipment enclosures shall be neatly grouped and tied together.
- M. Pigtails shall be extended from branch wiring in outlet boxes for attachment to devices. Loops in through wiring will not be acceptable.
- N. Conductors in outlet boxes shall have a minimum of eight inches of extra conductors.
- O. Inspect wire and cable for physical damage and proper connection.
- P. Verify continuity of each branch circuit conductor.
- Q. Tighten bolted connections to manufacturer's recommended torque values.
- R. Terminations for signal and control circuits shall utilize crimp-on spade lugs.
- S. Splices in damp or wet locations, or where located in pullboxes or manholes, shall utilize cast resin type, watertight connections.
- T. Do not run conductors from different panelboards in same raceway.
- U. Do not run conductors with different voltages in same raceway.
- V. Re-tighten all bolt type connectors 24 to 48 hours after initial installation and before taping.

END OF SECTION

SECTION 16130
OUTLET AND JUNCTION BOXES

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide outlet and junction boxes as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit shop drawings and product data for outlet and junction box construction, size and finish.
- B. List of box construction, size and finish indicating where each type will be used.

1.04 REFERENCES

ANSI/NFPA 70 - National Electrical Code.

Materials and/or installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Outlet boxes and covers shall be pressed steel and plugged holes. All boxes shall be of National Electric Code (NEC) size for the number of wires or conduits passing through or terminating therein, but in no case shall any box be less than 4 inches square by 2-1/8 inches deep, unless specifically noted as smaller on the drawings or approved by electrical engineer of record on project. Separate boxes or sectional boxes shall be used for different voltages.
- B. Light fixture outlet boxes shall be equipped with fixture-supporting device, as required by the unit to be installed.
- C. Exposed boxes in utility areas or exposed to weather shall be weatherproof boxes with grounding terminal, threaded hubs and gaskets, Type "FS" or "FD" Series, manufactured by Crouse-Hinds, Appleton, or equal. Pot metal boxes are not acceptable.
- D. Telephone and data outlets shall be a minimum of 4-11/16 inches square by 2-1/4 inches deep.
- E. Switch Outlets: Use solid gang boxes for three or more switches for mounting behind a common single plate.
- F. Condulets shall have threaded hubs and gasket. Type "FS" or "FD" series, manufactured by Crouse-Hinds, Appleton, or equal.
- G. Floor boxes shall be provided and installed as specified per plans or cast metal with adjustable height boxes. Manufacturer: Hubbell #B-2537, Walkerduct #800 CI Series, or equal.
- H. Acoustic pads shall be pliable, putty-like pads, one-quarter-inch thick. Manufacturer: Lowry Pads, or equal (no known equal).

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Provide additional boxes necessary for proper installation of the electrical work in compliance with NEC requirements.
- B. Provide boxes at locations required by the Code, and at those locations required to facilitate the pulling of wire. They shall also be installed for long conduit runs or runs which have more than total 270° design bends. Pull box locations shall be approved by the Owner's Authorized Representative prior to installation.
- C. Conduits entering boxes shall be thru tight-fitting bored or punched holes, or threaded hubs, and shall be secured firmly.
- D. Secure recessed boxes for ceiling outlets with galvanized steel bar hangers specifically manufactured for the purpose, to ceiling channels to permit the installation of the box.
- E. The volume of the boxes shall be in accordance with the Code requirements, but shall be no smaller than 4-inches square by 2-1/8 inches deep unless otherwise indicated.
- F. Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removal recessed luminaries.
- G. Where both emergency and normal circuits feed a single light fixture, provide an outlet box for each system.
- H. Provide separate boxes for different voltage conductors. Also provide separate boxes for general loads, communications, fire alarm, lighting, signal and miscellaneous systems.
- I. Securely fasten all outlet boxes to the structural members. In concrete or drywall construction, set recessed boxes so that the front of the plaster ring or front of the box for those without plaster rings is not more than 1/4 inch behind the final finished surface. Set all recessed boxes in other types of construction so that the fronts are flush with the finished surface. Where these settings are not achieved, provide a 24-gauge or heavier galvanized steel liner flush with finished surface.
- J. Label the cover of each accessible junction box with panel and circuit designation and function per Section 16141.
- K. Provide and maintain sufficient access and working space to permit access and safe maintenance to all boxes.
- L. Covers for flush outlets shall finish flush with plaster or other finished surface.
- M. Recess boxes shall not be mounted back-to-back in any wall; minimum offset shall be 24 inches for fire rated wall and 18 inches non-fire rated wall.
- N. Provide U.L. approved factory made knockout seals in the boxes where unused knockouts are not intact. Provide recessed threaded plugs in all unused hubs of cast boxes.
- O. Nails shall not be used to support outlet boxes.
- P. Use extension rings with blank covers for making exposed conduit connections to flush wall or ceiling boxes.
- Q. For boxes not specified or indicated, use boxes and mounting height as required by equipment and recommended by equipment manufacturer.
- R. J-Boxes shall not be installed in visible finished areas except as shown on Drawings or as specified in writing by Owners Authorized Representative.
- S. J-Box shall not be supported by any conduit. Provide independent support from building structure.

- T. For outlets flush in exterior walls, use weatherproof joints and connections all around. Outlets shall have cast covers and be fitted with gaskets.

*****END OF SECTION*****

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SECTION 16131
INTERIOR PULLBOXES

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide interior pullboxes as required to meet Building Code Requirement, Specification and applicable construction standards for workmanship.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

Submit shop drawings and product data for pullbox construction, size and finish.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Sheet steel pullboxes shall be fabricated of the gauge of sheet metal required by the California Electric Code (NEC), galvanized after fabrication, furnished with required knockouts and removable screw cover. Finish with prime coat ready for painting, where exposed to public view; or (ANSI) 61 light gray in other locations. Covers for pullboxes larger than 30" shall be two sections with handles.
- B. Provide cast iron pullboxes with gasketed screw cover and drilled and tapped holes as required. Provide boxes as manufactured by O.Z., Alhambra Foundry Co., Russell & Stoll, or equal.
- C. Dimensions of pull boxes for high-voltage cables shall be a minimum of 25 percent larger than standard NEC code size boxes for 600-volt wire.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Securely fasten to structural members or channel supports.
- B. Do not install pullboxes in public areas unless specifically indicated.
- C. Install sheet metal pullboxes in dry protected locations.
- D. Install cast iron pullboxes in wet and damp locations. Boxes shall be flush with grade or slab.
- E. Provide tight fitting bore or punched holes, through which rigid conduit shall be secured to boxes with a double lock nut and bushing.
- F. Label covers of interior wireways and pull boxes. Tag all conductors to identify circuits and origin.

*****END OF SECTION*****

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SECTION 16133

CABINETS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide and install cabinets for the electrical and communication system as shown on the Drawings and as required to satisfactory carry out this project scope of work.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

Submit shop drawings and product data for cabinet construction and finish.

PART 2 -- PRODUCTS

2.01 MATERIALS

Cabinets shall be flush or surface mounted type as indicated. Cabinets shall be constructed of the gage of sheet steel required by the National Electrical Code (NEC), with hinged lockable doors, common keyed with panel boards, equipped with 3/4" fire retardant plywood backboard; terminal blocks for connection; index card holders; and cards mounted behind heavy plastic on the inside of the cabinet doors. Size as indicated on the Drawings. Finish with a zinc chromate primer when located in interior or exterior areas exposed to public view and American National Standard Institute (ANSI) 61 factory enamel when located in janitors' closets, mechanical rooms, and electrical equipment rooms. Furnish cabinets manufactured by General Electric, Westinghouse, or equal. Minimum depth of cabinets shall be 6".

