ADDENDUM NO. 02
September 10, 2018

To Drawings and Specifications dated August 03, 2018.
DSA Application No.: 02-116660 - Approved August 14, 2018

MARENGO RANCH ELEMENTARY SCHOOL – HVAC REPLACEMENT
Galt Joint Union Elementary School District

Prepared by: **PBK**
2520 Venture Oaks Way, Suite 440
Sacramento, California 95833

PBK Project Nos.: 17233

A. Receipt of this Addendum shall be acknowledged on the Bid Form.

B. This Addendum forms part of the Contract documents for the above referenced project and shall be incorporated integrally therewith.

C. Each bidder shall make necessary adjustments and submit this proposal with full knowledge of all modifications, clarifications, and supplemental data included therein. Where provisions of the following supplemental data differ from those of the original Contract Documents, this Addendum shall govern.

GENERAL INFORMATION

Item No. 1 The district would like to remove and replace existing HVAC units and roofs concurrently with the Building Improvements project. All of the following projects are to be combined as one:

- Original Building Improvement Project – DSA App. No. 02-116660. (DSA Approved)
- Addendum #01 – HVAC Replacement (Pending DSA Approval)
- Addendum #02 – Roof and HVAC Replacement (DSA Approval Not Required)

Item No. 2 Addition of the attached Bid Documents:

- Notice to Contractors
- Marengo Ranch Elementary School Project – Request for Proposals for Preconstruction and Lease-Leaseback Services

SPECIFICATIONS

Item No. 3 Addition of the attached Specification Sections:

06 10 53 – Miscellaneous Rough Carpentry
07 54 19 – PVC Thermoplastic Membrane Roofing
09 24 00 – Cement Plastering (Patch and Repair)
22 05 00 – Common Work for Plumbing
22 05 23 – Valves and Accessories for Plumbing
22 11 23 – Natural Gas Piping
23 00 00 – HVAC General Conditions
23 05 00 – Common Work Results for HVAC
23 05 93 – Air and Water System Balancing
23 31 00 – Ductwork
23 33 00 – Air Duct Accessories
23 34 00 – Exhaust Fans
23 74 00 – Packaged Air Conditioning Units
26 28 16 – Overcurrent Protective Devices

26 28 19 – Disconnect Switches

DRAWINGS

Item No. 4 Addition of the attached Drawing Sheets:

G0.00 – Cover Sheet
G0.01 – Index, Drawing Conventions, and Location Map
D3.01 – Demolition Roof Plans – Bldgs A, B & G
D3.02 – Demolition Roof Plans – Bldgs C, E, H & L
A0.01 – Architectural Site Plan
A3.01 – Roof Plans – Bldgs A, B & G
A3.02 – Roof Plans – Bldgs C, E, H & L
A3.03 – Roofing Details
M0.01 – HVAC Legends & Notes
M0.02 – HVAC Schedules
M3.01 – HVAC Roof Plans Bldg L
M3.02 – HVAC Roof Plans Bldg E
M3.03 – HVAC Roof Plans Bldg G
M3.04 – HVAC Roof Plans Bldg C
M3.05 – HVAC Roof Plans Bldg B
M3.06 – HVAC Roof Plans Bldg H
M5.01 – HVAC Details
M6.01 – HVAC Details
E0.01 – Symbols List & Drawing Index
E3.01 – Power Roof Plans
E3.02 – Power Roof Plans

END OF ADDENDUM NO. 02

NOTICE TO CONTRACTORS

Notice is hereby given by Galt Joint Union Elementary School District ("District") that it will receive up to, but no later than the Due Date and Time stated below, sealed Proposals for Lease-Leaseback Construction Services (LLB) for the Project(s) generally described as Marengo Ranch Elementary Building Modernizations.

Project Description

The scope for this project includes a complete exterior façade removal and replacement, replacement of exterior building lights, modernizations to restrooms, addition of restrooms in one building, fire and intrusion alarm upgrades, painting and dry rot replacement at portables, coating the roofs at the portables, removal and replacement of existing non-metal roofs, replace HVAC units, stripping and painting existing metal roofs, and seismic bracing of existing gas lines.

Proposal Due Date and Time

2:00 p.m. on Monday, October 1st, 2018 at Galt Joint Union Elementary School District, 1018 C Street Suite 210, Galt, CA 95632

Request for Proposal Documents Available

On the District's website:
http://gjuesd-ca.schoolloop.com/pf4/cms2/view_page?d=x&group_id=1500178971369&vdid=i1d9f1tusv40tt

Or:

Galt Joint Union Elementary School District
Business Department
1018 C St., Suite 210, Galt, CA 95632
Contact: Ms. Marie Williams, email (mwilliams@galt.k12.ca.us) or (209) 744-4550 ext. 315

Submittal of Proposals

All Proposals shall be submitted on forms furnished by the District. Proposals must conform with, and be responsive to, the Request for Proposal Requirements, copies of which may be obtained from the District as set forth above. Only Proposals submitted to the District prior to the date and time set forth above shall be considered. Proposals will be opened privately.

Pre-Qualification of Contractors

In order to submit a Proposal, contractors must possess a current and active A or B license and be prequalified by the District by September 19, 2018. There are additional Lease-Leaseback contractor qualifications identified in the Request For Proposal.

Anticipated Project Requirements

Contracts will require a 100% performance bond, a 100% labor and materials bond. All projects are subject to the State Labor Code and the District's Labor Compliance Program requirements, including all Department of Industrial Relations requirements. For questions regarding the State Labor Code refer to Sections 1735, Discrimination of Employment and 1770, 1773, 1773.11 Prevailing Rates of Wages. Contractors who have been pre-qualified may be required to submit certifications of compliance with the procedures for implementation of the Disabled Veterans

Business Enterprise Contracting Goals. Contractors are allowed according to PCC sec. 22300 to submit "securities of lieu of retention".

Waiver of Irregularities

The District reserves the right to reject any or all Proposals or to waive any irregularities or informalities in any Proposal or in the Request for Proposal process.

DVBE Participation Goal

The District has established a Disabled Veteran Business Enterprise (DVBE) Participation Goal of 3%. All Proposers will be required to submit DVBE Worksheets that confirm outreach efforts to meet this goal.

Award of Contract

A Contract for Preconstruction Services and subsequently a Contract for Construction, if awarded, will be by action of the District's Board of Education to the responsive Proposer providing the Best Value to the District. The District reserves the right to reject any or all Proposals or to waive any irregularities in any Proposal or in the Request for Proposal process.

Bid Advertisement Dates

September 12, 2018 and September 19, 2018

Mandatory Pre-Submittal Conference/Site Walk

Thursday, September 20, 2018 at 2:00 p.m., Marengo Ranch Elementary, Room D6

END OF NOTICE TO CONTRACTORS

GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

1018 C Street, Suite 210
Galt, CA 95632
(209) 744-4545

MARENGO RANCH ELEMENTARY SCHOOL PROJECT

REQUEST FOR PROPOSALS FOR PRECONSTRUCTION AND LEASE-LEASEBACK SERVICES

RFP Issued: September 12, 2018
Mandatory Pre-Submittal Conference: September 20, 2018 @ 2:00 p.m.
Responses Due Date: October 1, 2018 @ 2:00 p.m.

I. INTRODUCTION

The Galt Joint Union Elementary School District ("District") is issuing this Request For Proposals ("RFP") requesting proposals from experienced lease-leaseback contractors ("Contractor" or "Firm" or "Proposer") who have been prequalified by the District in accordance with Education Code section 17406(a)(2)(C), Public Contract Code section 20111.6, and the District's Board Policies, and are qualified for the District's **Marengo Ranch Elementary School Building Modernization** Project (the "Project"), located at **1000 Elk Hills Drive**, Galt, California 95632 in Sacramento County.

The purpose of this RFP is to obtain information that will enable the District to select a lease-leaseback Contractor using the "best value" competitive procurement process pursuant to the provisions of Education Code section 17406 and the District's Board Policies that can assist the District with both preconstruction services and construction services. The "best value" competitive procurement process is an evaluation process whereby a Firm is selected by the District on the basis of objective criteria for evaluating the qualifications of Firms, with the selected Firm representing the best combination of price and qualifications. Each Contractor responding to this RFP should be prepared and qualified to provide the preconstruction services and lease-leaseback construction services described in this RFP to the District in an expeditious and timely manner and on relatively short notice so as to enable the District to meet critical time deadlines and schedules.

The District has provided notice of this RFP in compliance with Education Code section 17406(a)(2)(A) and Public Contracts Code section 20112, in order to ensure that the selection of the successful Contractor will be the result of a competitive solicitation process.

II. BACKGROUND ON THE PROJECT

This Project will be constructed using the lease-leaseback project delivery method authorized by Education Code section 17400 et seq. The District has contracted with **PBK** ("Architect") to be the Architect or Record for the Project, and the selected LLB entity will be expected to provide both preconstruction services and lease-leaseback construction services for the Project as described below and in Exhibit "A" to this RFP.

Initially, the District will enter into a preconstruction services agreement with the selected Contractor to perform certain basic services as well as those services described hereafter as part of the Preliminary Plan Phase and Working Drawing Phase. The plans and specifications for the Project will require approval by the Division of the State Architect ("DSA"). Thereafter, under authority of Education Code section 17406, the District intends to lease the Project Site to Contractor and have Contractor develop and cause the construction of the Project thereon and lease the Project Site back to the District in order to effectuate the foregoing, based upon a finding that it is in the best interest of the District to do so.

The estimated construction cost/budget for the Project is **$6,976,349.00** and the estimated performance period is **18** months.

III. CRITICAL DATES

Mandatory Pre-Submittal Conference

A Mandatory Pre-Submittal Conference will be held on **September 20, 2018, at 2:00 p.m.** to begin in **Room D6** located at **Marengo Ranch Elementary School, 1000 Elk Hills Drive**, Galt, CA 95632.

NOTE. At the Pre-Submittal Conference, District representatives will distribute information and materials to further describe the Project and the Scope of Work. To obtain the Project documents please contact **Marie Williams at 209-744-4545 ext. 315** or email your requests to **mwilliams@galt.k12.ca.us.** Project documents and the plan holders list may be viewed online by going to the District's website at **http://gjuesd-ca.schoolloop.com/**. Any proposed changes to these documents must be clearly identified and described in Respondent's Proposal. Respondents shall consider and address the materials and information distributed at the Pre-Submittal Conference in their Proposals.

Submittal Due Date

Responses to this RFP shall be submitted no later than **October 1, 2018, at 2:00 p.m.** at the Business Department of the District Administrative Offices, 1018 C Street, Suite 210, Galt, CA 95632. Attention: **Lois Yount, Director of Business Services/CBO**.

RFP Timeline

The following is a projection of tentative milestone dates for the Project:

DATE	MILESTONES
September 20, 2018, 2:00 p.m.	Mandatory Pre-Submittal Conference
September 19, 2018, 10:00 a.m.	Deadline for Contractor to Submit Prequalification Documents
N/A	Deadline for MEP Subcontractors to Submit Prequalification Documents
September 24, 2018, 10:00 a.m.	Deadline to submit questions and requests for information
October 1, 2018, 2:00 p.m.	RFP Responses Due
October 3, 2018	District completes evaluation of Proposals and qualifications of Proposers pursuant to Submittal Evaluation Criteria and Methodology section of this RFP, below, and in keeping with the District's Board Policies

October 8, 2018	Interviews (if required) of short listed Contractors
October 24, 2018	Board awards Preconstruction Services Agreement to Contractor with highest Best Value Score and determined to be best value to District
November 2, 2018	Preconstruction Services Completion Deadline
September 21, 2018	Estimated DSA Plan Approval for Project
November 2, 2018	Final GMP Deadline for Construction Services
October 24, 2018	Board awards LLB Documents for construction of Project to Contractor with highest Best Value Score and determined to be best value to District, and approves form of Site Lease, Sublease and Construction Services Agreement, or rejects all proposals.
November 5, 2018	Construction Services Commencement Date for Project
May 2020	Substantial Completion of Project
November 5, 2018	Estimated Commencement Date of Sublease
June 2020	Estimated Expiration Date of Sublease

IV. QUESTIONS AND CLARIFICATIONS OF THE RFP

All questions about the meaning or intent of this RFP shall be submitted to the District in writing addressed as follows:

Lois Yount
c/o Marie Williams
Galt Joint Union Elementary School District
1018 C Street, Suite 210
Galt, CA 95632
Email: mwilliams@galt.k12.ca.us and kim.johnson@pbk.com

Replies will be issued by addenda and mailed to all parties recorded by the District as having received the RFP documents. Questions received less than 7 calendar days prior to the submittal due date will not be answered. Only questions answered by formal written addenda will be binding.

ATTEMPTS TO CONTACT BOARD MEMBERS REGARDING THIS RFP WILL BE GROUNDS FOR DISQUALIFICATION FROM THE SELECTION PROCESS.

A Firm may withdraw its Response to this RFP by submitting, by mail or facsimile, a written request signed by the Firm's authorized representative. To be effective, the withdrawal must be received by the District prior to the date and time set forth herein as the due date for receipt of the Response to the RFP. Proposals may be resubmitted in the same manner, if done so before the submission deadline. Withdrawal or modification of a submitted Proposal in any other manner will not be permitted.

V. PRECONSTRUCTION SERVICES AGREEMENT

The selected Contractor shall perform the preconstruction services (the "Preconstruction Services") for the Project pursuant to a Preconstruction Services Agreement (the "Preconstruction Agreement"). In no event shall the Preconstruction Services to be provided by the Contractor include any work for which a contractor is required to be licensed and for which DSA approval is required. Preconstruction Services shall be limited to providing advice, including, but not limited to, input during design, reviewing the Project's plans and specifications to identify and note all deficiencies, incongruities and inconsistencies that may affect constructability of the Project, descheduling, pricing, and phasing to assist the District to design a more constructible Project.

VI. LEASE-LEASEBACK DOCUMENTS

The selected Contractor will act as a General Contractor pursuant to a Construction Services Agreement, Site Lease, and Sublease (collectively, "Lease-Leaseback Documents" or "LLB Documents"), and may contract with separate specialty contractors to perform the various trades comprising the entire Scope of Work. The Contractor shall work under the direction of District staff.

VII. DIR REGISTRATION AND PREVAILING WAGES

DIR Registration. Contractors and their subcontractors (of any tier) shall not be qualified to submit or be listed on a proposal, or engage in the performance of any contract for public work, as defined in the Labor Code, unless currently registered and qualified to perform public work pursuant to Section 1725.5 of the Labor Code. It is not a violation of this section for an unregistered contractor to submit a proposal that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.1 of the Labor Code at the time the contract is awarded.

Prevailing Wages. The Contractor and all subcontractors shall comply with the requirements set forth in Division 2, Part 7, Chapter 1 of the Labor Code. Pursuant to Labor Code section 1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate

for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type of worker needed to execute the contract. Copies are available from the District to any interested party on request and are also available from the Director of the Department of Industrial Relations.