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Securely fasten to structural members of channel supports.
- B. Furnish and install nameplates on all cabinets.

END OF SECTION

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SECTION 16140
WIRING DEVICES

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide wiring devices as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit shop drawings and product data, indicating amperage and voltage rating, materials, color and manufacturer's catalog sheet of each device.
- B. Submit shop drawings and product data indicating materials and thickness or gage of materials, color and manufacturer's catalog sheet of each device.
- C. Indicate application conditions and limitations of use stipulated by product testing agency specification under regulatory requirement.

1.04 REFERENCES

- A. NEMA WD 1 - General Purpose Wiring Devices.
- B. NEMA WD 2 - Semiconductor Dimmers for Incandescent Lamps.
- C. NEMA WD 6 - Wiring Device Configurations.

Materials and installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. All devices shall conform to National Electrical Manufacturer's Association (NEMA) standards and shall be Underwriters' Laboratories, Inc., (UL) listed and labeled. Model #'s labeled below shall be same manufacturer's equivalent where specific model # is discontinued.
- B. Switches
 - 1. Wall switches shall be specification grade, fully enclosed, quiet-type tumbler switches rated 20 amperes, 120/277-volt, bakelite or composition, back and side wired, bumper pad, full rating for inductive or non-inductive loads and incandescent or fluorescent lighting loads.
 - 2. Single Pole Switches: G.E. 59511, Hubbell #1221, Arrow #1991 or Pass & Seymour 20AC1.
 - 3. Three-way Quiet Switches: G.E. 59531, Hubbell #1223, Arrow #1993 or Pass & Seymour 20AC3.
 - 4. Wall switch and pilot lights shall be flush mounted combination wall type with switch and pilot light equipped with a 6-watt, 125-volt candelabra base lamp. The pilot light shall have a green jewel with brass rim flush mounted in the wall plate. Alternate shall be approved by Engineer of Record and/or Owner prior to purchase.
 - 5. All switches shall be of the same manufacturer.

6. Normal switch color shall be confirmed with architect or owner. Switches controlling circuits connected to emergency power source shall be red.
- C. Manual Wallbox Dimmers
1. Fluorescent dimmers shall be 120 (or 277) volts as required for circuit wiring. Rating shall be based on quantity of lamps controlled.
 2. Incandescent dimmers shall be thin-profile 120 volts and up to 1500 watts rating. Lutron "Nova T" series, "NTV-1000 or NTV-1500" or equal.
 3. Wallbox dimmers shall be slider type with built-in switch and radio/T.V. interference filter. Dimmers shall be solid-state type.
- D. Sensor Switch (Motion Sensor)
1. Wall sensor switch shall be infrared type, two wire connection (no neutral), 120/277V compatible with electronics ballast and working with 60 watt load. Model # 01-141 Novitas or equal.
 2. Ceiling sensor switch shall be infrared type. Cover 28' x 28' for corner mounting and 32" x 60" for center mounting, by Novitas.
 3. Ceiling sensor control unit (switch pack) shall be 120/277V and installed in J-box next to lighting circuit, J-box Model #13-012 Novitas or equal.
- E. Receptacles
1. Single and duplex convenience receptacles shall be U-grounded type, 125 volts, side and back wired with binding screws only with double wipe contacts and spring steel back up clips. Rating 20 amperes, 125 V. Model #5362 of Hubbell, Pass & Seymour or Arrow Hart. See Item 2 below for receptacle color.
 2. Receptacles shall be red on emergency circuits, orange on isolated ground system or white for the rest. Confirm color with architect or owner.
 3. The grounding contact shall be one piece and internally connected to the frame with ground terminal for external ground.
 4. Special receptacles shall be as indicated on plans by NEMA configuration.
 5. Ground fault receptacles shall be 20 amperes, 125 volt, duplex, three wire grounding with pilot light and test and reset buttons. Suitable for feed-through wiring, color to be selected, Hubbell 5362 GF Series, or Pass & Seymour 2091 SIL Series.
 6. Isolated ground type receptacles shall be IG 5362 Hubbell, Pass & Seymour or Arrow Hart and shall conform to UL Standard #498 and NEC/NFPA requirements, ANSI #C73.
 7. Poke-thru receptacle shall be flush, 5/8" thick, die-cast aluminum, for power and communication UL listed and classified for 2 hours fire rated Walker 1500 series, Hubbell #PT7-FX.
 8. Wiring devices in exposed weatherproof boxes shall be the devices specified in this section, and shall be installed in "FS" or "FD" series condulets with weatherproof cast metal covers, and gaskets as required.
 9. All receptacles shall be of the same manufacture.
 10. Each receptacle installed within 72" of sinks, in wet or damp areas, on roof, outdoors, below grade (pit), janitor, closets, and bathrooms, shall have automatic 5 ma, individual ground fault (GFI) protection.
 11. Floor Outlets: Where floor outlets are shown, boxes shall be cast iron by Walkerduct #800, and 880 CI Series, Steel City, Hubbell #B-2500 series, or equal. Where 120,

208 or 240 volts are used, standard NEMA receptacles, suitable for the service, shall be used.

F. Plates

1. Provide plates for all switches, receptacles, junction boxes, telephone and other outlets.
2. Provide engraved or etched plates for all lock switches, pilot switches, switches from which equipment or circuit controlled cannot be readily seen, three or more switches under a common plate and for switches as indicated.
3. Stainless steel plates shall be American Iron and Steel Institute (AISI) Type 302, with beveled edges, 0.040" thick with satin smooth finish. "Smoothie," Hubbell #97071 Series.
4. Plastic cover plate shall be high impact thermoplastic, high strength, scratch-resistant, smooth and self-extinguishing, Hubbell "PI" Series or Pass & Seymour RP Series.
5. Where outlets are indicated to be weatherproof, provide an AISI Type 302 stainless with double hinged covers, Pass & Seymour #WPD-8.
6. Galvanized steel plates shall be square or rectangular and hot dipped galvanized or sherardized, beveled edges and 0.040" thick. Galvanized steel plates shall be used in utility area.
7. Provide plates equipped with close fitting openings for the exact device to be used. Provide plates for telephone outlets equipped with bushed openings.
8. Refer to Section 16141 for labeling of plates.
9. Cover plates on pressed steel outlet boxes in furred areas, attics, etc., or exposed in mechanical equipment rooms shall be of the same material as the outlet box.
10. Cover plates in locations concealed from public view shall have the circuit numbers and source feed point hand labeled with marking black pen (permanent marker). See Section 16141 for labeling.
11. Provide plastic cover plates unless noted otherwise.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Mount switches 42" above finished floor and vertically in all locations unless indicated otherwise.
- B. All convenience and telephone outlets mounted 18" above the floor shall be installed vertically. Install receptacle with the grounding terminal up. All receptacles mounted more than 18 inches above the floor over the bench top shall be installed horizontally with the grounding terminal to the left.
- C. National Electrical Code (NEC) sized (#12 minimum) bonding jumper shall connect grounded outlet box to receptacle grounding terminal on all flush mounted units.
- D. Align and plumb all devices and plates. Plates shall fit flat against wall and tight against device surface without strain on plate.
- E. Each class of device shall be furnished by one manufacturer for total project. Mixing devices of different suppliers will not be permitted.
- F. Ganged switches on 277 volt circuits shall have a barrier between each switch.