VIII. SUBCONTRACTORS

Pursuant to Education Code section 17406(a)(4)(A), if designated in Exhibit "B" to this RFP, the District will require all Firms to identify and designate the subcontractor(s) who will be performing the scope(s) of work set forth in Exhibit "B". Each Firm shall list only one subcontractor for each scope of work as defined by the Contractor in its proposal. All subcontractors shall be properly licensed by the Contractors State License Board. All designated subcontractors in Exhibit "B" will be afforded the protections of the Subletting and Subcontracting Fair Practices Act (Public Contract Code section 4100 et seq.)

After award of the lease-leaseback contract for the Project, and in accordance with Education Code section 17406(a)(4)(B), any subcontractor that was not identified in the Contractor's proposal and whose subcontract value exceeds one-half of one percent of the price allocable to construction work must be awarded a subcontract in accordance with the following process:

- Provide public notice of availability of work to be subcontracted in accordance with publication requirements applicable to the competitive bidding process of the District, including a fixed date and time on which qualification statements, bids, or proposals will be due.
- Establish reasonable qualification criteria and standards.
- Award the subcontract either on a best value basis or to the lowest responsible bidder.

The process above may include prequalification or short-listing. The process shall not apply to subcontractors listed in the Contractor's original proposal. Subcontractors awarded subcontracts as set forth above shall be afforded all the protections of the Subletting and Subcontracting Fair Practices Act.

IX. FEE PROPOSALS

Proposers will be required to include in Exhibit "C" as required by the Submittal Format and Content section and Exhibit "A" of the RFP: (1) a Preconstruction Services Fee expressed as a lump sum fixed price based on the construction budget, schedule, and description in Sections II and V of the RFP; (2) a Lease-Leaseback Fee to include the Contractor's overhead and profit expressed as a percentage; and (3) a General Conditions Fee expressed as a lump sum monthly rate based on the construction budget, schedule, and description in Section X and Exhibit "A" of the RFP.

The District will use the total costs for the Preconstruction Services Fee, Lease-Leaseback Fee and General Conditions Fee as the basis for determining the Guaranteed Maximum Price ("GMP") for the Project, inclusive of all of the Contractor's costs for labor, materials, equipment, overhead and profit, general conditions, special conditions (if any), and Contractor Contingency, but shall specifically exclude the amount of the District Contingency. The GMP is comprised of "Tenant Improvement Payments" for the Work performed by the Contractor on the Project, and "Sublease Payments" which will be paid

following Project Completion for a period of up to six (6) months in consideration for the District's rental, use, and occupancy of the Project Site.

As part of the District review of the GMP for the Project, the District will expect to have access to all subcontractor bids, including proof that all mechanical, electrical and plumbing subcontractors proposed to be used by the Contractor on the Project have been prequalified by the District and possess a current registration with the Department of Industrial Relations ("DIR") as required by Labor Code section 1725.5; contingency breakdown and tracking documents; general conditions breakdown and tracking documents; and Contractor's fees. In the event the selected Contractor entity realizes a savings on any aspect of the Project, such savings shall be added to the District Contingency and expended consistent with the District Contingency.

X. SCOPE OF WORK

The Scope of Work for which the selected Contractor shall be responsible is set forth in the Construction Services Agreement. Of particular importance, the selected Contractor shall be required to perform the following construction and post-construction services:

- Bid coordination of plans, bidding, and selection of qualified, prequalified (if required by Education Code section 17406(a)(2)(C), Public Contract Code section 20111.6, and the District's Board Policies) subcontractors, including trade contractors, consistent with Section 7 of the Construction Services Agreement, and Project construction administration;
- Comply with Education Code section 17407.5 which requires the Contractor and its subcontractors at every tier to use a skilled and trained workforce to perform all work on the Project that falls within an apprenticeable occupation in the building and construction trades;
- Construct the Project, as specified above;
- Coordinate and expedite record drawings and specifications;
- Compile operations and maintenance manuals, warranties/guarantees, and certificates;
- Obtain occupancy permit; and coordinate final testing, documentation, and governmental inspections;
- Prepare final accounting and closeout procedures with the Project Inspector;
- Assist the District in any audit reporting to the Office of Public School Construction; and
- Other responsibilities necessary for the completion of the Project in accordance with the approved plans and specifications.

XI. SUBMITTAL FORMAT AND CONTENT

The Responses to this RFP should be clear, concise, complete, and demonstrate Respondent's qualifications. (NOTE: Respondents shall base their submittals on the "Scope of Work" and the information and materials distributed at the Pre-Submittal Conference.)

One original and five copies and a digital copy (on a thumb drive) of the submittal shall be delivered to the District's Business Department no later than **2:00 p.m. on October 1, 2018** at:

Galt Joint Union Elementary School District
1018 C Street, Suite 210
Galt, CA 95632
Attention: Lois Yount
c/o Marie Williams

Submittal Cover

Include the RFP's title, submittal due date, and the name of principal firm (or firms if there is a joint venture or association).

Table of Contents

Include a complete and clear listing of headings and pages to allow easy reference to key information.

1. ***Cover Letter***

The cover letter should be brief (two page maximum). Describe how the Scope of Work for the preconstruction services and lease-leaseback construction services will be accomplished for the District, identify the team members (i.e., joint partners and sub-consultants), and the name, address and California Contractors State License Number(s) of all subcontractor types required by this RFP to be used on the Project, if any; and include the title and signature of the firm's contact person for this procurement. If the Firm is proposing to co-respond with another principal firm, the cover letter must specify the type of services to be provided by each firm and the proposed percentage allocated to that phase or function of the service. Any changes to the District's requested format or deletions of requested materials should be explained in the cover letter. The signatory shall be a person with official authority to bind the company. The Firm acknowledges that the District may terminate the RFP process and/or reject any or all proposals at any time, up to the award of a valid contract for the services and materials specified herein the Project.

2. ***Evaluation Categories***

A. **Mandatory Qualifications.** The following requirements are mandatory and must be satisfied. The mandatory requirements will be scored on a pass/fail basis. Failure to meet any one of the mandatory requirements specified in this Section XI(2)(A) will disqualify your Firm from any further consideration for this RFP.

(1) **Lease-Leaseback Contractor Prequalification.** All Firms submitting a proposal to this RFP must be prequalified with the District pursuant to Education Code section 17406(a)(2)(C), Public Contract Code section 20111.6 (b)-(m), and the District's Board Policies, without exception prior to submitting a proposal. Any Firm that submits a proposal and is not

prequalified will be deemed non-responsive and that Firm's proposal will be rejected and returned to the Firm unopened.

Prequalification documents are available from the Galt Joint Union Elementary School District website at http://gjuesd-ca.schoolloop.com/, and at the Business Department of the District located at 1018 C Street, Suite 210, Galt, CA 95632. Prequalification documents must be submitted by **September 19, 2018 at 10:00 a.m.** for general contractors. Contractors will be notified by telephone, email, or mail of their prequalification rating within a reasonable period of time after submission of their prequalification documents, but not less than five (5) business days prior to the proposal submission deadline.

All mechanical, electrical or plumbing ("MEP") subcontractors (defined as contractors that hold a C-4, C-7, C-10, C-16, C-20, C-34, C-38, C-42, C-43 or C-46 license), who are identified in the proposal as set forth in Exhibit "B", must also be prequalified prior to submitting a proposal. This prequalification requirement applies even if the subcontractor will perform, or is designated and identified to perform, work that does not require one of the licenses listed above, but the subcontractor holds one of the licenses listed above. Prequalification documents for MEP subcontractors are due by **September 26, 2018 at 10:00 a.m.**

MEP subcontractors (as defined above) that are NOT required to be designated and identified in the proposal as set forth in Exhibit "B" must be prequalified prior to the award of their respective subcontract. A list of prequalified MEP subcontractors will be made available by the District upon request, but not less than five (5) business days prior to the proposal submission deadline. However, it is the responsibility of the Contractor to ensure that all MEP subcontractors **holding** any of the licenses listed above are properly prequalified.

(2) **Lease-Leaseback Contractor Experience.** All Firms submitting a proposal must have acted as the prime contractor and completed a minimum of two lease-leaseback projects on existing, operating school campuses over $2.5 Million in the past three (3) years. For projects with an estimated construction cost/budget of $10 Million or more, all Firms submitting a proposal must have acted as the prime contractor and completed a minimum of five (5) lease-leaseback projects totaling at least $100 Million during the past five (5) years, of which at least two (2) of those projects were at least $20 Million each.

(3) **Contractor Responsibility.** Identify if your Firm has ever had the following occur in the past five (5) years. For the purposes of this paragraph, "Firm" shall include any present or past (over the past five years), officers, owners, principals, partners, or any qualifying individuals including any RME

or RMO. Any occurrence of the following in the past five (5) years shall render the Firm not qualified to submit a proposal:

- Found to be a non-responsible contractor by any public agency;
- Convicted for false claims;
- Firm's license has been revoked or suspended;
- Debarred or otherwise ineligible to bid on or be awarded a public works contract;
- Terminated for cause or defaulted on a construction contract; or
- Convicted of a crime involving the awarding of a construction contract, or the bidding or performance of a construction contract.

(4) **License Requirements.** Pursuant to Business and Professions Code section 7028.15 and Public Contract Code section 3300, the Contractor must possess a General Building Contractor License (B License), which is current, valid, and in good standing with the California Contractors State License Board at the time the proposal is submitted to the District and throughout the entire term of the Project, and if awarded, subcontractors must possess the appropriate license for the work to be performed on the Project.

(5) **Proof of DIR Registration.** Except as provided in Article VII above of this RFP, all Firms submitting a proposal in response to this RFP must currently be registered with the DIR as required by Labor Code section 1725.5 and provide proof from the DIR website that the Contractor and all subcontractors (of any tier) who will be working on the Project are then registered with DIR. Proposers shall be required to maintain its registration with DIR without interruption at all times from submittal of its proposal until the Project is accepted by District as complete.

(6) **Performance and Payment Bonds.** All Firms submitting a proposal in response to this RFP must be able to provide separate faithful payment and performance bonds, each in an amount equal to 100% of the total GMP amount. All bonds must be issued by a California admitted surety as defined in California Code of Civil Procedure section 995.120. Firms must provide a letter from their surety indicating the Firm's current and overall bonding capacity, and the ability to meet the bond requirements in Section 20 of the Construction Services Agreement.

(7) **Insurance Requirements.** All Firms submitting a proposal to this RFP must have the ability to meet all of the insurance requirements set forth in Section 33 of the Construction Services Agreement. Firms must include a copy of their current certificate of insurance in their proposals evidencing the following minimum insurance requirements:

- A.M. Best financial rating of A:VII or equivalent rating as deemed acceptable to the District.
- Commercial General Liability Insurance. It shall be at least as broad as Insurance Services Office General Liability Coverage (Occurrence Form CG 0001). One Million Dollars ($1,000,000) per occurrence for bodily injury, personal injury and property damage/Three Million Dollars ($3,000,000) aggregate.
- Automobile Liability Insurance. It shall be at least as broad as Insurance Services Office Form Number CA 0001 Automobile Liability, Code I (any auto). One Million Dollars ($1,000,000) for bodily injury and property damage each accident limit.
- Workers' Compensation and Employer's Liability Insurance. The Contractor and all subcontractors shall insure (or be a qualified self-insured), under the applicable laws relating to workers' compensation insurance, all of their employees working on or about the Project site, in accordance with the "Workers' Compensation and Insurance Act," Division IV of the Labor Code of the State of California and any Acts amendatory thereof. The Contractor shall provide employer's liability insurance in the amount of at least One Million Dollars ($1,000,000) per accident for bodily injury and disease.
- Builder's Risk "All Risk" Insurance. The Contractor shall maintain builder's risk insurance on an "all risk" completed value basis (including flood) upon the Project.

All insurance will be in a form and with insurance companies acceptable to the District.

Insurance carriers shall be qualified to do business in California and maintain an agent for service of process within the state.

Galt Joint Union Elementary School District, its employees, consultants, and agents, shall be listed as additional insureds on each of the above policies, and original proof of insurance showing the additional insured parties must be presented at time of final execution of lease-leaseback contract(s).

B. **Firm and Personnel Experience and Qualifications.** The following shall be stated: (Note: Questions may be answered in other section of the proposal if clearly and conspicuously identified and referenced in the proposal.)

(1) **Description of Firm.** Include a description of the Firm's qualifications for providing preconstruction and lease-leaseback services on California school construction projects. Include information regarding the size of the Firm, number of employees, name(s) of owner(s), location of the primary office and the office from which the required services will be performed, nature of all work performed, and the number of years in this particular business. The Firm shall provide an affirmative statement that it is independent of the District as defined by generally accepted standards.

2. **Firm's Personnel and Staffing Resources.** Submit an organizational chart containing the names of each key staff member (Project Manager, Superintendent, Cost Estimator, Scheduler, etc.), together with their resumes, who will be proposed to provide the requested services, including their qualifications and recent relevant experience providing similar services. Relevant experience should include contract value, start and finish dates, and delivery method. Each resume shall include, without limitation, the following information: (a) education; (b) years of relevant experience; (c) professional registrations, certifications and affiliations; (d) project-specific experience with focus on public works projects and emphasis on K-12 projects providing preconstruction and lease-leaseback services, including dates and durations of each project listed and the name of the firm where employed. Include a discussion on the Firm's philosophy and approach for providing outstanding customer service.

The District's evaluation will consider the entire team. Therefore, no changes in the team's composition will be allowed without prior written approval of the District. The Contractor shall be responsible for any additional costs incurred by changes in the team's composition.

C. **Capacity and Methodology.** Describe how the Firm will provide services and fulfill the requirements and expectations of the District and this RFP. Use this section to address those portions of the Project your Firm intends on self-performing with its own personnel, exclusive of supervisory and clerical work, and without the services of any subcontractor, the ability of your Firm to undertake and accomplish the required Scope of Work while meeting deadlines, the Firm's record of meeting schedules and deadlines of other clients, advantages over other firms in the same industry, strength and stability as a business, and supportive client references. Describe the Firm's ability to provide lease-

leaseback services exclusively and in a timely manner for the District and the Firm's commitment to providing experienced personnel assigned to the Project.

Describe in detail your methods and plan for carrying out the Scope of Work for the Project. Include in this information the "Contract Schedule" attached as Exhibit "A" to this RFP based on the timelines and information provided in the information packet distributed at the Pre-Submittal Conference. Describe your approach to the Project, including any creative methodology or technology that your Firm uses or unique resources that your firm can offer.

D. Litigation and Disputes. Provide specific information and circumstances of any termination for convenience, litigation settled or judgments entered against the Firm within the last five (5) years. Identify if the Firm or any employee of the Firm is a party to an existing dispute with an owner, or owner's consultants, related to any project for which the Firm provided construction services. If so, please describe the nature of the dispute and its anticipated outcome. At a minimum, discuss whether or not any of the following has occurred and, if so, please explain:

- Firm has filed a petition for bankruptcy. If so, provide the date the petition was filed and identify the jurisdiction in which it was filed
- Any EPA, Air Quality Management District, or Regional Water Quality Control Board finding against the Firm or the owner of a project on which the Firm was the prime contractor in the past five (5) years
- In the past five (5) years, any violation by the Firm of any provision of California apprenticeship laws or regulations, or the laws pertaining to use of apprentices on public works, or the laws requiring use of "skilled and trained workforce" on certain public works projects
- Failure to enter into a contract once selected
- Withdrawal of a proposal as the result of an error
- Direct involvement with owners, construction managers, or architects in litigation, arbitration, or mediation involving public projects in the past five (5) years

E. Experience and Past Performance. Each Firm is required to submit a list of its most relevant K-12 public works projects, including any public works projects with the District, with an emphasis on lease-leaseback services, provided in the past five (5) years that are of the approximate size and scope of the Project. For each such project, include the following information:

- The project name
- Contracting Method utilized, e.g. single prime bid, lease-leaseback, etc.