- G. Manual dimmers shall be installed in individual outlet boxes. Do not install in ganged boxes with other devices.

*****END OF SECTION*****

SECTION 16141
NAMEPLATES AND WARNING SIGNS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide nameplates and warning signs as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

Submit a nameplate schedule to the Owner's Authorized Representative for review before the nameplates are installed.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Fabricated nameplates shall clearly state the following:

1. Manufacturer's name and equipment design ratings including current, voltage, (V), kilovoltamperes (KVA), horsepower (HP), revolutions per minute (RPM), bus bracing rating, and data, or as applicable.
2. System usage and purpose, system nominal voltage, equipment rating KVA, amperes, HP and RPM as applicable. Designation data per Drawings or supplied with shop drawings.
3. Panel and pullbox designation, date, voltage phase, wire, source of supply, and room number of the service.

B. Manufacturer's Device Nameplates: Device usage, manufactured date, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:

1. Circuit Breakers: Voltage, continuous current, maximum interrupting current and trip current.
2. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics".
3. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically held" or "electrically held".
4. High Voltage Sectionalizing Boxes: Voltage, continuous current and maximum current switching, located to be visible after installation.
5. Motors: Rated voltage, full load amperes, frequency, phases, speed, horsepower, code letter rating, time rating, type of winding, class and temperature.
6. Controllers: Voltage, current horsepower and trip setting of motor running overcurrent protection.

C. Equipment nameplate shall be engraved, laminated Micarta type with white letters engraved through the black background, except on emergency systems background shall be red and include the word "EMERGENCY". Letters shall be 3/8" high for devices, and minimum 1/2" high for equipment and enclosures. Adhesives are not acceptable.

- D. All plates for receptacles and switches on emergency circuit shall be labeled "EMERGENCY" with 3/8" letters.
- E. Each outlet not 120V - 20A shall be labeled indicating volts, amperes, circuit number with panel name and equipment fed.
Example: 208V - 20A
 P1A-2,4
 COPIER
- for I.G. receptacle next to data outlet equipment name will be "Computer Only". No equipment name for convenience outlet.
- F. All conduit and outlet boxes for signal system shall be color coded with 6" wide spray paint in every 6' as follows:
- | | |
|----------------|-------------|
| Fire Alarm | Red |
| Tel/Data | Light Green |
| Paging Address | Gray |
| HVAC Control | Light Blue |
- G. Marker pen is not acceptable to use for nameplate unless otherwise noted.
- H. Provide a full size glass framed photocopy of single line diagram on wall adjacent to main switchgear.
- I. All labeling of receptacles shall be written in a consistent font, letter height, and color throughout the project.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Nameplates shall be mounted by steel screws.
- B. Signs shall be permanently mounted with cadmium plated, steel screws.
- C. The following items shall be provided with nameplate identification: cabinets, pull boxes, panel boards, disconnect switches, transformers, feeders and any other items as specified.

*****END OF SECTION*****

SECTION 16170
SWITCHES, DISCONNECT AND SAFETY

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide switches, disconnect and safety as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

Submit complete equipment product data and shop drawings with dimensions, equipment ratings for voltage capacity, horsepower and short circuit rating.

1.04 REFERENCES

- A. ANSI/UL 198C - High-Intensity Capacity Fuses; Current Limiting Types.
- B. ANSI/UL 198E - Class R Fuses.
- C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).
- D. FS W-F-865 - Switch, Box, (Enclosed), Surface-Mounted.
- E. NEMA KS 1 - Enclosed Switches.

Materials and installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. DISCONNECT SWITCHES

- 1. Provide all disconnect switches with devices enabling the switch to be locked in the open and closed positions.
- 2. Externally operable safety switches shall have quick-make, quick-break mechanism, capable of switching 10 times the switch rating, and with cover interlocks with defeat mechanism for maintenance. Provide switches with number of poles, ampere, voltage and HP rating, types of enclosures and fusible or nonfusible as indicated and as required for the particular application. Provide National Electric Manufacturer's Association (NEMA) 1 enclosures for interior locations and NEMA 3R enclosures for exterior or wet locations unless otherwise indicated. Switches have a dual rating when used with dual element fuses shall have rating so indicated on the metal plate.
- 3. Provide UL listed current limiting type RK5 fuses where required.
- 4. Provide circuit breaker with enclosure as shown on the Drawings. Circuit breaker shall be same as specified in Section 16425.
- 5. Manufacturers: Westinghouse, General Electric or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Install switches, disconnects and safety, where indicated on the Drawings.
- B. Securely fasten to structural members or channel support.
- C. The switches shall be installed to have easy access and in sight of equipment.

*****END OF SECTION*****

SECTION 16180
OVERCURRENT PROTECTION

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide overcurrent protection as shown on drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit under pertinent provisions of Article 5 of the General Conditions.
- B. Submit shop drawings and product data for the following:
 - 1. Circuit Breakers.
 - 2. Fuses.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Molded case circuit breakers shall be as specified in Section 16425 - 2.01.
- B. Fuses
 - 1. Provide fuses for services as shown or as required as follows:
 - a. Motor and equipment fused disconnects.
 - b. Control and signal circuits.
 - 2. 600 Volt Power Fuses: Provide UL listed current limiting type, RK5 for 0-600A, where required. By Bussman, Gould, Shawmut or equal.
 - 3. Where required, provide control and instrument fuses suitable for installation in fuse blocks or fuseholders.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Provide three spare fuses or 10 percent of each type of fuse, whichever is greater.
- B. Provide spare fuse cabinets with fuse schedule mounted in frame on door inside. Provide hinged, lockable door keyed to panelboards.
- C. Provide each switch with a fuse identification label installed on inside showing fuse type, size and manufacturer.

*****END OF SECTION*****

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SECTION 16190
VIBRATION ISOLATION

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide vibration isolation for electrical equipment that has vibration properties, such as transformers, or attached to other equipment that has vibration properties, such as HVAC equipment, motors, etc.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit catalog cuts and data sheets on specified vibration isolation units proposed, showing compliance with these Specifications.
- B. Submit an itemized list showing detailed selection data for each vibration isolator including:
 - 1. The equipment identification mark.
 - 2. The isolator type.
 - 3. The actual load.
 - 4. The static deflection expected under actual load.
 - 5. The specified minimum static deflection.
 - 6. The ratio of spring height under load to spring diameter.
- C. All submittals shall be signed by a Structural Engineer licensed in the State of California.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Provide vibration isolators of the appropriate sizes with the proper loading capacity to meet the specified deflection requirements.
- B. All metal parts of vibration isolation units installed outdoors shall be cold-dip galvanized, cadmium plated, or neoprene coated after fabrication.
- C. All isolators installed outdoors shall have baseplates with bolt holes for fastening the isolators to the support members.
- D. All vibration isolation mounts shall be supplied by one of the following approved manufacturers.
 - 1. Mason Industries Inc. (Anaheim, CA) - MI.
 - 2. California Dynamic Corporation (Los Angeles, CA) - CalDyn.
 - 3. Kinetics Noise Control Inc. (Santa Fe, CA) - KNC.
- E. Vibrator Isolator Types
 - 1. General Properties
 - a. Springs shall be so designed that the ratio of horizontal stiffness to vertical stiffness is approximately 1.