- Awarding and completion dates
- Percentage completion dates for projects currently underway but not yet completed
- Name(s) and telephone number(s) of the owner's representative
- The firm's team members, sub-contractors, and consultants, describing the exact tasks that each firm performed
- Total project cost

As part of or in addition to the description of the Firm's past projects listed above, list projects the Firm has successfully completed that had obstacles, such as aggressive schedule or significant budgetary restrictions. Provide a description of the creative solutions implemented and how the obstacles were overcome, including the following:

- What the firm did to accommodate the complexity of the project
- How the firm met the client's needs on site
- How inconveniences were minimized
- How safety was maximized

F. **Preconstruction Services.** Proposers must have direct experience and must be able to demonstrate an aptitude to "value engineer" or analyze the Projects' plans, components, and features, to find more efficient and cost-effective methods or alternatives. Describe your methodology in providing preconstruction services for the Project, specifically discussing value engineering, constructability review, site investigations, estimating, and scheduling. Provide examples of constructability reviews that you performed that resulted in the identification of significant design conflicts or omissions, and of value engineering that resulted in significant savings or money or time.

G. **Safety.** Discuss your plan to maintain a safe worksite. In your discussion, include whether your Firm has an injury and illness Prevention Program that complies with 8 CRR § 1509, whether your Firm has a safety program that meets Cal/OSHA requirements, and whether your Firm will provide a full-time person dedicated to safety on the Project.

Discuss any Cal/OSHA or Federal OSHA finding against your Firm for any serious, willful or repeat violations or its safety or health regulations in the past five (5) years.

For each of the last five (5) complete years, provide the Average Lost Workday Incident Rate (LWIR), the Average Recordable Incident Rate (RIR), and the Experience Modification Rate (EMR) provided by your worker's compensation insurance carrier.

H. **Financial Information.** Provide the following financial information:

- A letter from a financial institution stating a current line of credit
- A current "Comprehensive Insight Plus Report" from a commercial credit rating service, such as Dunn and Bradstreet.
- A notarized statement from an admitted surety insurer (approved by the California Department of Insurance and authorized to issue bonds in the State of California), which states: (a) that your current bonding capacity is sufficient for the Project; and (b) your current available bonding capacity
- Indicate current value of all work the Proposer has under contract
- Provide business construction revenues for the past five years

I. **Labor Compliance/Skilled and Trained Workforce.** Describe your ability to comply with the statutory requirements for the payment of prevailing wages, including the monitoring and enforcement of your subcontractor's payment of prevailing wages. Provide copies of any DIR Civil Wage and Penalty Assessment and the final resolution.

Further describe your plan and methodology to comply with the requirements for the use of a "skilled and trained workforce" as defined in Education Code section 17407.5 and Public Contract Code section 2600 et seq., for each apprenticable occupation that will be used on the Project, including your subcontractors of any tier. Include in your discussion your plan and methodology to comply with the percentage requirements for the use of "skilled journeypersons" for each apprenticable occupation and the required monthly report demonstrating compliance. Finally, identify and discuss which apprenticable occupation(s) will be the most difficult to meet the percentage requirements for skilled journeypersons on the Project and state why.

J. **Exceptions to Preconstruction Agreement, and/or Lease-Leaseback Documents.** The form of both the Preconstruction Services Agreement and Lease-Leaseback Documents (Site Lease, Sublease, and Construction Services Agreement) are attached to this RFP as Exhibit "D". Please review each agreement and provide any proposed exceptions to those agreements with your proposal.

3. ***Fee Proposal.***

The Fee Proposal must be submitted in a separate, sealed envelope with your company name, proposal title, "Fee Proposal, Exhibit "C"," labeled on the outside of the envelope.

Provide a lump sum fee to provide preconstruction services, the lease-leaseback fee and a monthly general conditions cost on Exhibit "C". The proposed fees should include all direct labor costs, fringe benefits, insurance, overhead, profit, and all

other expenses the Contractor will incur in providing the preconstruction services and the lease-leaseback construction services.

XII. PROPOSAL EVALUATION AND BEST VALUE SCORE

A. Evaluation Categories, Points, and Scoring.

The District's Evaluation Committee will consist of up to three (3) members who will each independently score each proposal based upon the evaluation categories set forth below and in District the District's Board Policies. The District's evaluation process for the lease-leaseback contract proposals shall consist of the three (3) following phases:

1. The first phase involves determining the Total Technical Score utilizing the criteria below, including the weight assigned to each criterion. The maximum Technical Score consists of 150 available evaluation points. Either failing a Mandatory Requirement or receiving a Total Technical Score of less than 113 points disqualifies a Proposer from consideration.

	EVALUATION CATEGORY: Qualifications/Technical	POINTS
1.	Mandatory Requirements	Pass/Fail
2.	Firm and Personnel Experience and Qualifications	25
3.	Capacity and Methodology	35
4.	Litigation and Disputes	10
5.	Experience and Past Performance	35
6.	Preconstruction Services	10
7.	Safety	5
8.	Financial Information	20
9.	Labor Compliance/Skilled and Trained Workforce	5
10.	Exceptions to Preconstruction/LLB Documents	5
	MAXIMUM TECHNICAL SCORE	**150**

2. The second phase involves determining the Total Price Score for each Proposer utilizing the price rankings and corresponding assigned points below for Preconstruction Services, Lease-Leaseback Fee and General Conditions Cost. The maximum Total Price Score consists of 100 evaluation points.

Services	Price Ranking from Low to High	Points Assigned	Max Points
Preconstruction Services	Up to 4.9% lower/higher than average cost	20 points	**20 Points**
	5% -9.9% lower/higher than average cost	18 points	
	10%-14.9% lower/higher than average cost	16 points	
	15%-19.9% lower/higher than average cost	14 points	
	20%-24.9% lower/higher than average cost	12 points	
	25%-29.9% lower/higher than average cost	8 points	
	30% or more lower/higher than average cost	0 points	

Lease-Leaseback Fee	Low Fee	40 points	**40 Points**
	Up to 0.5% higher than low fee	37 points	
	0.51% – 1.0%higher than low fee	34 points	
	1.01% - 1.5% higher than low fee	31 points	
	1.51% -2.0% higher than low fee	28 points	
	2.01% -2.5% higher than low fee	25 points	
	2.51% - 2.5% higher than low fee	22 points	
	3.01% - 3.5% higher than low fee	19 points	
	More than 3.5% higher than low fee	0 points	
General Conditions Cost	Low Cost	40 points	**40 Points**
	Up to 4.9 % higher than low cost	37 points	
	5.0% -9.9% higher than low cost	34 points	
	10.0% - 14.9% higher than low cost	31 points	
	15.0% - 19.9% higher than low cost	28 points	
	20.0% -24.9% higher than low cost	25 points	
	25.0% - 30.0% higher than low cost	22 points	
	More than 30% higher than low cost	0 points	
	MAXIMUM TOTAL PRICE SCORE		**100 POINTS**

3. The third phase involves adding the Total Interview Score from each short listed Firm interviewed, totaling a maximum of 50 available evaluation points, to the Total Proposal Score to determine the Best Value Score.

B. Evaluation and Selection of Successful Lease-Leaseback Contractor

The purpose of this RFP is to enable the Galt Joint Union Elementary School District to select the Firm offering the best value to the District for award of the Preconstruction Services Agreement and Lease-Leaseback Documents under the provisions of Education Code section 17400 et seq.

1. The Evaluation Committee shall review and evaluate the qualifications of the Proposers in the following manner solely based upon the scoring criteria and evaluation methodology adopted by the District's Board of Education at the District's Board Policies as set forth in Paragraph A. of this Section XII.

2. The Evaluation Committee will first evaluate the Qualifications/Technical portion of the submitted proposals to determine whether they meet the format and content requirements and the standards specified in the RFP. The Evaluation Committee will not open the contents of the sealed fee proposal during this part of the evaluation.

3. Each proposal that has passed all Mandatory Requirements and has achieved the 113 point minimum qualification technical score set forth above shall be ranked from highest to lowest final technical score based on the average of the scores of the individual evaluators for each proposal ("Total Technical Score").

4. After all Total Technical Scores are assigned, the fee proposal submitted with each Firm's proposal using the format attached at Exhibit "C" of this RFP shall be opened and scored in accordance with the standards discussed above. The Proposer's total price score ("Total Price Score") will be added to its Total Technical Score to obtain a total proposal score ("Total Proposal Score").

5. Based on the highest Total Proposal Scores, the District's Evaluation Committee will select a short list of firms to personally interview. Prior to the interviews, a list of standard questions may be developed to ask each presenter. The interview will be worth up to 50 points (the "Total Interview Score"). Following the interviews, the average of the scores of the individual evaluators for each interviewed firm will be added to the Total Proposal Score for a potential combined maximum "Best Value Score" of 300 points. As used in this RFP and District the District's Board Policies, "Best Value Score" shall mean the total score awarded to a Proposer for all scored evaluation factors, i.e., (Total Technical Score / number of members on Proposal Evaluation Committee) + Total Price Score + (Total Interview Score / number of members on Proposal Evaluation Committee) = Best Value Score.

6. Proposers not on the short list will not be eligible for further consideration for award.

7. Once the evaluation of the Proposers is complete, all responsive proposals from Firms interviewed shall be ranked from the highest Best Value Score (i.e., the most evaluation points earned) to the lowest Best Value Score (i.e., the least evaluation points earned) to the District.

8. The award of the lease-leaseback agreement shall be made by the Board to the responsive Proposer whose proposal earned the highest Best Value Score, and is determined, in writing by the Board, to be the best value to the District.

9. Proposals will be opened privately to assure confidentiality and avoid disclosure of the contents to competing Proposers prior to and during the review, evaluation, and negotiation processes. However, to the extent that the submittals are public records under California law, they may be released to members of the public if specifically requested under the California Public Records Act.

10. The District reserves the right to request additional information at any time, which, in its sole opinion and discretion, is necessary to assure that a Proposer's competence, business organization and financial resources are adequate to perform the required lease-leaseback services for the District.

11. If the selected Proposer refuses or fails to execute the tendered instrument, the Board may award the instrument to the Proposer with the next highest Best Value Score if the Board deems it to be for the best interest of the District.

XIII. GENERAL INFORMATION

District Obligation

Receipt of proposals and responses to this RFP does not obligate the District in any way. The District reserves the right to accept or reject any or all proposals, and to waive any irregularities or informalities in any proposal or in the RFP process.

Compliance

Submittals must be in strict accordance with the requirements of the RFP. Any Proposal not submitted in accordance with the requirements of the RFP will not be considered.

Amendments

The District reserves the right to cancel or revise this RFP in part or in its entirety. If the District cancels or revises this RFP, all Respondents will be notified by addenda. The District also reserves the right to extend the date responses are due and any timelines described in the RFP.

Late Proposals

It is the Proposer's responsibility to ensure its proposal submittal is received by the District on or before the time and date specified. Submittals received after the date and time specified will not be considered.

Additional Provisions and Requirements

A. **Public Record.** Responses to this RFP will become the exclusive property of the District and subject to the California Public Records Act, Government Code sections 6250 et seq. Those portions, if any, of the RFP submittal marked or otherwise identified by the Proposer to be returned to the Proposer, will be returned following award of the contract for the Project.

Those elements in each response which are trade secrets as that term is defined in Civil Code section 3426.1(d) or otherwise exempt by law from disclosure and which are prominently marked as "TRADE SECRET," or "CONFIDENTIAL," or "PROPRIETARY" may not be subject to disclosure. The District shall not in any way be liable or responsible for the disclosure of any such records including, without limitation, those so marked, if disclosure is deemed to be required by law or by an order of the court. Proposers which indiscriminately identify all or most of their submittal as exempt from disclosure without justification may be deemed non-responsive.

In the event the District is required to defend an action on a Public Records Act request for any of the contents of a Proposal marked "confidential," "proprietary," or "trade secret," the Proposer agrees, upon submission of its Proposal for the District's consideration, to

defend and indemnify the District from all costs and expenses, including attorneys' fees, in any action or liability arising under the Public Records Act.

B. **Independent Contractor.** District retains Contractor on an independent contractor basis and Contractor is not an officer, agent, or employee of District. Contractor is not an employee for state tax, federal tax, or any other purpose and is not entitled to the rights or benefits afforded to District employees. Any additional personnel performing the services under the Agreement on behalf of Contractor shall also not be employees of District, and shall at all times be under Contractor's exclusive direction and control. Contractor shall pay all wages, salaries, and other amounts due such personnel in connection with their performance of services under the Agreement and as required by law. Contractor shall be responsible for all reports and obligations respecting such additional personnel, including, but not limited to: social security taxes, income tax withholding, unemployment insurance, disability insurance, and workers' compensation insurance.

C. **Conflict Of Interest.** Contractor represents that Contractor has no existing financial interest and will not acquire any such interest, direct or indirect, which could conflict in any manner or degree with the performance of services required under this RFP, or for the construction of the Project, and that no person having any such interest shall be subcontracted in connection with this RFP, or employed by Contractor. Contractor shall not conduct or solicit any non-District business while on District property or time.

Contractor entity will also take all necessary steps to avoid the appearance of a conflict of interest and shall have a duty to disclose to District prior to entering into the Preconstruction or Lease-Leaseback Agreement any and all circumstances existing at such time which pose a potential conflict of interest.

Contractor warrants that it has not directly or indirectly offered or given, and will not directly or indirectly offer or give, to any employee, agent, or representative of District any cash or non-cash gratuity or payment with a view toward securing any business from District or influencing such person with respect to the conditions, or performance of any agreements with or orders from District, including, without limitation, the Preconstruction or Lease-Leaseback Agreement.

D. **Non-Discrimination.** The District does not discriminate on the basis of race, color, national origin, religion, age, ancestry, medical condition, disability, or gender in consideration for an award of contract.

E. **Drug-Free Policy and Fingerprinting.** The selected Contractor shall be required to complete any and all fingerprinting requirements and criminal background checks required by State law and shall also be required to complete a Drug-Free Workplace Certification.

F. **Costs.** Costs of preparing a Response to this RFP are solely the responsibility of the Proposer.

G. **Securities.** Proposers are advised that if awarded a contract, they will be permitted, at their request and expense and in accordance with Section 22300 of the California

Public Contract Code, to substitute securities equivalent to retention monies withheld by District to ensure performance under the contract. Upon satisfactory completion of the Project the securities shall be returned to the Contractor.

H. **Bonding.** The successful Contractor entity will be required to furnish a Performance Bond in the amount of one hundred percent of the contract price, and a Payment (Material and Labor) Bond in the amount of one hundred percent of the contract price and in a form acceptable to the District.

I. **Limitations.** This RFP does not commit District to award a contract, to defray any costs incurred in the preparation of a Proposal pursuant to this RFP, or to procure or contract for work.

J. **Protests.** A Proposer may protest an award if he/she believes that the award is not in compliance with law, Board policy, or this RFP's specifications. For a protest to be considered by the District, the protest must be submitted in writing to the District at the address provided in Article IV of this RFP within three (3) business days following the issuance of the notice of intent to award an agreement. The protest must clearly identify: (i) the specific process/basis, or other matter that is the subject of the protest; (ii) the specific provisions of all documents relevant to the protest; and (iii) describe in detail all arguments in support of or justifying the protest. A Proposer's failure to comply with each of the foregoing requirements in a timely manner shall constitute a waiver of his/her right to protest the award of the agreement, and shall also constitute a failure to exhaust an available administrative remedy and bar any further action.

Upon the timely receipt of a valid protest, the District and/or its legal counsel will review the protest and all relevant information and documents and will provide a written determination to the protesting Proposer, which determination shall be final. Alternatively, in the District's sole election, the District may present the protest, together with a written recommendation to the District Board, for final determination.

NOTE: Incomplete submittals, incorrect information, or late submittals may be cause for immediate disqualification. District reserves the right to request additional information or clarification during the evaluation process. District retains the right to reject any or all submittals, per Education Code section 17406(a)(2)(G). All Proposers should note that the execution of any agreement pursuant to this RFP is dependent upon the approval of the Galt Joint Union Elementary School District in its sole discretion.

EXHIBIT "A"

DESCRIPTION OF PROJECT

Name of Project: Marengo Ranch Elementary School Building Modernization

Estimated Construction Cost/Budget: $6,976,349.00

Description of Project: The scope for this project includes a complete exterior façade removal and replacement, replacement of exterior building lights, modernizations to restrooms, addition of restrooms in one building, fire and intrusion alarm upgrades, painting and dry rot replacement at portables, coating the roofs at the portables, removal and replacement of existing non-metal roofs, replace HVAC units, stripping and painting existing metal roofs, and seismic bracing of existing gas lines.

EXHIBIT "B"

DESIGNATION OF SUBCONTRACTORS FORM

If the District has requested Firms designate subcontractors for specific scopes of work in Section VIII of the RFP, the Firm must provide all information for the subcontractors below and submit this with the proposal. All other subcontractors shall be identified using this form after the lease-leaseback contract has been awarded in accordance with Education Code section 17406(a)(4)(B), including MEP subcontractors not identified at the time of proposal submission.

Name of Subcontractor	Description and Portion of Work	Location and Place of Business	License Type and Number	DIR Registration Number

Once proposals are submitted, Firms may not revise or amend information contained in this form. See Section VIII of the RFP for information regarding the procurement of subcontractors not designated in the proposals.

Date: _____

_____
Proper Name of Firm

_____
Printed Name/Position of Representative

_____
Signature of Firm Representative

Address _____

_____

_____

Phone (____) _____

EXHIBIT "C"

FEE PROPOSAL FORM

The Fee Proposal must be submitted in a separate, sealed envelope with your Firm name, proposal title, "Fee Proposal, Exhibit "C"", labeled on the outside of the envelope and submitted at the same time the proposal is submitted.

The District will use the total costs for all line items below to provide a Total Price Score for each Proposal, rather than score each line item cost separately. The prices provided below will be used as the basis for the Guaranteed Maximum Price for the Lease-Leaseback Agreement and the fee for the Preconstruction Services Agreement to be entered into with the District; therefore, Proposers are requested to provide accurate pricing. No revisions to the costs or prices noted below shall be allowed unless agreed to and approved by the District.

The Firm proposes the following fees:

1. The Preconstruction Services fee shall be expressed as a lump sum firm-fixed price based on the construction budget, schedule, and description in Sections II and V of the RFP and Preconstruction Services Agreement at Exhibit "D" and shall be scored based upon the percentage the fixed price bears to the average fixed fee of all Proposers.

Preconstruction Services Fee: [LUMP SUM] $_____

2. The Lease-Leaseback Fee shall include the Firm's overhead and profit and should be expressed as a percentage. For purposes of evaluating the fee proposals, the lease-leaseback fee percentage will be multiplied by the construction budget.

Lease-Leaseback Fee: [PERCENTAGE] _____%

3. The General Conditions should be expressed as a lump sum based on the construction budget, schedule, and description in Section X and Exhibit "A".

General Conditions Cost: [MONTHLY RATE] $_____/month

Executed this ___ day of _____, 201_

_____ _____
Proposer's Name Signature

_____ _____
Title Print Name

EXHIBIT "D"

PRECONSTRUCTION SERVICES AGREEMENT

AGREEMENT FOR PRELIMINARY SERVICES
FOR THE CONSTRUCTION OF IMPROVEMENTS

This Agreement is made and entered into this_____day of_____, 2018, between the Galt Joint Union Elementary School District hereinafter referred to as "DISTRICT" and_____Construction hereinafter referred to as "DEVELOPER," for the purposes of providing preliminary consulting services to facilitate and manage the building modernization projects at Marengo Ranch Elementary School ("Project").

WHEREAS, DISTRICT has selected DEVELOPER to provide all facets needed to complete development of the Project pursuant to Education Code section 17406, including the preliminary consulting services detailed in this Agreement;

WHEREAS, DEVELOPER desires to provide certain consulting services to the DISTRICT with respect to reviewing the Plans and Specifications for the Project, prepare cost estimates, prepare construction schedules, obtain proposals from trade contractors, and other related services in preparation for the Project's development;

WHEREAS, DEVELOPER represents that it and its referenced consultants are properly licensed and have the expertise and experience to obtain pricing from contractors, develop construction schedules, identify and order long lead items, coordinate construction activities, review and execute lease documents and perform the other development services set forth in this Agreement; and

WHEREAS, DISTRICT and DEVELOPER plan to enter into lease agreements which include construction provisions and related exhibits for the development of the Project pursuant to Education Code section 17406 (collectively, the "Lease Agreements") after DEVELOPER's performance of its duties as set forth in this Agreement.

WHEREAS, the DISTRICT is authorized by Section 53060 of the California Government Code to contract with and employ any persons for the furnishing of special services and advice in financial, economic, accounting, engineering, legal or administrative matters, if those persons are specially trained and experienced and competent to perform the special services required; and

NOW, THEREFORE, the parties hereto agree as follows:

ARTICLE I. -- SCOPE OF DEVELOPER SERVICES

A. **Scope.** DEVELOPER, as the DISTRICT's development consultant and authorized representative as contemplated by Business and Professions Code 7040, agrees to perform the services described in **Exhibit B**.

B. **Warranty.** DEVELOPER agrees and represents that it is qualified to properly provide the services set forth in this Agreement in a manner which is consistent with the generally accepted standards of DEVELOPER's profession. DEVELOPER further represents and agrees that it will perform said services in a legally adequate manner in conformance with applicable federal, state and local laws and guidelines, including, but not limited to, State Allocation Board guidelines for school construction and labor compliance programs.

C. **Schedule.** Services outlined above will commence on the date the DISTRICT issues a notice to proceed for the Agreement, and conclude on or about _____. It is anticipated that construction will commence on or about _____. A more detailed schedule will be provided in the construction provisions. Any extension shall be subject to reasonable approval in writing by the parties.

D. **Limited Authority.** The duties, responsibilities and limitations of authority of DEVELOPER shall not be restricted, modified or extended without written agreement between the DISTRICT and DEVELOPER.

E. **Construction.** Upon agreement on the Guaranteed Maximum Price ("GMP") and DSA approval of the Plans and Specifications, the DISTRICT and DEVELOPER plan to enter into the formal Lease Agreements to provide for the development of the Project; therefore, DEVELOPER shall perform the services described herein in a timely manner, consistent with the commencement dates stated herein. The formal Lease Agreements shall govern the construction and delivery of the Project.

ARTICLE II. -- DISTRICT'S RESPONSIBILITIES

The DISTRICT has and shall continue to provide to DEVELOPER information regarding requirements for the Project, including information regarding the DISTRICT's objectives, schedule, constraints and criteria. DISTRICT will retain the firm of Lozano Smith Attorneys At Law to represent the DISTRICT in negotiations and preparation of all legal documents, including the formal Lease Agreements in accordance with Education Code section 17406.

ARTICLE III. -- TERMINATION

A. **Termination by DEVELOPER.** This Agreement may be terminated by DEVELOPER upon fourteen (14) days written notice to DISTRICT in the event of an uncured substantial failure of performance by DISTRICT, unless the DISTRICT has acted to commence cure efforts in any case where a reasonable cure can not be concluded within the fourteen (14) day notice period.

B. **Termination by DISTRICT.** This Agreement may be terminated at any time without cause by DISTRICT upon fourteen (14) days written notice to DEVELOPER. In the event of such a termination by DISTRICT, the DISTRICT shall pay DEVELOPER for all undisputed services performed and expenses incurred per this Agreement, supported by documentary evidence, including, but not limited to, payroll records, invoices from third parties retained by DEVELOPER pursuant to this Agreement, and expense reports up until the date of notice of termination plus any sums due DEVELOPER for Board-approved extra services. In ascertaining the services actually rendered hereunder up to the date of termination of this Agreement, consideration shall be given to both completed work and work in process that would best serve the DISTRICT if a completed product was presented.

C. **Ownership of Records.** It is mutually agreed that all materials prepared by DEVELOPER under this Agreement shall become the property of the DISTRICT and DEVELOPER shall have no property right therein whatsoever. DEVELOPER hereby assigns to DISTRICT any copyrights associated with the materials prepared pursuant to the Agreement. Immediately upon termination and upon written request, the DISTRICT shall be entitled to, and DEVELOPER shall deliver to the DEVELOPER, all data, drawings, specifications, reports, estimates, summaries and such other materials and commissions as may have been prepared or accumulated to date by

the DISTRICT in performing the Agreement (the "Termination Material") which is not DEVELOPER privileged information, as defined by law, or DEVELOPER's personnel information.

ARTICLE IV. -- COMPENSATION TO DEVELOPER

In consideration of DEVELOPER performance of services hereunder, DISTRICT agrees to:

Reimburse DEVELOPER in the amount not to exceed XXXXX Dollars ($XXXXXXX) for the performance of services contemplated by this Agreement. DEVELOPER shall be paid monthly for the actual fees incurred in line with the hourly fee schedule attached hereto as **Exhibit C** as well as for the allowed costs and expenses for all time and materials required and expended for work requested and specified by the DISTRICT as completed. Said amount shall be paid within thirty (30) days upon submittal to (and verification by) the DISTRICT of a monthly billing statement showing completion of the tasks for that month on a line item basis. When DEVELOPER and DISTRICT enter into the lease/leaseback agreements for the development of the Project, this compensation for services rendered will be included as part of the Guaranteed Maximum Price to be paid to DEVELOPER by DISTRICT.

DEVELOPER shall be responsible for any and all costs and expenses incurred by DEVELOPER, including but not limited to the costs of hiring sub-consultants, contractors and other professionals, review of the Project, Plans and Specifications, review and preparation of necessary documentation relating to the development of the Project, all travel-related expenses, as well as for meetings with DISTRICT and its representatives, long distance telephone charges, copying expenses, salaries of DEVELOPER staff and employees working on the Project, overhead, and any other reasonable expenses incurred by DEVELOPER in performance of the services contemplated by this Agreement.

ARTICLE V. -- LEASE DOCUMENTS

Provided that an acceptable GMP is agreed to by the DISTRICT, DISTRICT and DEVELOPER shall enter into formal Lease Agreements which will govern the lease, construction and delivery of the Project subsequent to approval of the Plans and Specifications and DEVELOPER obtaining bids for delivery of a GMP for the Project which is acceptable to the DISTRICT. Parties anticipate entering into said documents on or about November 2018.

ARTICLE VI. -- MISCELLANEOUS

A. **Indemnity.** DEVELOPER shall indemnify, defend and hold harmless DISTRICT, its administrators, Board and employees from all claims, liabilities, lawsuits, costs, losses, expenses, damages or judgments arising from any negligent or intentional acts or omissions of DEVELOPER, its agents, employees and consultants relating to DEVELOPER performance of its obligations under this Agreement. DEVELOPER shall also defend, indemnify and hold harmless the DISTRICT from any claim for employment benefits, worker's compensation or other benefits, by any agent or employee of DEVELOPER. In addition to the foregoing, each party shall indemnify, defend and hold harmless the other from all claims, demands, liabilities and actions arising out of claims for payment of fees, costs or expenses incurred by the indemnifying party with third parties in connection with their respective activities under this Agreement.

B. **Insurance.** DEVELOPER shall not commence any work before obtaining, and shall maintain in force at all times during the duration and performance of this Agreement and the Project the policies of insurance specified in this Section. Such insurance must have the approval of the DISTRICT as to limit, form, and amount, and shall be placed with insurers with a current A.M. Best's rating of no less than A: VII.

1. Prior to execution of this Agreement and prior to commencement of any work, DEVELOPER shall furnish the DISTRICT with original endorsements effecting coverage for all policies required by the Agreement. The endorsements shall be signed by a person authorized by the insurer to bind coverage on its behalf. Subject to acceptance by the DISTRICT, DEVELOPER's insurer will provide complete certificates of insurance and upon request certified copies of all required insurance policies, including endorsements effecting the coverage required by this Section. DEVELOPER agrees to furnish one copy of each required policy to the DISTRICT, and additional copies as requested in writing, certified by an authorized representative of the insurer. Approval of the insurance by the DISTRICT shall not relieve or decrease any liability of DEVELOPER.

2. In addition to any other remedy the DISTRICT may have, if DEVELOPER fails to maintain the insurance coverage as required in this Section, the DISTRICT may obtain such insurance coverage as is not being maintained, in form and amount substantially the same as is required herein, and the DISTRICT may deduct the cost of such insurance from any amounts due or which may become due under this Agreement.

3. Each insurance policy required by this Agreement shall be endorsed to state that coverage shall not be suspended, voided, canceled, terminated by either party, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the DISTRICT.

4. Any deductibles must be declared to, and approved by, the DISTRICT.

5. The requirement as to types, limits, and the DISTRICT's approval of insurance coverage to be maintained by DEVELOPER are not intended to, and shall not in any manner, limit or qualify the liabilities and obligations assumed by DEVELOPER under the Agreement.

6. DEVELOPER and its subconsultants and subcontractors shall, at their expense, maintain in effect at all times during the performance or work on the Project not less than the following coverage and limits of insurance, which shall be maintained with insurers and under forms of policy satisfactory to the DISTRICT. The maintenance by DEVELOPER and its subconsultants and subcontractors of the following coverage and limits of insurance is a material element of this Agreement. The failure of DEVELOPER or of any of its contractors or subcontractors to maintain or renew coverage or to provide evidence of renewal may be treated by the DISTRICT as a material breach of this Agreement.