- b. Spring isolators shall have diameter not less than 0.8 of the compressed height of the spring at the rated load.

2. Isolator Description

- a. Type MS shall be spring type, without housings or snubbers, equipped with leveling bolts and with two layers of ribbed or waffled neoprene pads, separated by a 1/16" galvanized steel plate under the base plate. Neoprene sleeves and washer shall be installed at all anchor bolts.
- b. Type HS shall be suspension hangers having a steel frame and spring element, in series with a neoprene pad, cup or washer. The isolator shall be designed so that hanger rod may be misaligned 15 degrees in any direction relative to the vertical, without contacting hanger box frame.
- c. Type BN shall be formed by two layers of 1/4" to 5/16" thick ribbed waffled neoprene sandwiches between two stainless steel or aluminum plates.
- d. Type HN shall consist of a neoprene-in-shear element contained within a steel housing. A neoprene neck bushing shall be provided where the hanger rod passes through the hanger housing to prevent the rod from contacting the hanger housing. The diameter of the hole in the housing shall be sufficient to permit the hanger rod to swing through a 30 degree arc before contacting the hanger housing.

*****END OF SECTION*****

SECTION 16191
RESTRAINING DEVICES

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide restraining devices as required.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SUBMITTALS

- A. Submit complete shop drawings.
- B. All submittals shall be signed by a Structural Engineer licensed by the State of California.

PART 2 -- PRODUCTS

2.01 MATERIALS

A. Restraints

- 1. Restraints shall consist of 2" by 1/4" flat iron bars with resilient pads to provide vertical and lateral restraint during seismic shock.
- 2. Each restraint shall consist of two pieces of flat iron bars bolted together with two 3/8" bolts and serrated washers. The holes in the bars shall be slotted vertically to permit adjustment for required clearance.

B. Steel wire minimum #12 American Wire Gage (AWG).

C. All seismic restraining devices shall comply with the current seismic requirements of the State of California for this type of device.

PART 3 -- EXECUTION

3.01 INSTALLATION

A. BOLT RESTRAINTS TO FLOOR WITH 1/2" LAG TYPE BOLTS AND ANCHORS.

B. Install restraints after equipment has been set on isolators and after the isolators have been adjusted for required deflection.

C. Provide cable restraints for lighting fixtures and supports for power poles.

*****END OF SECTION*****

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SECTION 16450
GROUNDING SYSTEM

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide a complete and adequate grounding system.

1.02 SYSTEM REQUIREMENT

- A. Grounding shall be as approved by the State of California, Division of Industrial Safety.
- B. 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 size within each raceway connected to the isolated metallic raceways or enclosures at each end.
- C. The main switchgear shall be bonded to the 2" or larger metal cold water line with minimum of 1" conduit with 1 No. 4/0 wire. All metallic piping systems (gas, fire sprinkler, etc.) shall be bonded to the cold water line with 3/4" conduit with 1 No. 8 wire.
- D. Noncurrent-carrying metal parts of all high voltage, light and/or power and signal conduit systems, supports, cabinets, switchboards, enclosures, fixed equipment, portable equipment, and motor frames shall be permanently and effectively grounded.
- E. Service neutral conductor of light and/or power alternating current systems shall be grounded if the maximum voltage to ground does not exceed 150 volts. Higher voltage service neutrals shall be grounded where so indicated on the Drawings.
- F. Secondary neutral conductor of all light, power and signal alternating current systems shall be grounded. Neutrals shall be grounded at supply side of first switch controlling the system. Where no switch controls the entire system, the neutral shall be grounded at the transformer.
- G. Provide a "made electrode" bonded to the equipment enclosure for each light and/or power system. Grounded (neutral) conductors shall be terminated at the neutral bus of the first panel or switchboard and the neutral bus, equipment enclosure, and "made electrode" shall be bonded together.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 REFERENCES

ANSI/NFPA 70 - National Electrical Code.

Materials and/or installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Yard boxes shall be precast concrete and shall be approximately 14" wide, 19" long and 12" deep (outside dimensions), or larger, if necessary to obtain the required clearances. Boxes shall be equipped with bolt down, checkered, cast iron covers and a cast iron frame cast into the box. Yard boxes shall be Brooks 36.
- B. Made electrodes shall be approved copper clad steel ground rods, minimum of 3/4" in diameter. Rods shall be 10 feet in length.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Grounding electrodes shall be located in the nearest usable planting area, where not otherwise indicated on the Drawings, and each electrode shall terminate within a concrete yard box installed flush with the finish grade. In planting area, the concrete yard box shall be 2" above planting surfaces.
- B. Rods shall be driven to a depth of not less than 8'-0". Electrodes shall have a resistance to ground of not more than 5 ohms if practicable. If the resistance exceeds 5 ohms, two or more electrodes connected in parallel shall be provided. The minimum number and size of ground rods shall be as required by the State Electrical Safety Orders. Each electrode shall be separated from each other electrode by not less than 6'-0". Paralleled electrode shall be connected together with approved fittings and approved grounding conductors in galvanized rigid steel conduit, buried not less than 12" below finish grade.
- C. Transformers and other isolated neutrals shall be grounded from the neutral bushing or connector to main ground electrode.
- D. The interior metallic cold water system shall be bonded to the building steel.
- E. All conduit stub-ups shall be grounded and where multiple stub-ups are made within an equipment enclosure, such as a switchboard, they shall be equipped with grounding bushings and bonded together and to the enclosure and the enclosure ground bus.
- F. All feeder runs and branch circuit wiring in non-metallic conduit shall carry a green TW insulated NEC sized ground conductor per circuit properly connected for electrical ground continuity.
- G. All feeder and branch circuit conduits shall contain an equipment ground conductor with 600 volt green insulation.
- H. When indicated on Drawings, provide isolated ground conductor in addition to green ground conductor. Isolated ground conductor shall be green with yellow stripe.
- I. Flexible conduit shall not be used as a ground path. Include NEC sized green conductor in all flex conduit.
- J. Provide NEC approved bonding devices, fittings or jumpers at expansion fitting, isolation sections or wherever continuity of ground is broken.
- K. Provide 6 feet (1) #4/0 ground bare copper jumper at building seismic and expansion joint at each level. This jumper shall be accessible for inspection and testing.
- L. Connections above grade shall be made with bolted solderless connectors and those below grade shall be made by a fusion-welding process. In lieu of 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.
- M. Weld grounding conductors to underground grounding electrodes.
- N. Install grounding and bonding conductors with sufficient slack to avoid breaking due to settlement and movement of conductors at attached points.
- O. The resistance to ground for all systems shall be measured by the "direct" method or "fall-of-potential" method.
 - 1. Perform "fall-of-potential" test per Institute of Electrical and Electronic Engineers (IEEE) Standard No. 81, Section 9.04 on the main grounding electrode or system.

2. 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.
 3. The earth electrode under test must be far enough away from the water pipe system to be outside its sphere of influence. Rule of thumb: Distance from the earth electrode system to the water pipe system should be about 10 times the radius of the electrode or grid to obtain a measurement within an accuracy of plus or minus 10%.
- P. Apply corrosion-resistant finish to field connections, buried metallic grounding and bonding products, and places where factory applied protective coating has been destroyed, which are subjected to corrosive action.
- Q. Resistance to ground for electrical systems shall not exceed 5 ohms measurement and additional grounding shall be provided to attain this value or lower.