7. Worker's Compensation and Employer's Liability Insurance.

a. Worker's Compensation - Insurance to protect DEVELOPER, its contractors, subconsultants and subcontractors from all claims under Worker's Compensation and Employer's Liability Acts, including Longshoremen's and Harbor Worker's Act ("Acts"), if applicable. Such coverage shall be maintained, in type and amount, in strict compliance with all applicable state and federal statutes and regulations. DEVELOPER shall execute a certificate in compliance with Labor Code Section 3700, on the form attached to this Agreement.

b. Claims Against DISTRICT - If an injury occurs to any employee of DEVELOPER for which the employee or his/her dependents, in the event of his death, may be entitled to compensation from the DISTRICT under the provisions of said Act, for which compensation is claimed from the DISTRICT, and if such injury is a compensable injury under said Acts, there will be retained out of the sums due DEVELOPER under this Agreement, an amount sufficient to cover such compensation as fixed by said Acts, until such compensation is paid or it is determined that no compensation is due. If the DISTRICT is required to pay such compensation, the amount so paid will be deducted and retained from any sums due, or to become due to DEVELOPER.

8. Commercial General and any Auto Automobile Liability Insurance.

a. The insurance shall include, but shall not be limited to, protection against claims arising from death, bodily or personal injury, or damage to property resulting from actions, failures to act, or operations of the insured, or by its employees or agents, or by anyone directly or indirectly employed by the insured. The amount of insurance coverage shall not be less than $1,000,000 per occurrence.

b. The Commercial general and any auto automobile liability insurance coverage shall also include, or be endorsed to include, the following:

(i) Provision or endorsement naming the DISTRICT and each of its officers, officials, employees, agents, and volunteers as additional insureds in regards to: liability arising out of the performance of or failure to perform any work under the Agreement or on the Project; liability arising out of activities performed by or on behalf of DEVELOPER; premises owned, occupied or used by DEVELOPER; or automobiles owned, leased, hired or borrowed by DEVELOPER. The coverage shall contain no special limitations on the scope of protection afforded to the DISTRICT, its officers, officials, employees, agents or volunteers.

(ii) Provision or endorsement stating that for any claims related to this Project, DEVELOPER's insurance coverage shall be primary insurance as respects the DISTRICT, its officers, officials, employees, agents, and volunteers to the extent the DISTRICT is an additional insured. Any insurance or self insurance maintained by the DISTRICT, its officers, officials, employees,

agents or volunteers shall be in excess of DEVELOPER's insurance and shall not contribute with it.

(iii) Provision or endorsement stating that DEVELOPER's failure to comply with reporting or other provisions of the policies including breaches of representations shall not affect coverage provided to the DISTRICT, its officers, officials, employees, agents, or volunteers.

(iv) Provision or endorsement stating that DEVELOPER's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

(v) Provision or endorsement stating that such insurance, subject to all of its other terms and conditions, applies to the liability assumed by DEVELOPER under the Agreement, including, without limitation, that set forth in Article VI, Section A, Indemnity.

C. **No Design Responsibility**. DISTRICT acknowledges that DEVELOPER, in performing those services set forth in this Agreement, will be acting as a knowledgeable and experienced contractor in carrying out its duties under this Agreement and is not acting, and does not purport to act, as a design professional and is assuming no design responsibility under this Agreement.

D. **Limitation of Liability.** DEVELOPER's liability arising out of the performance of the work hereunder shall be limited to the aggregate of (1) the insurance coverage limits required under this Agreement; (2) any additional insurance coverage provided by DEVELOPER's policies for any such loss or damage; and (3) the amount of fees and expenses paid by DISTRICT to DEVELOPER in connection with this Agreement.

E. **Independent Contractor.** DEVELOPER, in the performance of this Agreement, is and shall be and an independent Contractor. DEVELOPER understands and agrees that DEVELOPER and all of DEVELOPER's employees, agents, contractors, subcontractors, consultants, and subconsultants shall not be considered officers, officials, employees or agents of the DISTRICT.

F. **No Third Party Rights.** Nothing contained in this Agreement shall create a contractual relationship with or a cause of action in favor of any third party that is not a party to this agreement against either the DISTRICT or DEVELOPER.

G. **Binding on Successors.** The DISTRICT and DEVELOPER, respectively, bind themselves, their partners, officers, successors, assigns and legal representatives to the other party to this Agreement with respect to the terms of this Agreement. DEVELOPER shall not assign this Agreement.

H. **Governing Law.** This Agreement shall be governed by the laws of the State of California, and venue for any action to enforce shall be in the County in which the Project is located.

I. **Modifications.** This Agreement may be amended or modified only by an agreement in writing signed by both the DISTRICT and DEVELOPER.

This Agreement has been entered into as of the day and year first written above.

"DISTRICT"	**"DEVELOPER"**
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT	**XXXXXXXX CONSTRUCTION**
By:_____	By: _____
Name: Karen Schauer Title: Superintendent	Name: _____ Title: _____

Exhibit A

Workers' Compensation Certificate

CERTIFICATE OF COMPLIANCE WITH LABOR CODE § 3700

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

_____

By: _____

Title: _____

Exhibit B

Scope of Services

DEVELOPER shall provide all usual and all reasonable services as needed in the circumstances and such services shall include without limitation:

A. Site Evaluation and Coordination

1. Evaluate existing site to determine access requirements, undocumented utility appurtenances, condition of salvage items and impacts from observable soil conditions.

2. Provide recommendations relating to soil investigations and utility locations and capacities.

3. Develop written report capturing observations and subsequent recommendations and submit to DISTRICT.

B. Plan Review

1. Review initial conceptual design and make recommendations to assist in achieving conformance with DISTRICT's construction budget.

2. Review plans and specifications for each design increment at 100% DD phase and CD Phase (prior to DSA submittal) and evaluate design concepts, systems and details for construction and sequence feasibility.

3. Develop written report capturing observations and subsequent recommendations and submit to DISTRICT.

4. Meet and work with DISTRICT's design team to insure that project design is consistent with DISTRICT's current design standards and incorporates relevant recommendations.

C. Meetings

1. Attend weekly Design Team meetings, DISTRICT and site staff meetings, and other community and stakeholder meetings as required.

D. Accounting and Budget Management System

1. In concert with DISTRICT staff and consultants, develop the Project accounting and budget management systems. A process of providing up to date costs is required. During construction, monthly reporting will be required.

E. Value Engineering

1. Review plans and specifications and make recommendations for each design increment and evaluate design concepts, systems and details for cost effectiveness, space usage, and schedule efficiencies.

2. Provide DISTRICT with two (2) written evaluations of plan review at two different design stages (stages to be determined) and provide subsequent recommendations, including written analysis of long lead purchases with associated recommendations.

F. CPM Scheduling/Methodology and Strategic Plan

1. Develop one conceptual schedule (at design stage to be determined) for each design increment detailing projected sequence of work and duration.

2. Develop a master conceptual schedule for incorporating sequence and durations for scope of each design increment. Overall sequence of construction will be based on the information received from the DISTRICT, the Project architect and site staffs reflecting the school's schedule and potential construction conflicts from work of other contracts.

3. Prepare written narrative reflecting construction methodology and outlining strategic plan to be submitted with master schedule.

4. Develop cash flow projections in association with master conceptual schedules.

G. Preliminary and Detailed Estimating

1. Develop detailed estimates of probable construction costs for each design increment at the following stages of design:

    a. 100% Completion -- Conceptual Design Phase

    b. 100% Completion – Design Development Phase

    c. 50% Completion – Construction Document Phase

    d. 90% Completion – Construction Document Phase/Submittal to DSA

2. Develop one detailed master estimate for complete site scope of work at minimum Design Development Phase.

3. Cost estimates will follow a unit price format broken down by Construction Specification Institute sections of work.

H. Construction Planning

1. Develop Construction Staging and Phasing plan consistent with design documents, Increment Submittals and DISTRICT's bond program execution schedule.

2. Indicate contractor lay-down areas, access points, temporary construction facilities (trailers, site fencing, etc).

3. Indicate campus traffic sequencing and special controls impacting campus operations.

4. Prepare a Construction Staging and Phasing plan and submit to DISTRICT.

I. Procurement/GMP Development

1. Prior to and in preparation of final GMP development, develop detailed scopes of work for each trade in each design increment.

2. Develop and initiate subcontractor pre-qualification process as required and evaluate responses.

3. Advertise and solicit subcontractor and vendor proposals for each applicable trade for each design increment proposal stage utilizing vendor databases and local resources for solicitation.

4. Evaluate subcontractor and vendor proposals for price, completeness, responsiveness and qualifications giving significant consideration to local subcontractors and vendors and negotiate with successful bidders as required.

5. In coordination with DISTRICT and Design Team, review subcontractor and vendor proposals to finalize selection of subcontractors and material vendors.

6. Develop final GMP proposals for each design increment utilizing selected subcontractors and material vendors and submit to DISTRICT in final cost proposal formats.

J. Schedule for Construction

DSA submittal is currently scheduled for **XXXXXX.** Construction is anticipated to start in the _____ for ___ month duration.

Exhibit C

Hourly Rates

Project Name: Marengo Ranch Elementary School Building Modernization

Hourly Rate Schedule **Fee OH&P Schedule**

SECTION 06 10 53 - MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

B. Related Sections:
1. Section 01 33 00; Submittal Procedure.
2. Section 01 73 29; Cutting and Patching.
3. Section 06 16 00; Sheathing. (Dryrot repair)

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to basic removal of dryrot material for exterior painting:
1. Framing with dimension lumber.
2. Rooftop equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Wood furring and grounds.
5. Plywood backing panels.
6. Accessories necessary for a complete installation.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.

1.4 SUBMITTALS

A. Product Data: Submit each type of process and factory fabricated product. Indicate component and materials and dimensions and include construction and application details.
1. Wood Treatment: Submit data for wood preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   a. Include data for fire retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by qualified independent testing agency.
   b. For fire retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
   c. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to site.

B. Laboratory and Testing Reports:
1. Laboratory Test Reports: Submit report for installation adhesives indicating compliance

with requirements for low emitting materials.
2. Post installed anchors.
3. Metal framing anchors.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Building Code: Comply with applicable requirements of CBC Chapter 23 for miscellaneous wood.
2. Fire Retardant Treated Lumber and Plywood by Pressure Process: Provide products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
3. Level floor finishes to minimum requirement noted CBC Section 11B-302.1.

B. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
3. Dress lumber, S4S, unless otherwise indicated.
4. Maximum Moisture Content of Lumber: 19 percent unless otherwise indicated.

B. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.
3. Kiln dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
4. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
5. Application: Treat items indicated on Drawings, and the following:

a. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
b. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

C. Fire Retardant Treatment: Where indicated as fire retardant treated, provide materials acceptable to authorities having jurisdiction, and with fire test response characteristics specified as determined by testing identical products per ASTM E 84 by a qualified testing agency.
1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Comply with specified requirements for fire retardant treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Provide treated materials with moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Test treated lumber according to ASTM D 5664, and calculate design value adjustment factors according to ASTM D 6841.
   a. For enclosed roof framing, framing in attic spaces, and where high temperature fire retardant treatment is indicated, provide material with adjustment factors of minimum 0.85 modulus of elasticity and 0.75 for extreme fiber in bending for climatological zone.
5. Kiln dry lumber after treatment to a maximum moisture content of 19 percent.
6. Identify fire retardant treated wood with appropriate classification marking of qualified testing agency.
   a. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
7. For exposed items indicated to receive a stained or natural finish, verify chemical formulations shall not bleed through, contain colorants, or adversely affect finishes.
8. Application: Treat items indicated on Drawings, and the following:
   a. Framing for raised platforms.
   b. Concealed blocking.
   c. Roof framing and blocking.
   d. Wood cants, nailers, curbs, equipment support bases, blocking, and similar members in connection with roofing.
   e. Plywood backing panels.

D. Dimension Lumber Framing:
1. Non Load Bearing Interior Partitions: Construction or No. 2 grade of any species.
2. Other Framing: Construction or No. 2 grade of any species.

E. Miscellaneous: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including but not limited to blocking, nailers, cants, grounds, furring, roof top equipment bases and support curbs, and utility shelving.
1. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.
2. For blocking not used for attachment of other construction, use Utility, Stud, or No. 3 grade lumber of any species provided that it is cut and selected to eliminate defects that interfere with attachment and purpose.
3. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that interfere with attachment of work.
4. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

F. Concealed Boards: 19 percent maximum moisture content of any of the following species

and grades:

1. Mixed southern pine or southern pine, No. 2 grade; SPIB.
2. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
3. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
4. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
5. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

G. Plywood Backing Panels:
1. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, C-C Plugged or Exposure 1, C-D Plugged, fire retardant treated, in thickness not less than 3/4 inch (19 mm)] nominal thickness.

H. Fasteners: Provide fasteners of size and type indicated that comply with requirements.
1. Where carpentry is exposed to weather, in ground contact, pressure preservative treated, or in area of high relative humidity, provide fasteners with hot dip zinc coating complying with ASTM A 153/A 153M.
2. Nails, Brads, and Staples: ASTM F 1667.
3. Screws for Fastening to Metal Framing: ASTM C 1002 drywall type or ASTM C 954 nonload bearing steel stud, length recommended by screw manufacturer for material being fastened.
4. Power Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
5. Post Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 mechanical, masonry, ICC-ES AC58 mechanical, concrete, ICC-ES AC193 adhesive, masonry, or ICC-ES AC308 adhesive, concrete as appropriate for the substrate.
   a. Material, Interior: Carbon steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
   b. Material, Exterior: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

I. Metal Framing Anchors:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Cleveland Steel Specialty Co.
   b. KC Metals Products, Inc.
   c. Phoenix Metal Products, Inc.
   d. Simpson Strong-Tie Co., Inc.
2. Galvanized Steel Sheet: Hot dip, zinc coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation. Use for interior locations unless otherwise indicated.
3. Hot Dip, Heavy Galvanized Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high strength low alloy steel Type A (HSLAS Type A), or high strength low alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick. Use for wood preservative-treated lumber and where indicated.
4. Stainless Steel Sheet: ASTM A 666, Type 304 and Type 316 for exposed application in coastal environments. Use for exterior locations and where indicated.

J. Miscellaneous Materials:
1. Adhesives for Gluing to Concrete or Masonry: Formulation complying with ASTM D 3498 that is approved for use indicated by adhesive manufacturer.
2. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized asphalt compound, bonded to high density polyethylene film, aluminum foil, or spunbonded polyolefin to produce overall thickness of not less than 0.025 inch (0.6 mm).

PART 3 EXECUTION

3.1 INSTALLATION

A. Framing Standard: Comply with AF&PA WCD 1 *Details for Conventional Wood Frame Construction* unless otherwise indicated.

B. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

C. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
1. Install fire retardant treated plywood backing panels with classification marking of testing agency exposed to view.

D. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

E. Do not splice structural members between supports unless otherwise indicated.

F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

G. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire
3. blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.
4. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
5. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.

H. Sort and select lumber so natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

I. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

J. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.9.1 *Fastening Schedule* in the International Building Code.
   2. ICC-ES evaluation report for fastener.

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

L. Wood Blocking and Nailer Installation: Install where indicated and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
   1. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
   2. Provide permanent grounds of dressed, pressure preservative treated, key beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.2 PROTECTION

A. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA registered borate treatment. Apply borate solution by spraying to comply with EPA registered label.