3.02 RECORDS

- A. A certified record of ground-resistance test on each driven ground rod, ground rod assembly, and other grounding electrodes shall be prepared and submitted for approval to the Owner upon completion of this part of the work.
- B. The record shall include the number of rods driven and their depth at each location to meet the required resistance to ground measurements specified. A statement shall be included describing the condition of the soil at the time of measurement.

3.03 AS-BUILT DRAWINGS

- A. As-built drawings shall indicate the location of all ground rods and supplementary grounding electrodes connected to the grounding system.
- B. The location of each ground rod, ground-rod assembly, and other grounding electrodes shall be identified by letter in alphabetical order and keyed to the record of ground-resistance tests.

*****END OF SECTION*****

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SECTION 16470

PANELBOARDS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide panelboards as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SHOP DRAWINGS SUBMITTALS

Include a front elevation, indicate cabinet dimensions, make, location and capacity of equipment, integrated short circuit ampere rating, size of gutters, type of mounting, finish, and catalog number of locks and construction details. Catalog of all circuit breakers.

1.04 REFERENCES

- A. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.
 - B. FS W-P-115 - Power Distribution Panel.
 - C. NEMA AB 1 - Molded Case Circuit Breakers.
 - D. NEMA PB 1 - Panelboards.
 - E. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
 - F. NEMA PB 1.2 - Application Guide for Ground-fault Protective Devices for Equipment.
- Materials and installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Provide panelboard cabinets flush or surface-mounted as noted on the Drawings, with bolt-on circuit breakers, with hinged lockable door, typewritten index card holders under plastic cover, aluminum busing, and main lugs or main protective device as indicated on the Drawings. Panels to 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. Busing shall be minimum 225 amperes. Panelboards with a height greater than 3 feet shall have three trim bolts each side.
- B. Lighting, power and distribution panelboards shall be three phase, four wire, S/N 208/120V or 480/277V, as indicated on the Drawings. Panelboards shall be Westinghouse or General Electric. All panelboards shall be equipped with a ground bus and a minimum 225A frame main circuit breaker. In addition to regular ground bus bar provide an isolated ground bus bar for all 120/208V lab, patient area panelboards and as indicated on the Drawings.
- C. All boxes shall be formed of galvanized steel, chemically cleaned, and all breaks in galvanizing shall be painted with metallic aluminum paint. Minimum size: 20" wide by 5-3/4" deep unless noted otherwise on the Drawings. All trims and doors shall be chemically

cleaned. Front door and trim shall be finished with ANSI 61 light gray paint for surface or semi-recessed mounting, and shall be finished with a prime coat for flush mounting.

- D. Provide zinc chromate primer factory finish on the exposed trim of all flush mounted panels in corridors, offices and other public spaces.
- E. 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 as shown on the Drawings, or higher as described in next Paragraph. As a minimum, 120/208V circuit breakers shall be rated 10,000 amperes symmetrical. Circuit breakers for the 480/277 voltage ratings shall be minimum 14,000 ampere interrupting rating, or higher as noted on the Drawings.
- F. 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.
- G. 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.
- H. 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.
- I. All circuit breakers shall meet Section 16425 - 2.01 (molded case circuit breaker). Voltage shall be as required.

2.02 PANELBOARD CABINETS

- A. 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 size exceeds No. 4 or 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 the bottom of the cabinets. Side gutters shall not be less than 4" wide. The width of the cabinets shall be minimum 20".
- B. 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, lock for metal door. All panelboard locks shall be keyed to operate from one key.
- C. 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.
- D. Panelboard Schedule: The Contractor shall prepare a neatly typewritten schedule with the number or name of the room or area or 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.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Fronts shall be flush type unless otherwise indicated and shall be fastened fully concealed 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 screws at the site to accomplish this if necessary. Install nameplates at the front of each panelboard.
- B. 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.
- C. Panelboard cabinets shall be rigidly supported in place independent of the conduits with (2) row unistrut.
- D. Panelboards located in mechanical areas shall have weatherproof gaskets on trims and doors.
- E. Obtain building room numbering system and include these room numbers in final typewritten panelboard directories.
- F. Install nameplates in accordance with the "Nameplates and Warning Signs" Section.
- G. From each flush mounted panelboard, route (4) 1" empty conduits into accessible ceiling space and cap for future use.

*****END OF SECTION*****

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SECTION 16480
TRANSFORMERS

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide dry type transformers as shown on the Drawings and as specified.

1.02 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.03 SHOP DRAWINGS AND PRODUCT DATA SUBMITTALS

- A. K.V.A. and voltage of primary and secondary windings.
- B. Windings insulation class and rated temperature rise.
- C. Underwriters' Laboratories, Inc. (U.L.) label.
- D. Sound level test results of a similar transformer.
- E. Physical size.
- F. Finish and efficiency at 25, 50, 75 and 100 percent rated load.
- G. Windings material.
- H. Applied voltage test report.
- I. Induced voltage test report.
- J. Basic impulse insulation level (BIL).
- K. Impedance rating and characteristics.

1.04 REFERENCES

- A. ANSI/NEMA - ST 1 - Specialty Transformers.
- B. ANSI/NEMA ST 20 - Dry Type Transformers for General Applications.

Materials and/or installation shall meet or exceed the above referenced standards.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Transformers, Dry Type: Distribution transformers shall be constructed and tested in accordance with ASA and NEMA Standards, and shall be wound with copper conductors. Performance of transformers shall be equal to or exceed ASA and NEMA published criteria. UL listed and bear the Energy Star label.
- B. Transformers shall be indoor self-cooled type with Class H, NEMA Group III insulation (220°C) and a maximum temperature rise of 115° C (higher temperature rise is not acceptable). under continuous full load conditions at 40°C ambient temperature.
- C. Transformers shall be equipped with five 2-1/2% (2 above and 2 below normal voltage) taps. Windings shall be copper of the fine-resistant type, designed for natural convection cooling through normal air circulation.

- D. Core mounting frames and enclosures shall be of the welded and bolted construction with sufficient mechanical strength and rigidity to withstand shipping erection and short circuit stresses.
- E. Enclosure cover plates shall be code gage sheet steel, captive bolted to the enclosure framework. Enclosure shall have suitable ventilating openings. The ventilated opening shall be screened. Enclosure shall be provided with lifting lugs and jacking plates as required.
- F. Transformers shall be furnished complete with mounting channels and mounting bolts. Metal parts, excepting cores and core mounting frames shall be cleaned, rust-proofed and be given a heavy coating of an inert primer.
- G. The transformer finish shall be ANSI 61 gray.
- H. Transformers shall be by Square D, Cutler Hammer or General Electric.
- I. All transformers shall have a basic impulse insulation level of 10 KV. The following tests shall be done at the factory:
 - 1. Applied voltage test to each winding and from each winding to ground.
 - 2. Induced voltage test - two times normal voltage.
 - 3. Ratio, polarity and sound level.

Sound level tests shall be performed in test rooms with an ambient sound level not exceeding 24 dB.

 - 4. Energy Star Standard.
- J. Sound levels shall meet NEMA TR-27 and not exceed the following:

0-9 KVA	-	40 dB
10-50 KVA	-	45 dB
51-150 KVA	-	50 dB
151 to 300 KVA	-	55 dB
301 to 500 KVA	-	60 dB
- K. Transformers shall have a minimum overload capacity per ANSI Standard. Certified temperature test of electrical duplicate units shall be supplied upon request.
- L. Terminal compartments for both primary and secondary lines shall be located in the bottom of the transformer to ensure termination of cable leads in ambient temperature levels and to provide for side or bottom entrance of conduit.
- M. Provide shielded insulation isolated drive and K-factor transformer as indicated on drawings and meet this section requirement.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. Transformer core frame shall be installed level on shock absorbing pads within the enclosure.
- B. Set transformers on vibration isolation mounts. Refer to Section 16190.
- C. Where feeders come from the floor below, they shall terminate at the end of transformer enclosure with a metal grounding bushing with neoprene throat insert. Ground the bushing to the transformer enclosure.

- D. Where feeders come from overhead, the conduits shall enter the side of the transformer enclosure. The conduits within 36 inches of the enclosure shall be flexible steel. Conductors shall route to transformer enclosure through nipples with insulated bushings on each side.
- E. All conduits shall be isolated from the transformer enclosures by the use of neoprene grommets at conduit entrances to enclosure and the use of a grounding bushing. Flexible jumpers shall be installed for grounding continuity from enclosure to conduits or bus ducts.

3.02 VOLTAGE CHECK

- A. The Contractor shall set the taps on all transformers, which are a part of this contract as necessary to provide satisfactory operating voltages with all present loads energized, including the new loads and any existing loads. A check shall be made in the presence of the Owner's Authorized Representative at a panel fed from each transformer which is the farthest from the transformer.
- B. The Contractor shall provide all instruments and accessories required to perform the checks. Voltmeters shall be accurate with 3/4 or 1% and shall have scales permitting the voltage readings to be made on the upper half of the scale. Calibration of the meters shall be satisfactory to Owner's Authorized Representative.

*****END OF SECTION*****

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SECTION 16520
AUTOMATIC LIGHTING CONTROL SYSTEM

PART 1 -- GENERAL

1.01 DESCRIPTION OF WORK

Provide and design an automatic lighting control system as described in this specification and as called for on the drawings.

1.02 QUALITY ASSURANCE

- A. Manufacturer shall have a minimum of 10 years experience in manufacturing and installing this type of system.
- B. The Contractor shall provide a list of recent jobs completed during the last 5 years with the name and phone number of a contact person.
- C. All components and assemblies are to be pre-tested and assembled at the factory prior to installation.
- D. Provide a factory-trained technician on site. The technician shall functionally test each component in the system after installation to verify proper operation and confirm that the panel wiring and addressing conform to the wiring documentation.

1.03 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.04 SUBMITTALS

The following list includes the required shop drawings and product data information that shall be submitted.

- 1. Underwriters Laboratories, Inc. (UL) listing and factory test reports.
- 2. Internal and system wiring diagrams.
- 3. Single line diagram of the system configuration. *Typical riser diagrams are not acceptable.*
- 4. Dimensions of the equipment layout.
- 5. Control wiring and conduits layout and connections.
- 6. Floor plans to scale showing the location of each device and equipment.
- 7. Product data of all the components including but not limited to programmable central controllers, transceivers panels, input relays, switches and other ancillary equipment.

1.05 REFERENCES

- A. UL 916 Energy Management Equipment.
- B. FCC Emissions Standards specified in Part 15, subpart J for Class A, Applications.

PART 2 -- PRODUCTS

2.01 MATERIALS

- A. Provide and microprocessor controlled relay panels for the Lighting Control System. The system shall include programmable standalone master panel, switch inputs, wiring, power supplies, relays and ancillary relays.

- B. Panels shall be capable of standing alone or operating as part of a network.
1. The system shall provide intelligence to operate as follows:
 - a. Store all user operating data.
 - b. Initiate all relay output commands based on:
 - 1) Operator inputs
 - 2) Automatic operating schedule
 - 3) Binary type field sensors
 - 4) Universal override switch inputs
 - 5) Internal 56K Baud modem
 - c. Provide automatic system diagnostics and alarming based on detected faults in the controller, transceiver panels, relays, and data line.
 2. System shall include a memory back up to be able to survive an indefinite length of power failure.
- C. Lighting Control Panel (LCP): Microprocessor based, complete prewired assemblies consisting of the following:
1. Stand alone panel controller capable of receiving and acting upon programs downloaded from the central computer. Programs downloaded from the network shall be capable of continuing to operate even if the network should fail. Battery Back up provides 8 days of memory retention. Panel shall be part of a system that can control up to 750 relays and receive up to 500 switch inputs. Panel shall have an USB input for local programming and trouble shooting from a laptop computer.
 2. Internal digital clock with self control power.
 3. Output modules: Plug in type to receive coded digital commands from the panel controller and pulse output relays to the appropriate state. Actual status feedback of the relays are to be fed back to the panel controller and from there to the central computer. Actual status of each relay is to be indicated by a pilot LED on the control board. Each Module controls 8 or 16 relays.
 4. Switch input modules: Plug-in type, actuated by remote external contact closures. These contact closures may be either momentary or maintained. The action of the contact is noted by the panel controller and acted upon as programmed by software. The action of the contact can command any group of output relays to the desired state. Either 8 or 24-input channels as shown on the plans.
 5. Output Relays
 - a. Type: Momentary pulsed, mechanically latched with pilot light contact.
 - b. Rating: 20 Ampere, 277VAC
 - c. Number per panel: 16,32 or 48 as required to satisfy this project scope.
 6. The low voltage and high voltage sections of the lighting control cabinet shall be separated by a 14 gage steel barrier in which the relays are mounted. In areas where both 120 volt and 277 volt loads are present the high voltage compartment shall have a 14 gage steel barrier between the relays that carry 120 VAC and the relays that carry 277VAC. Each section shall be clearly labeled as to the voltage in that compartment.

7. Panel power supply shall be dual primary 115/277 volts AC, 60 Hz. \pm 10%. Low voltage side shall be protected from power line surges and spikes on the input power. The low voltage section shall be protected against short circuit faults and relay failures.
8. Panels shall be UL approved and shall have a short circuit withstand current rating at 14,000 AIC.
9. Manufacturer: Lighting Control and Design, or G.E. or equal.

PART 3 -- EXECUTION

3.01 INSTALLATION

- A. The Lighting Control System shall be installed and wired completely as required by the equipment manufacturer by the contractor, who shall make all necessary wiring connections to the lighting fixtures, override switches, photo cells and equipment.
- B. The Contractor shall provide on-site programming time with factory-trained personnel for the system set-up. The Contractor shall set up the software program and program the entire system in accordance with the Owner's instructions.
- C. Documentation
 1. Accurate "as-built" drawings shall be provided by the Contractor. These shall indicate the load controlled by each relay and the identification number for that switch connected to an input and the identification number of that input. Three sets of space plans or reflected ceiling plans shall be provided by the contractor indicating which fixtures are controlled by each relay.
 2. A separate data grade private line with RJ45 jack shall be furnished for each modem.