END OF SECTION 06 10 53

SECTION 07 54 19 **PVC THERMOPLASTIC MEMBRANE ROOFING**

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Installation of adhered PVC Thermostatic roofing membrane with flashings and other components to comprise a roofing system.
2. Flashing and caulking (Detailed on drawings).
3. Tapered roof insulation.
4. Crickets.
5. Cover board.
6. Wood nailers and shims.
7. Sheet metal terminations
8. Walkway protection
9. Expansion Joints
10. Deck repair/replacement
11. Other work incidental to the complete and proper installation of a watertight roofing system as shown on the Drawings and specified herein, and in accordance with all applicable requirements of the Contract Documents.

B. Related Requirements:
1. Section 06 10 53; Miscellaneous Rough Carpentry. For wood nailers, curbs, and blocking.
2. Section 06 16 10; Sheathing, wood-based, structural-use roof deck panels.
3. Section 07 62 00; Roof Related Sheet Metal.
4. Section 07 92 00; Joint Sealants.

C. Related Work:
1. All Sections of Work relating to the roofing system, including mechanical, plumbing and electrical items penetrating the roof system.

D. Intentions of the Work – It is the intent of this Section that the Work shall:
1. Provide a watertight facility using a sustainable “Cool Roof” system.
2. Provide a roofing system that moves storm water off of and away from the buildings.
3. Provide a long term system warranty.
4. Conform to all applicable building code requirements and of authorities having jurisdiction.
5. Coordinate with General Contractor of temporary equipment and conduit on roof and protection of installed roof membrane.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

1.4 REFERENCES

A. American Society for Testing and Materials (ASTM)

B. A385, Practice for Providing High-Quality Zinc Coatings (Hot-Dip)

C. D570, Water Absorption of Plastics

D. D638, Tensile Properties of Plastics

E. D751, Method of Testing Coated Fabrics

F. D882, Tensile Properties of Thin Plastic Sheeting

G. D1004 Initial Tear Resistance of Plastic Film and Sheeting

H. D1204 Linear Dimensional Changes of Non-rigid Thermoplastic Sheeting or Film at Elevated Temperature

I. D2136 Coated Fabrics — Low-Temperature Bend Test

J. D2565 Operating Xenon Arc-Type Light Exposure Apparatus With and Without Water for Exposure of Plastics

K. D3045 Heat Aging of Plastics Without Load

L. D4434 Poly (Vinyl Chloride) Sheet Roofing

M. E108 (Rev. A) Fire Tests of Roof Coverings

N. G21 Determining Resistance of Synthetic Polymeric Materials to Fungi

O. G53 Operating Light — and Water-Exposure Apparatus (Fluorescent UV- Condensation Type) for Exposure of Nonmetallic Materials

P. ASCE-7 Wind uplifts requirements for geographical area.

Q. Federal Specifications (FS)
   1. TT-S-00230C: Federal Specification Standard TT-S-00230C Elastomeric type, cold applied single component for caulking, sealing and glazing in buildings, building areas (plazas, decks, pavements) and other structures

R. National Roofing Contractors Association (NRCA)
   1. Roofing and Waterproofing Manual – Latest Edition

S. Single Ply Roofing Institute (SPRI)
   1. ANSI/SPRI ES-1 Perimeter Roof Edge Compliance
   2. ANSI/SPRI/FM 4435/ES-1

T. Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA)
   1. Architectural Sheet Metal Manual – Latest Edition

U. Underwriters' Laboratories (UL)
   1. Fire Hazard Classifications
   2. Class 90-wind uplift.

V. California Building Code (CBC)

1.5 PERFORMANCE REQUIREMENTS

A. General Requirements: Provide an installed thermoplastic single ply roofing system, flashing and related work that is watertight and will not permit the passage of liquid water, able to withstand wind loads, thermally induced movement and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing system Manufacturer based on testing and field experience.

C. Roofing System Design: Comply with SPRI “Wind Design Guide for Fully Adhered Roofing Systems" for the following ground roughness exposure and system design:
1. Exposure C:
2. Risk Category: III
3. Wind: 115 mph, 3-second gust
4. Mechanically Attached / Fully-Adhered

D. Underwriter’s Laboratories Inc. (UL)
1. UL RMSD — 1998 Roofing Materials and Systems Directory
2. UL 790 — 1998 Fire Resistance of Roofing Coverings Materials
3. Exterior Fire Exposure Classification: Class A, ASTM E 108, for application and slopes shown.
4. UL 90 — Wind uplift requirements

E. ASCE-7 Wind uplifts requirements for geographical area.

F. American National Standards Institute (ANSI)

G. American Architectural Manufacturer’s Association (AAMA)

H. Occupational Safety and Health ACT (OSHA)

I. International Building Code (IBC)

J. 2016 California Building Code (CBC)

1.6 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.

8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.7 ACTION SUBMITTALS

A. Product Data: For each type of product. MSDS sheets. Manufacturer's printed instructions, schedules, charts, literature, and illustrations to indicate the performance, fabrication procedures, product variations, adhesive, and accessories to be used in the Work.

B. Shop Drawings: Furnish from copies of the Manufacturer's literature or from copies of NRCA "Roofing and Waterproofing Manual", Latest Edition.

C. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work, including:
1. Furnish for approval any proposed details, which differ from those, included with this proposal package. All proposed details shall first be approved in writing by roofing Manufacturer prior to submitting to Architect for approval.
2. Base flashings and membrane terminations.
3. Tapered insulation, including slopes.
4. Roof plan showing orientation of roof deck and orientation of roofing, fastening spacing, and patterns for mechanically fastened roofing.
5. Insulation fastening patterns for corner, perimeter, and field-of-roof locations including roof drains and roof access panels.
6. Furnish detail project sequencing, staging, material loading, manpower plans, and project construction schedule for approval.

D. Samples:
1. Furnish copy of sample warranty that is to be issued upon project completion.
2. Furnish samples of roof membrane.
3. Furnish sample of metal edge to be installed.

1.8 SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Fire rated documents showing compliance with U.L.

C. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified.

D. Product Test Reports: For components of roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Research/Evaluation Reports: For components of roofing system, from ICC-ES.

F. Field quality-control reports.

G. Sample Warranties: For manufacturer's special warranties.

H. Certifications:
1. Manufacturer's written certification that installer is approved and licensed to install specified roofing system. (Submit a copy with Proposal Form)
2. Manufacturer's affidavits that materials used in Project contain no asbestos.
3. Installer shall submit resume and project experience list for proposed system for

Project Manager and job site superintendent.

4. Installer shall submit written certification that there are no undocumented workers being employed by them or any subcontractor on this project and that covers all workers on this project by workmen's compensation.
5. Installer shall submit list of all subcontractors with evidence of subcontractor's insurance coverage in compliance with contract requirements.
6. Manufacturer's written certification of approval / acceptance of these specifications and details.

I. Referenced Standards: Two (2) copies of each referenced standard and retain approved copies at site.

J. Upon Substantial Completion of Work, submit the following to Architect for his submission to Owner:
1. Manufacturer's Warranty: Manufacturer's written warranty as specified.
2. Contractor's Warranty: Contractor's written warranty as specified.
3. Maintenance Procedures: Three (3) copies of roof system Manufacturer's printed instructions for Owner's use regarding care and maintenance of roof.
4. Contractor's Warranty: Contractor's written warranty as specified.
5. Affidavits from material manufacturers, suppliers and sub-contractors for release of liens.
6. Refer to section 01 78 39 for additional requirements of close-out documents.
7. Maintenance Data: For roofing system to include in maintenance manuals.

1.9 INSPECTIONS / TESTS

A. The Owner's, Architect's, and Manufacturer's representative shall at all times have access to the job site and work areas. The contractor will provide proper and safe facilities for such access and inspection.
1. Owner / Architect Inspections:
   a. The Owner / Architect will be providing periodic inspections throughout the duration of the project. Owner's / Architect's Representative shall be required to inspect after completion of each major phase of construction for approval.
2. Manufacturer Inspections:
   a. An inspection shall be made by a representative of the material Manufacturer four (4) times per month during performance of Work and at all major phases of construction, to ensure that said project is installed in accordance with the Manufacturer's specifications and illustrated details. Daily written reports by the Manufacturer shall be turned over to the Architect, on each Monday following the inspection.
   b. The authorized material Manufacturer's field representative shall be responsible for:
      1) Keeping the Architect's representative informed after periodic inspections as to the progress and quality of the work observed.
      2) Calling to the attention of the contractor those matters observed which are considered to be in violation of the contract requirements.
      3) Reporting to the Architect's representative, in writing, any failure or refusal of the contractor to correct unacceptable practices called to his attention.
      4) Confirming, after completion of the work and based on his observation and test, that he has observed no application procedures in conflict with these specifications. Final payment will not be released until the Architect has received all specified warranties.

B. Any failure by the Owner's, Architect's or Manufacturer's Representative to detect, pinpoint, or object to any defect or noncompliance of these specifications of work in progress or completed work shah not relieve the contractor, or reduce, or in any way limit, his

responsibility of full performance of work required of him under these specifications.

C. Architect may require tests and inspections as necessary to verify quality of roofing materials and workmanship. Laboratory tests will be performed in accordance with ASTM standard procedures.
   1. Owner will select testing laboratory and will pay for Work required by testing laboratory.
   2. Retest for work which fail initial tests shall be required. In this event, contractor shall pay inspections and testing fees.
   3. Non-Compliance with contractor requirements will result in the Architect/Owner to assign full time quality control and will be subject to reimbursement by the construction manager/contractor.

1.10 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is ISO 9001 certified for roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Regulatory Requirements:
   1. Classification by Underwriters' Laboratories, Inc. as a Class A roof covering.
   2. Roofing system shall be installed in accordance with ASCE-7-16 wind uplift requirements for geographical location. Wind- resistance loads listed below have a safety factor of 2.0 incorporated into the calculation.
   3. Follow local, state, and federal regulations of safety standards and codes. Refer to applicable building code (California Building Code) and International Building Code for roofing system installation requirements and limitations.

D. Installer shall be an experienced single firm specializing in the type of roofing and sheet metal work required, employing only experienced workers for the class of work in which they are employed, having at least five (5) years successful experience on projects similar in size and scope and acceptable and licensed as applicators by the material Manufacturer.

E. No subcontracting of sheet metal fabrication or installation will be accepted. Contractor must have a sheet metal license to perform such Work.

F. Contractor: The contractor is responsible for the management and control of the work. He shall give his Personal superintendence of the work satisfactory to the Architect on the iob site at all times while work is in progress, with full authority to act for the contractor as his agent.

G. Work and materials hereinafter specified shall be best of kind described and, unless specified otherwise, shall be new and of best quality. All roofing materials utilized in performance of each type of work shall be the products of one manufacturer or supplier. Unless otherwise indicated, the materials to be used in this specification are those specified and denote the type, quality, performance, etc. required. All proposals shall be based upon the use of the specified material.

H. Materials will be securely fastened in place in a watertight, neat and workmanlike manner. Contractor shall plan and conduct the operations of the work so that each section started on one day is complete, details installed and thoroughly protected before the close of work for that day.

I. Application of materials shall be in accordance with the Manufacturer's recommendations. In the instance of a conflict between these specifications and those of the Manufacturer, the most stringent shall take precedence.

J. Roof system shall be installed in accordance with ASCE 7-16 wind uplift requirements and Factory Mutual I-49 perimeter flashing requirements and shall meet Underwriter's Laboratory Class "A" fire rating.

K. Contractor shall ensure that fastener pull out resistance tests on existing decks were performed and approved by Architect and coordinated with Roofing Consultant prior to starting roofing application.

L. Contractor shall take all necessary precautions to protect the new roof mat and deck from damage. The contractor shall be responsible for repairing all new areas of damage caused by the negligence of the contractor, at the contractor's expense. The Architect's on-site representative shall determine damage caused by contractor negligence.

M. Contractor shall keep the job clean and free from all loose materials and foreign matter. Contractor shall take necessary precautions to keep outside walls clean and shall allow no roofing materials to remain on the outside walls.

1.11 INSTALLATION CONFERENCE

A. Refer to Section 01 31 13 — Project Coordination.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in Manufacturer's original unopened packaging with all tags and labels intact and legible. Carton and can labels, shall indicate appropriate warnings, storage conditions, lot numbers, and usage instructions. Handle and store materials and equipment in such a manner as to avoid damage. The proper storage of materials is the sole responsibility of the contractor. Materials damaged in shipping or storage shall not be used. Wet or damaged roofing materials shall be discarded, removed from job site, and replaced with new materials prior to application.

B. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

C. Manufacturer's packaging and / or roll plastic is not acceptable for exterior storage. Tarpaulin with grommets shall be accepted minimum for exterior coverings. All materials stored, as above shall be minimum of four (4) inches off the substrate, and the tarpaulin tied off with rope.

D. Moisture sensitive products shall be maintained in dry storage areas or properly covered. Roofing insulation and felts must always be covered or stored in a dry area when not being used.

E. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

F. Products liable to degrade as a result of being frozen shall be maintained above 40° F in heated storage.

G. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

H. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

I. Protection: Use all means necessary to protect the adjacent buildings, equipment, and membrane roofing materials before, during, and after installation and to protect the installed work and materials of other trades.

J. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

K. No storage of materials shall be permitted on roof areas other than those materials that are to be installed the same day. Any exception must be in written form. Do not place materials or equipment in such a manner as to overload structure.

L. Repairs: In the event of damage, immediately make all repairs and replacements necessary to the approval of the Architect/Owner/IOR at no additional cost to the Owner.

1.13 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.14 WARRANTY

A. Manufacturer System Warranty:
   1. Provide TWENTY (20) year System Warranty. The System Warranty shall provide for the roof membrane, all accessories that comprise a roof system and contractor labor. The Warranty shall be Non-prorated provide for No Dollar Limit (NDL), and shall not exclude ponding water and no time limited shall be assigned for any such ponding water during the warranty period.

B. Installer Warranty: Form attached.
   1. Provide separate 5-year (Five) workmanship warranty. In the event any wori related to roofing, flashing, or metal is found to be within the Installer warranty term, defective or otherwise not in accordance with the Contract Documents, the Installer shall repair that defect to the Owner and copy be sent to the manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain components including for roofing system from manufacturer approved by membrane roofing manufacturer. The components of the roof system are to be products of a single manufacturer as required providing the specified system warranty.

B. Install all materials in accordance with Manufacturer’s current written specifications and details. Deviations shall not be made without prior written approval from the Manufacturer and the Owner’s Representative. Should any specifications or details conflict with the Contract Documents, submit to Owner the recommended alternative that provides the best long term moisture protection and complies with Manufacturer’s warranty requirements for

approval.

C. All materials shall be manufactured, specified, or accepted in writing by membrane manufacturer issuing the warranty. Proposed materials shall ensure full system warranty from said manufacturer. Installer shall be an applicator licensed by the Manufacturer.

D. Samples of all materials used on the project, which are not supplied by the membrane Manufacturer, shall be submitted to the membrane Manufacturer for written approval prior to starting work.

E. All materials used on the project shall be asbestos free.

F. PVC Thermoplastic Membrane Roofing: Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufactures specified.
   1. G410 Feltback, 60 mil by Sarnafil/Sika (Basis of Design)
   2. Sentinel P150 HFB, by Soprema
   3. FB60 PVC by Flex Roofing Systems

2.2 APPROVED MANUFACTURERS

A. Specifications are based on “G410 EnergySmart Feltback” Sarnafil’s, fully adhered PVC single-ply roofing system manufactured by Sika Sarnafil. Manufacturers whose products meet or exceed the specifications, who have manufactured and installed roof materials and systems of the type specified for a minimum of ten (10) years and who maintains a single source responsibility for the total roofing system, as described herein, may apply for approval as a substitution in accordance with Division 1 requirements regarding substitutions.
   1. Soprema – Sentinel P150 HFB
   2. Flex – FB60 PVC

B. All materials shall be manufactured, specified, or accepted in writing by membrane manufacturer issuing the warranty. Proposed materials shall ensure full system warranty from said manufacturer. Installer shall be an applicator licensed by the Manufacturer.

C. Samples of all materials used on the project, which are not supplied by the membrane Manufacturer, shall be submitted to the membrane Manufacturer for written approval prior to starting work.

D. All materials used on the project shall be asbestos free.

2.3 ROUGH CARPENTRY

A. All nailers, cants and wooden curbs shall be No. 2 or better treated lumber selected to meet design details and field dimensions and requirements of Section 06 10 00, Rough Carpentry.

2.4 ROOFING SHEET METAL

A. Refer to Section 07 63 00, Roof Related Sheet Metal.

2.5 ROOF ASSEMBLY

A. Class A roofing: (Assembly from bottom up.)

1. Existing roof structure.
2. Non-rigid thermal insulation below deck.
3. Plywood roof decking.
4. Red Rosin Slip Sheet
5. Rigid insulation (sloped, finish slope of 1/4:12)
6. Rigid insulation (flat stock, 3.5-inches)
7. Separation Board (1/2" DensDeck Prime min).
8. Membrane Roofing.

2.6 MEMBRANE ROOFING

A. **Membrane shall conform to:**
   1. ASTM D4434 (latest version), "Standard for Polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.
   2. NSF/ANSI Standard 347, "Sustainability Assessment for Single Ply Roofing Membranes". Certification Level: Platinum.
   3. The manufacture to guarantee that the membrane thickness meets or exceeds [the specified thickness] when tested according to ASTM D751

B. Single ply membrane system shall be a complete system, all components of which are provided by one manufacturer.
   1. Sika Sarnafil: G410 Feltback fiberglass reinforced membrane with an integral factory-applied lacquer coating to repel dirt and sustain reflectivity and factory applied 9 oz. geotextile felt backing.
   2. Soprema: Sentinel P150 HFB
   3. Flex Roofing Systems: FB60 PVC

C. Color: Title 24 Compliant, Standard Color from Manufacturer's palette.

D. Provide textured walkway material three feet wide meeting OSHA requirements and provided by the membrane manufacturer. (See spec this section)

2.7 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing.
   1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdictions.
   2. Auxiliary Materials as required by Roof System Manufacturer

B. Wall/Curb Flashing:
   1. 60 mil fiberglass reinforced membrane adhered to approved substrate using adhesive.
   2. Clad: PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad to be 25 gauge min, G90 galvanized metal sheet with a 20 mil unsupported membrane laminated on one side.
   3. As required by Roof System Manufacturer

C. Perimeter Edge Flashing:
   1. Clad: PVC-coated, heat-weldable sheet metal capable of being formed into a variety of shapes and profiles. Clad to be 25 gauge min, G90 galvanized metal sheet with a 20 mil unsupported membrane laminated on one side
   2. Non-typical Edge: Project-specific perimeter edge detail reviewed and accepted for one-time use by the Manufacturer'sTechnical Department. Manufacturer to review prior to start of work.
   3. As required by Roof System Manufacturer

D. Liquid Applied Flashing System,
   1. Renew flashings with new Liquid-Applied Flashing System to preserve the life of the details. 3-Course flashing installation at penetrations and protrusions.
   2. Warrantable with Roofing System. Include in Roof System Warranty.
   3. Fast cure liquid membrane flashing system
   4. Flashing drains, penetrations, protrusions, electrical penetrations, low curb details, I-beams and other similar or unconventional conditions.
   5. As required by Roof System Manufacturer

E. Sealants: A single component, high performance, elastomeric sealant conforming to ASTM D232 or ASTM C920 requirements. Acceptable types are as follows:
   1. Sonolastic NP 1 manufactured by Sonneborn Building Products; Minneapolis, MN (612) 835-3434

F. Heat-Resistant, High-Temperature Sealant:
   1. #736 Heat Resistant Sealant by Dow Corning
   2. RTV 382 by Intek Sealants & Adhesives
   3. High Temp RTV Silicon #26C by Permatex
   4. Superflex Red High Temp RTV by Loctite
   5. #1300 Rubber and Gasket Adhesive by Scotch Grip
   6. Sikasil GP HT (High Temperature) by Sika (up to 500-degrees, Long-time lead item)

G. Miscellaneous Flashing:
   1. Flashing: Prefabricated expansion joint cover made from the membrane. Flash is designed for securement to wall or horizontal surfaces to span and accommodate the movement of the new and existing expansion gaps, refer to roof expansion details. As required by Roof System Manufacturer
   2. Stack: Prefabricated vent pipe flashing made from 0.048 inch thick G410 membrane. As required by Roof System Manufacturer
   3. Circular 0.060 inch thick membrane patch welded over T-Joints formed by overlapping thick membranes. Circle- “G”: Circular 0.048 inch thick G410 membrane patch welded over T-Joints formed by overlapping thick membranes.
   4. Corner: Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil) thick membrane that are heat-welded to membrane of Clad base flashings. Size appropriate to site conditions. Circle- “G”: Circular 0.048 inch thick G410 membrane patch welded over T-Joints formed by overlapping thick membranes.
   5. Multi-Purpose Sealant: A sealant used at flashing terminations approved by manufacturer.
   6. Adhesive: Solvent based and provided by roofing manufacturer to attach membrane to flashing substrate
   7. Felt: Non-woven polyester of polypropylene mat cushion layer that is behind Flashing membrane when the flashing substrates are rough-surfaced or incompatible with the flashing membrane.

H. Walkpads / Protection Pads:
   1. Walk pads shall have contrasting color from surfacing.
   2. Provide walk pads shall be installed at point of roof access, at service points of all roof mounted equipment requiring periodic maintenance.
   3. Protection pads shall have rounded corners and extend minimum four (4) inches beyond edge of overlying element.
   4. Provide new protection pads under all pipe supports, at HVAC and mechanical access points, in front of all roof top doors and openings.
   5. Circle- “G”: Circular 0.048 inch thick G410 membrane patch welded over T-Joints formed by overlapping thick membranes.
   6. As required by Roof System Manufacturer

I. Substrate cover board or Separation Board: Fiberglass mat gypsum roof boards to be Den Deck Prime by Georgia Pacific, complying with ASTM C1177.
   1. ½-INCH

J. Red Rosin Slip Sheet
   1. Dry Sheathing Paper over wood deck, rosin-coated, 5 lbs per 100 sf.

K. Miscellaneous Accessories: Provide concrete splashblocks at roof leader terminated 6-inches above roof. Coordinated bird and bug screens. Roof hatch access steps and flashing. Mechanical equipment curbs and access panels.

L. Metal Termination Bars: Manufacturer's standard aluminum bars, approximately 1-inch wide, roll formed and pre-punched.

M. Metal Battens: Manufacturer's standard aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, pre-punched.

N. Metal Flashings, Copings, Edge Trim and Accessories: Provide all roofing Manufacturer's metal required for a complete roofing system covered under the Manufacturer's warranty. ANSI / SPRI ES-1: Fabricate and install sheet metal edge flashings and copings to comply with requirements of ANSI / SPRI ES-1 for 120 MPH wind speed zone and wind resistance loads.

O. Sealants: Membrane Manufacturer's approved sealant shall be used to seal penetrations through the membrane system and at miscellaneous sealant applications that come in contact with roof systems components.

P. Air Seal Membrane: If required by Manufacturer to meet wind design requirements. Air seal membrane shall be a minimum 4 mil. Polyethylene sheeting or as required by roof system Manufacturer.

Q. Sealing Tape Strip: Compressible foam with pressure-sensitive tape on one side. Sealing tape strip is to be used with metal flashing as a preventive measure against air and wind blown moisture entry.

R. Metal Reglet: Manufacturer's 6063T5 extruded aluminum counter-flashing, approximately 2.25 inches wide and 0.10 inch thick, pre-punched at 8 inches o.c. for attachment to the wall or curb. Use prefabricated mitered inside and outside corners where walls interest.

S. Miscellaneous Accessories: Provide pourable sealants, performed cone and vent sheet flashings, pre-formed inside and outside corner sheet flashings, T-joint covers, termination reglets, and other accessories as recommended by roofing system Manufacturer for intended use.

T. Other miscellaneous materials shall be of the best grade available and approved in writing by roof system Manufacturer, prior to use, for the specific application.

2.8 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by PVC roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Recovery Board: Glass-Faced Gypsum Roof Board equal to UL rated Type X "Dens Deck Prime" as produced by Georgia-Pacific. Board sizes shall be 48" x 96" x 1/2" or as indicated

on drawings for roof assembly. Provide as required by manufacture recommendation primer for Roof System.

1. Approved substitute (and acceptable to roof system Manufacturer), SECUROCK by USG.

C. Tapered Board Insulation: ASTM C578
   1. Provide one of the following:
      c. Rigid polyisocyanurate (ISO) foam insulation with black mat facers.
      d. Warrantable by Roofing System Manufacturer.
      e. As required by Roof System Manufacturer

D. Polyisocyanurate Roof Insulation:
   1. Shall comply with ASTM C1289 and Federal Specification (FS) HH-I-1972/Gen and HH-I-1972/2, with a 20 psi minimum compressive strength.
   2. Insulation shall be surfaced on both sides with non-asphaltic fiberglass facers.
   3. Thickness shall be a minimum total of 3.50-inches (or size specified on drawings) and installed in two layers.
   4. Warrantable by Roofing System Manufacturer.
   5. As required by Roof System Manufacturer

E. Tapered ISO. Insulation:
   1. Factory cut 48 inches x 48 inches polyisocyanurate board;
   2. Slope and thickness to vary as required to achieve a minimum 1/4 inch per foot finished slope unless noted otherwise on the Drawings;
   3. ASTM C1289, UL Class A, Factory Mutual Class 1.
   4. Warrantable by Roofing System Manufacturer.
      a. 20 psi rigid polyisocyanurate insulation board with a cellulosic felt facer.

F. PVC Roof Membrane Adhesive
   1. Sarnacol AD Feltback Membrane Adhesive
      a. A low odor, VOC compliant, one step foamable polyurethane adhesive used to attach feltback membrane to approved compatible substrates. Adhesive is applied by combining two 5 gallon box sets placed on a cart and dispensed through a combining hose or by hand with a dual component caulk gun. Additional adhesive may be required for rougher surfaces.
   2. Sarnacol OM Feltback Membrane Adhesive
      a. A low odor, VOC compliant, one step foamable polyurethane adhesive used to attach feltback membrane to approved compatible substrates. Adhesive is applied by combining two 5 gallon box sets placed on a cart and dispensed through a combining hose or by hand with a dual component caulk gun. Additional adhesive may be required for rougher surfaces.

2.9 MISCELLANEOUS MATERIALS AND ACCESSORIES

A. Other materials shall be as shown, specified or required and be of the best grade for the proposed use as recommended by the Manufacturer.
   1. Expansion Joint: As detailed on drawings and outlined in NRCA and SMACNA manuals.
   2. Low Level expansion joints, as noted on the drawings, to be fabricated similar to Situra Inc. “Red Line” Low level expansion joint details. Install as per Manufacturer’s recommendations.
   3. Sealant Backer Rod: Provide compressible rod stack of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable, non-absorptive material as recommended by sealant Manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be

deteriorated by sealant application temperature as indicated.

4. Pipe Hangers and Supports: Provide and install all necessary supports for gas lines, conduit, chilled water lines, duct work, condensate lines, etc. Refer to Section 07 72 00, Roof Accessories.
5. Cant Strips: Shall be wood fiber where used for non-structural purposes. Shall be treated solid wood where used for structural purposes meeting NRCA, Factory Mutual and Underwriters Laboratory guidelines. If solid wood cant is used where insulation exists, cant is to be toe nailed into treated solid wood nailer the same height as insulation.
6. Termination Bar:
   a. Material: Extruded aluminum bar with lip profile.
   a. Size: 0.090 inch thick by 3/4 inch wide with 3/16 inch lip width and a 45 degree lip angle, factory punched 1/4 inch x 3/8 inch oval holes spaced six (6) inches on center.
   b. Approved Product / Manufacturer: “LIPTB 06” manufactured by Olympic Manufacturing Group, Inc., or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Existing Conditions: Examine existing building and new construction to determine existing physical conditions that affect installation of new roofing. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work:
   1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
   2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
   3. Verify that minimum drying period recommended by roofing system manufacturer has passed.
   4. Verify all roof surfaces are smooth and free of dirt, debris and incompatible materials.
   5. Verify all roof surfaces shall be free of water.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to Manufacturer’s written instructions and warranty requirements.

D. Environmental Requirements:
   1. Apply roofing in dry weather.
   2. Do not expose roof components and flashing in inclement weather or when it is predicted 30% or more possibility for inclement weather.
   3. When ambient temperature is below 40 degrees Fahrenheit, expose only enough sensitive cements, sealants, and adhesives as required for use within a four-hour period.
   4. Do not expose membrane and accessories to a constant temperature of 180 degrees Fahrenheit.

E. Protection:
   1. Provide special protection and avoid traffic on completed areas of membrane installation.
   2. Restore to original condition or replace work or materials damaged during handling of

roof materials.

3. Take precautions as required to protect adjacent work and structures.

F. Emergency Equipment: Maintain on site equipment necessary to apply emergency temporary edge seal in event of sudden storms or inclement weather.

G. Restrictions:
1. Comply with General Requirements on use of site.
2. Smoking is prohibited on all roof areas or in existing buildings.
3. Maintain facility and all utility services in a functional condition.
4. Provide sanitary facilities for employees.

H. Examine and verify that receiving substrate surfaces of the structure have no defects or errors, which would result in poor or potentially defective application or cause latent defects in workmanship.
1. Examine substrate to which roofing material is to be applied to ensure that its condition is satisfactory for roofing application. Do not permit voids greater than 1/4 inch wide in the substrate. Substrates for roofing materials shall be dry and free of oil, dirt, grease, sharp edges, and debris. Inspect substrates, and correct defects before application of thermoplastic sheets.

I. Verify that roofing openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.

J. Do not proceed with installation until unsatisfactory conditions have been corrected. Starting installation shall imply acceptance of surfaces and conditions.