3.02 SERVICE AND SUPPORT

- A. Startup: After the system has been installed, the Contractor shall provide the services of a factory trained representative of the manufacturer to verify correct operation of all system components. The contractor shall guarantee all material and workmanship involving the system for three years after startup.
- B. Training: After system startup and after all the programming is completed, the Contractor shall arrange for a factory trained representative to train the Owner's personnel. The trainer shall instruct the Owner's personnel in how to program the system and demonstrate a typical operating program for an area. The Contractor shall allow for 24 hours' instruction time for the Owner's training.
- C. Factory Support: Factory support shall be available free of charge during the three-year warranty period to answer programming and application questions. The manufacturer, or his representative, shall have a remote terminal capable of programming the system to support the Owner's personnel during this period. The Contractor shall include a modem, necessary cabling and telephone extension to support this telecommunications operation. The Contractor shall provide a three-year maintenance service contract as part of the cost.
- D. The Contractor shall also provide a software site licensing so that the Owner will be able to transfer the software program from the main computer to the other computers. This transfer shall not be an extra cost to the Owner.

*****END OF SECTION*****

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SECTION 16721
FIRE ALARM SYSTEMS

PART 1 -- GENERAL

1.01 RELATED DOCUMENTS

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 fire alarm systems.
- B. Related Sections include the following:
 - 1. Division 08 Section "Door Hardware" for door closers and holders with associated smoke detectors, electric door locks, and release devices that interface with the fire alarm system.
- A. This specification represents the County's minimum requirements for a complete, proper, approved and operating Fire Protection System. Contractor shall be responsible for a design-build Fire Protection System including compliance with all applicable codes and requirements of the agency having jurisdiction (County of Riverside Fire Dept). Contractor to create required drawings and submit to the agency having jurisdiction for plan check and approval and shall acquire a permit and perform all installation, coordination, inspections and testing, as well as provide all materials and services necessary for a complete, approved and operational Fire Protection System.

1.03 DEFINITIONS

- A. FACP: Fire alarm control panel.
- B. LED: Light-emitting diode.
- C. NICET: National Institute for Certification in Engineering Technologies.
- D. Definitions in NFPA 72, 1999 Edition, apply to fire alarm terms used in this Section.

1.04 SYSTEM DESCRIPTION

Noncoded, analog-addressable system; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

- 1. Interface with existing fire alarm system.

1.05 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 72, 1999 Edition, CBC, CFC & Titles 19 and 24 CCR.

- B. Fire alarm signal initiation shall be by one or more of the following devices:
1. Manual stations.
 2. Heat detectors.
 3. Flame detectors.
 4. Smoke detectors.
 5. Verified automatic alarm operation of smoke detectors.
 6. Automatic sprinkler system water flow.
 7. Fire extinguishing system operation.
 8. Fire standpipe system.
 9. Duct smoke detectors.
 10. Tamper switch
 11. Flow switch
- C. Fire alarm signal shall initiate the following actions:
1. Alarm notification appliances shall operate continuously.
 2. Identify alarm at the FACP and remote annunciators.
 3. De-energize electromagnetic door holders.
 4. Transmit an alarm signal to the remote alarm receiving station.
 5. Unlock electric door locks in designated egress paths.
 6. Release fire and smoke doors held open by magnetic door holders.
 7. Activate voice/alarm communication system.
 8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
 9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
 10. Record events in the system memory.
 11. Record events by the system printer.
 12. Sound fire sprinkler bell (as applicable)
- D. Supervisory signal initiation shall be by one or more of the following devices or actions:
1. Operation of a fire-protection system valve tamper.
- E. System trouble signal initiation shall be by one or more of the following devices or actions:
1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
 2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at the FACP.

4. Ground or a single break in FACP internal circuits.
5. Abnormal ac voltage at the FACP.
6. A break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at the FACP or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.

F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators. Record the event on system printer.

1.06 SUBSTITUTIONS

Substitutions will be considered per Article 5.3 of the General Conditions.

1.07 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
 1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire alarm system design.
 - b. Fire alarm certified by NICET, minimum Level III.
 2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
 3. Device Address List: Coordinate with final system programming.
 4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
 5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
 6. Batteries: Size calculations.
 7. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 8. Ductwork Coordination Drawings: Plans, sections, and elevations of ducts, drawn to scale and coordinating the installation of duct smoke detectors and access to them. Show critical dimensions that relate to placement and support of sampling tubes, the detector housing, and remote status and alarm indicators. Locate detectors according to manufacturer's written recommendations.
 9. Voice/Alarm Signaling Service: Equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.

10. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits.
 11. Voltage Drop Calculations
 12. Fire alarm devices system equipment list describing functions and CSFM listing number
- C. Qualification Data: For Installer.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.
- F. Submittals to Authorities Having Jurisdiction: In addition to distribution requirements for submittals specified in Division 01 Section "Submittals," make an identical submittal to authorities having jurisdiction. To facilitate review, include copies of annotated Contract Drawings as needed to depict component locations. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.
- G. Documentation:
1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
 2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
 - a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.
 - b. Electronic media may be provided to Architect and authorities having jurisdiction.

1.08 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.09 PROJECT CONDITIONS

Interruption of Existing Fire Alarm Service: Do not interrupt fire alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Architect no fewer than fourteen days in advance of proposed interruption of fire alarm service.

2. Do not proceed with interruption of fire alarm service without Architect's and Owner's written permission.

1.010 SEQUENCING AND SCHEDULING

- A. Existing Fire Alarm Equipment: Maintain fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service and label existing fire alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of the new fire alarm system, remove existing disconnected fire alarm equipment.

1.011 EXTRA MATERIALS

Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
3. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
5. Keys and Tools: One extra set for access to locked and tamperproofed components.
6. Audible and Visual Notification Appliances: One of each type installed.
7. Fuses: Two of each type installed in the system.

PART 2 -- PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. FACP and Equipment:
 - a. Fire Control Instruments, Inc.; a GE-Honeywell Company.
 - b. Or approved equal
 2. Wire and Cable:
 - a. Belden, West Penn Wire/CDT; a division of Cable Design Technologies.

- b. Or approved equal.
- 3. Audible and Visual Signals:
 - a. Wheelock Inc..
 - b. Or approved equal

2.02 EXISTING FIRE ALARM SYSTEM

- A. Compatibility with Existing Equipment: Fire alarm system and all components shall operate as an extension of an existing system.
- B. Contractor is responsible to provide and install new equipment that will properly interface and operate with the existing Systems 3 FACP by Pyrotronics and meet all requirements of the agency having jurisdiction.

2.03 MANUAL FIRE ALARM BOXES

Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.

- 1. Single-action mechanism, breaking-glass or plastic-rod or pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
- 2. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass or plastic-rod or pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
- 3. Station Reset: Key- or wrench-operated switch.
- 4. Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
- 5. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm.

2.04 SYSTEM SMOKE DETECTORS

- A. General Description:
 - 1. UL 268 listed, operating at 24-V dc, nominal.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 - 3. Multipurpose type, containing the following:
 - a. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 - b. Piezoelectric sounder rated at 88 dBA at 10 feet (3 m) according to UL 464.
 - c. Heat sensor, combination rate-of-rise and fixed temperature.

4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.
 - a. Rate-of-rise temperature characteristic shall be selectable at the FACP for 15 or 20 deg F (8 or 11 deg C) per minute.
 - b. Fixed-temperature sensing shall be independent of rate-of-rise sensing and shall be settable at the FACP to operate at 135 or 155 deg F (57 or 68 deg C).
 - c. Provide multiple levels of detection sensitivity for each sensor.

B. Photoelectric Smoke Detectors:

1. Sensor: LED or infrared light source with matching silicon-cell receiver.
2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.

C. Duct Smoke Detectors:

1. Photoelectric Smoke Detectors:
 - a. Sensor: LED or infrared light source with matching silicon-cell receiver.
 - b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
2. UL 268A listed, operating at 24-V dc, nominal.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.
 - a. Weatherproof Duct Housing Enclosure: UL listed for use with the supplied detector. The enclosure shall comply with NEMA 250 requirements for Type 4X.
5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Provide remote status and alarm indicator and test station where indicated.
7. Remote Control: Unless otherwise indicated, detectors shall be analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

8. Each sensor shall have multiple levels of detection sensitivity.
9. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
10. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.05 HEAT DETECTORS

- A. General: UL 521 listed.
- B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F (57 deg C) or rate-of-rise of temperature that exceeds 15 deg F (8 deg C) per minute, unless otherwise indicated.
 1. Mounting: Plug-in base, interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
- C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F (88 deg C).
 1. Mounting: Adapter plate for outlet box mounting or Plug-in base, interchangeable with smoke-detector bases.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
- D. Continuous Linear Heat-Detector System: Consists of detector cable and control unit.
 1. Detector Cable: Rated detection temperature 155 deg F (68 deg C). Listed for "regular" service and a standard environment. Cable includes two steel actuator wires twisted together with spring pressure, wrapped with protective tape, and finished with PVC outer sheath. Each actuator wire is insulated with heat-sensitive material that reacts with heat to allow the cable twist pressure to short circuit wires at the location of elevated temperature.
 2. Control Unit: Two-zone or multizone unit as indicated. Provides same system power supply, supervision, and alarm features as specified for the central FACP.
 3. Signals to the Central FACP: Any type of local system trouble is reported to the central FACP as a composite "trouble" signal. Alarms on each detection zone are individually reported to the central FACP as separately identified zones.
 4. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.

2.06 NOTIFICATION APPLIANCES

- A. Description: Equipped for mounting as indicated and with screw terminals for system connections.
 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
 2. Revise sound-level values in first four paragraphs below to comply with local interpretations of ADA requirements.

- B. Bells: Electric-vibrating, 24-V dc, under-dome type; with provision for housing the operating mechanism behind the bell. Bells shall produce a sound-pressure level of 94 dBA, measured 10 feet (3 m) from the bell. 10-inch (254-mm) size, unless otherwise indicated. Bells are weatherproof where indicated.
- C. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.
- D. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.
- E. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Horns shall produce a sound-pressure level of 95 dBA, measured 10 feet (3 m) from the horn.
- F. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.
 - 1. Rated Light Output: candela as indicated on drawings.
 - 2. Strobe Leads: Factory connected to screw terminals.

2.07 FIREFIGHTERS' TWO-WAY TELEPHONE COMMUNICATION SERVICE

N/A

2.08 REMOTE ANNUNCIATOR

- A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, resetting, and testing.
 - 1. Mounting: Flush cabinet, NEMA 250, Class 1, as applicable.
- B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.09 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to the elevator controller to initiate elevator recall and to a circuit-breaker shunt trip for power shutdown.

2.010 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Listed and labeled according to UL 632.
- B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm

receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.

- C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.
- D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.011 GUARDS FOR PHYSICAL PROTECTION

Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.

- 1. Factory fabricated and furnished by manufacturer of the device.
- 2. Finish: Paint of color to match the protected device.

2.012 WIRE AND CABLE

- A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with CEC, Article 760.
- B. Signaling Line Circuits: To be compatible with existing FACP. Twisted, shielded pair, No. 14 AWG or as indicated on drawings.
 - 1. Circuit Integrity Cable: Twisted shielded pair, CEC Article 760, Classification CI, for power-limited fire alarm signal service. UL listed as Type FPL, and complying with requirements in UL 1424 and in UL 2196 for a 2-hour rating.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
 - 1. Low-Voltage Circuits: No. 16 AWG, minimum.
 - 2. Line-Voltage Circuits: No. 12 AWG, minimum.
 - 3. Multiconductor Armored Cable: CEC Type MC, copper conductors, TFN/THHN conductor insulation, copper drain wire, copper armor with outer jacket with red identifier stripe, UL listed for fire alarm and cable tray installation, plenum rated, and complying with requirements in UL 2196 for a 2-hour rating.

PART 3 -- EXECUTION

3.01 EQUIPMENT INSTALLATION

- A. Connecting to Existing Equipment: Verify that existing fire alarm system is operational before making changes or connections.
 - 1. Connect new equipment to the existing control panel in the existing part of the building.
 - 2. Connect new equipment to the existing monitoring equipment at the Supervising Station.

3. Expand, modify, and supplement the existing control equipment as necessary to extend the existing control functions to the new points. New components shall be capable of merging with the existing configuration without degrading the performance of either system.
- B. Smoke or Heat Detector Spacing:
- C. Edit first subparagraph below to indicate how Contractor shall determine detector spacing.
1. Smooth ceiling spacing shall not exceed 30 feet (9 m) and the rating of the detector.
 2. Spacing of heat detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
 3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.
 4. See Editing Instruction No. 13 in the Evaluations for discussion of placement of smoke detectors with respect to HVAC air inlets and outlets.
- D. HVAC: Locate detectors not closer than 3 feet (1 m) from air-supply diffuser or return-air opening.
- E. Duct Smoke Detectors: Comply with NFPA 72, NFPA 90A and CMC. Install sampling tubes so they extend the full width of the duct.
- F. Heat Detectors in Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location.
- G. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
- H. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- I. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- J. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.
- K. Device Location-Indicating Lights: Locate in public space near the device they monitor.
- L. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- M. Annunciator: Install with top of panel not more than 72 inches (1830 mm) above the finished floor.

3.02 WIRING INSTALLATION

- A. Install wiring according to the following:
1. NECA 1.
 2. TIA/EIA 568-A.
 3. CEC
- B. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceway and Boxes for Electrical Systems."
1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.
- C. Wiring Method:
1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, CEC Types MI and CI, is not permitted.
 3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.
- D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.
- G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum 1-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signals from other floors or zones.
- H. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.03 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Identification for Electrical Systems."
- B. Install instructions frame in a location visible from the FACP.
- C. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.04 GROUNDING

Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.05 FIELD QUALITY CONTROL

- A. **Manufacturer's Field Service:** Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
- B. **Testing Agency:** Owner may engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- C. **Testing Agency:** The contractor shall engage a qualified testing and inspecting agency to perform the following field tests and inspections and prepare test reports:
- D. **Perform the following field tests and inspections and prepare test reports:**
 - 1. Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
 - 2. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
 - 3. Include the existing system in tests and inspections.
 - 4. **Visual Inspection:** Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
 - 5. **Testing:** Follow procedure and record results complying with requirements in NFPA 72.
 - a. Detectors that are outside their marked sensitivity range shall be replaced.
 - 6. **Test and Inspection Records:** Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in CEC.

3.06 ADJUSTING

- A. **Occupancy Adjustments:** When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this

purpose.

- B. Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.
- C. Work in two paragraphs below is normally the responsibility of Owner. Retain one or both paragraphs if Owner needs additional time for inspections required by NFPA 72.
- D. Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- E. Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.07 DEMONSTRATION

Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices. Refer to Division 01 Section "Demonstration and Training."

*****END OF SECTION*****