K. Nailers:
1. Wooden nailers shall be installed at perimeter edges or drip edges on outside perimeter of building.
2. All Construction: Nailers shall be the same height as the new insulation being installed or to existing raised roof edge whichever is applicable.
3. Nailers shall be anchored to resist a pullout force of 300 pounds per linear foot per Factory Mutual Data Sheet 1-49.
4. Fasteners shall be no less than two (2) per nailer, and be spaced at 24-inches on center maximum.
5. Raise all curbs, flashing, etc, a minimum of ten (10) inches above the deck.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 SUBSTRATE PREPARATION

A. Substrate Surface: Prepare substrate surfaces to insure proper and adequate installation, in strict accordance with the Contract Documents and approved Shop Drawings, or Manufacturer's requirements.

B. Fill all gaps and voids between substrate components that are wider than 1/4 inch. Fill all

gaps with same materials as the substrate.

C. The membrane Manufacturer shall specify types of substrates that are suitable for use with the bonding adhesive.

D. Protection of Adjacent Areas or Surfaces: Protect adjacent areas or surfaces from damage as a result of the Work of this section. Remove sharp projections.

E. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

F. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of the roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

G. Tear-off (if applicable):
1. Tear-off existing roof system down to existing deck, deck to remain. Remove all associated Flashings and abandoned equipment.
2. Repair / Patch all existing decks as required, due to removal of equipment or deteriorated conditions.
3. Sweep or vacuum all surfaces, removing all loose aggregate and foreign substances prior to commencement of roofing. Ensure dry, smooth surface with no depressions or ponding water. Notify Architect prior to roofing any areas that may result in ponding water.
4. Trash Chutes: Roofing materials and other discarded materials shall be put into an enclosed trash chute. No material may be thrown off roof. Remove debris daily from roof and from grounds.
5. Refer to phasing plans for flashing of existing curbs now and demolition of existing curbs and penetrations at future dates, flashing of new curbs and penetrations at a future date.

3.4 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. Base Flashing: Fully adhere base flashings to the substrate in manufacturer provided bonding adhesive. Install termination bar and sealant at the top of base flashing.

D. Install roofing and auxiliary materials to tie in to existing roofing where applicable to maintain weather-tightness of transition and to not void warranty for existing roofing system.

3.5 INSULATION INSTALLATION

A. General:
1. Manufacturer's Instructions: In regard to attachment, the Manufacturer's instructions or specifications shall determine the suitability for an application.
2. Precautions: The surface of the insulation must not be ruptured or damaged prior to installation of the roof membrane. Replace damaged boards.
3. Coordinate installing roofing system components so insulation is not exposed to

precipitation or left exposed at the end of the workday.

4. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
5. Thermal insulation boards shall be laid on the substrate in parallel rows with end joints staggered and butted as close as possible. All joints shall be tight and at the roof perimeter and roof penetrations, insulation shall be cut neatly and fitted to reduce openings to a minimum. All openings 1/4 inch or larger shall be filled with insulation.
6. Insulation shall be tapered or feathered at drains and scuppers to provide proper drainage (if applicable).
7. No more insulation shall be installed than can be covered by the completed roof system by the end of the day or the onset of inclement weather.
8. Tapered insulation and crickets, when specified, shall be placed in accordance with the drawings and / or as required NRCA standards.

B. Install tapered insulation under area of roofing to enhance drainage and provide positive drainage.

C. Install insulation under area of roofing to achieve required thickness.
1. Where overall insulation thickness is 3.5 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 12 inches (150 mm) in each direction.

D. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

E. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch (6 mm) with insulation.

F. Install cover board over the insulation, staggering joints a minimum of 12” in all directions. Mechanically attach to the deck.

G. Wood decks:
1. Specified rigid insulation shall be mechanically fastened to the wood deck meeting ASCE 7-16 wind uplift requirements as dictated by wind zone applicable to location of project.
2. Fasteners and fastening patterns shall be determined by building height, location and geographical area of the United States.
3. It is the contractor's responsibility to consult current publications, literature, and bulletins of current codes and the Manufacturer that are in effect at the time of this project.

3.6 INSTALLATION OF THERMOPLASTIC MEMBRANE

A. General: Install in strict accordance with Manufacturer's latest published requirements, instructions, specifications, and details and approved shop drawings.

B. Over the properly installed and prepared substrate, manufactures adhesive (Sarnacol 2121 or approved equal) shall be poured out of the pail and spread using notched ¼” X ¼” X ¼” rubber squeegees. The adhesive shall be applied at a rate according to manufacture requirements. No adhesive is applied to the back of the feltback membrane. ***Do not allow adhesive to skin over or surface-dry prior to installation of feltback membrane.***

C. The feltback roof membrane is unrolled immediately into the wet adhesive. Adjacent rolls overlap previous rolls by 3 inches. This process is repeated throughout the roof area.

Immediately after application into the adhesive, each roll shall be firmly pressed into place with a water filled, foam covered lawn roller by frequent rolling in two directions. ***Do not allow adhesive to skin over or surface dry prior to installation of feltback membrane.***

D. Weld cover strips at all seams that do not have a factory selvage edge.

E. T-Joints required.

F. For application of hot asphalt as an adhesive for the membrane, refer to Manufacturer's recommendations.

3.7 SEAM INSTALLATION

A. Clean seam areas, overlap sheets, and weld side and end laps of sheets and flashings according to Manufacturer's written instructions to ensure a watertight seam installation. Weld seam as follows:
   1. Weld Method: Hot Air

B. Test lap edges with probe to verify seam weld continuity on a daily basis.

C. Repair tears, voids, and lapped seams in roofing that does not meet requirements.

3.8 FLASHING INSTALLATION

A. Install sheet flashings and performed flashing accessories and adhere to substrate according to roofing system Manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of flashing sheet at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with sheet flashing as recommended by Manufacturer.

D. Clean seam areas, overlap seams, and firmly roll flashings into the adhesive. Weld side and end laps to ensure a watertight seam installation.

E. Test lap edges with probe to verify seam weld continuity. Apply lap sealant, if required by roofing Manufacturer, and seal exposed edges of sheet flashing terminations per Manufacturer's requirements.

F. Terminate and seal top sheet flashings and mechanically anchor to substrate through termination bars.

G. T-Joints required.

3.9 OVERNIGHT SEAL / WATER CUT-OFF

A. Over Night Seal: Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual.

B. Water Cut-Off: At the end of day's work or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to resumption of roofing.

3.10 ROOF SYSTEM INTERFACE WITH RELATED COMPONENTS

A. Sealant: Seal all exposed finish ply edges at gravel stops, waste stacks, pitch pans, vent stacks, etc., with a smooth continuous bead of approved sealant.

B. Sheet Metal: Refer to Section 07 62 00, ROOF RELATED SHEET METAL.

3.11 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate according to roofing system manufacturer's written instructions. Leave 3 inches of space between adjacent walkway.

B. Install *around* mechanical units and roof top units.

C. Install on 3-sides of roof access hatch.

D. Install at roof access locations

E. Install beneath conduit support blocks

3.12 DRAINS AND DRAINAGE

A. Check plumbing at drains, scuppers, downspouts, etc.

B. Check roof drains, overflow drains, and scuppers for proper installation and function.

C. Confirm that plumbing is sound, does not leak, and is proper.

D. Confirm that plumbing is functional and provides for complete drainage.

E. Replace plastic drain baskets with new cast iron strainers

3.13 MECHANICAL UNITS, SHEET METAL, AND ROOFTOP FIXTURES

A. Rejuvenate and renew sealants. Remove embrittled and/or otherwise ineffective sealants.

B. Remove unused or otherwise “dead” equipment and fixtures, including CMU blocks, wood/lumber, satellite dishes, etc.

C. Repair electrical conduit and couples

D. Repair electrical fixtures including conduit, electrical boxes, outlets, etc.

E. Install proper storm collar at mechanical flues. Seal with heat-resistant sealant.

F. Install proper penetration flashings at duct penetrations.

G. Route errant wires and cables through conduit.

H. Provide new engineered conduit & pipe supports, hangers, and clamps. Provide protection beneath sleepers and supports. Supports by Erico (Caddy Pyramid Supports), Mapa Products, Miro Industries, PHP Systems.

I. Replace conduit insulation wrap.

J. Prepare and Coat conduit lines with acrylic coating by National Coatings or approved equal
   1. Gas Lines – coat Red
   2. Copper condensate lines – coat White
   3. Electrical Lines – coat Green
   4. Drain Screens – coat Blue
   5. Legs of sheet metal curb flashings – coat Red
   6. Immediately clean any spills!

3.14 RESTORATION OF SHEET METAL FIXTURES

A. Restoration of Sheet Metal Fixtures including (but not limited to) Sheet Metal Flashings, Sheet Metal Trim, Hoods, Caps, Enclosures, Penetrations, and Ductwork
   1. All rooftop exposed sheet metal is included in this Work.
   2. Basis for the Design is National Coatings
   3. Clean and prepare all sheet metal fixtures and flashings.
   4. Clean and clear oxidation from sheet metal fixtures and flashings. Use mechanical means as necessary.
   5. Prime (rust-inhibitive primer) bare sheet metal caps and ancillary sheet metal flashings. This shall be completed prior to any detailing and 3-coursing.
   6. Detail & 3-course all joints using trowel-grade acrylic mastic (A150) and polyester OR with Glenkote Seal Flex Duct Sealant (at ducts). Coat with two coats of A400 Tan or Gray acrylic to match new coatings and roofing system.
   7. Coat sheet metal caps, sheet metal fixtures, and ancillary sheet metal flashings with a 2-Coat acrylic system (A400 + A400). Color to match roofing.
   8. Follow all manufacturer's guidelines for a proper application.

3.15 ROOF ACCESS

A. Install new SafePro Roof Hatch Safety Rail and Ladder Extension with self-closing access gate.

3.16 MISCELLANEOUS WORK

A. Repair any leaks at the roofs included in this Work.

B. Trim trees back from making contact with building and roof. Coordinate with School District and onsite Custodial Staff.

C. Wood blocking to match thickness of roofing for flush termination and/or free-flowing drainage.

D. Renew joint sealants along interior of walls at roof, if any.

E. Renew sealants. All sealant applications shall be tooled.

F. Under no circumstance shall flashings be secured through the top plane of the flashing fixture. Do not "top nail" flashings. This will not be acceptable, and flashing shall be replaced and properly installed.

G. Remove unused, abandoned, or otherwise "dead" equipment and fixtures, including CMU blocks, wood/lumber, satellite dishes, conduit, etc.

H. Repair electrical fixtures including conduit, couples, electrical boxes, outlets, etc.

I. Remove pitch pans from the roof so that new, warrantable, pre-manufactured units Liquid-

Applied Flashing System may be used to flash penetrations. Install for warrantable application/installation consistent with roofing manufacturer.

3.17 METAL FLASHINGS, COPINGS, EDGE TRIM AND ACCESSORIES INSTALLATION

A. General: Secure metal flashings accessories at roof edges according to FM Loss Prevention Data Sheet 1-49 for specified wind zone.

B. ANSI / SPRI ES-1: Fabricate and install sheet metal edge flashings and copings to comply with requirements of ANSI / SPRI ES-1 for 120 MPH wind speed zone and wind resistance loads.

3.18 OVERNIGHT SEAL / WATER CUT-OFF

A. Over Night Seal: Shall be performed according to accepted roofing practice as outlined in the NRCA Roofing Manual.

B. Water Cut-Off: At the end of day's work or when precipitation is imminent, construct a water cut-off at all open edges. Cut-offs can be built using asphalt or plastic cement and roofing felts, constructed to withstand protracted periods of service. Cut-offs must be completely removed prior to resumption of roofing.

3.19 SPIRIT OF THE ROOF

A. The intent of the design is as important as the design itself.

B. In the spirit of construction, we expect nothing less than "Good Roofing Practice."

C. Code compliance is the worst roof we can install.

D. All terminations shall have an element of redundancy.

E. Seal roof terminations with termination bar and 3-courses of sealant…1 each Butyl Tape, 1 each Butyl Tape or Sealant, and 1-each filet of sealant.

F. All Terminations include termination bar with sealant behind membrane, behind bar, and atop bar + Sheet Metal Counterflashing with sealed terminations. Surface mounted CF will have sealant behind the sheet metal leg and atop the sealant lip.

G. Details are common and typical. Some are specific, but for the most part, the details are common and typical. Their intent is what's important. It is difficult to match exactly every detail on a retrofit operation. Some show details specific to existing conditions, while others cannot. In retrofit work, knowing existing conditions is difficult sometimes…that's why we have "allowances." That's why details are shown as "Typical" or "Common". Our intention is to provide long term serviceable roofing for our clients and your customer.

H. All terminations have an element of redundancy.

3.20 FIELD QUALITY CONTROL

A. Owner’s Inspector of Record to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components, and furnish reports to Architect prior to install of finished roof materials. If conditions are not met, contractor to repair and

request re-inspection for verification.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

E. Manufacturer’s Quality Control Inspection: The Manufacturer’s Technical Representative shall review the on-going work on a minimum of one time every 10 working days. All defects noted non-compliance with the specifications or the recommendations of the thermoplastic Manufacturer should be itemized in a punch list. These items must be corrected immediately by the contractor to the satisfaction of the owner's representative and the thermoplastic Manufacturer.

3.21 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Immediately remove all spots, smears, stains, residues, adhesives, etc., from the Work of this Section and / or upon adjacent areas or surfaces, which result from the Work of this Section.

C. Upon completion of the Work of this Section, dispose of, away from the Site, all debris, trash, containers, residue, roofing remnants and scraps which results from the Work of this Section.

D. Correct deficiencies in or remove roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair sheet flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.

E. All warranties, as required for the project by this specification, shall be submitted for approval prior to final payment.

F. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.22 ACCEPTANCE

A. Prior to demobilization from the site, the Owner / Project Manager, Architect and installer shall review the work. All defects noted noncompliance with the specifications or the recommendations of the thermoplastic Manufacturer should be itemized in a punch list. These items must be corrected immediately by the contractor prior to demobilization to the satisfaction of the Owner / Project Manager and the thermoplastic Manufacturer.

B. Notify Architect and Owner 48 hours in advance of the date and time of inspection.

C. All warranties, as required for the project by this specification, shall be submitted for approval prior to final payment.

END OF SECTION #

SECTION 09 24 00 – CEMENT PLASTERING (PATCH AND REPAIR)

PART 1 GENERAL

1.1 RELATED DOCUMENTS

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

B. Related documents:
1. Section 01 33 00; Submittal Procedures.
2. Section 01 73 29; Cutting and Patching.
3. Section 02 41 19; Selective Demolition.
4. Section 06 10 53; Miscellaneous Rough Carpentry.
5. Section 07 92 00; Joint Sealants.
6. Section 09 90 00; Painting and Coatings.

1.2 SUMMARY

A. Section Includes: Requirements including but not limited to:
1. Exterior cement plaster repair.
2. Metal lath and furring.
3. Accessories necessary for a complete installation.

1.3 SUBMITTALS

A. Product Data: Submit technical data for product and accessory, including construction details and material descriptions.

B. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Building Code: Comply with applicable provisions of the CBC 2016 California Building Code (CCR Title 24, Part 2, as adopted and amended by DSA).
2. Fire Resistance Ratings: Where indicated, provide cement plaster assemblies identical to those of assemblies tested for fire resistance according to ASTM E 119 by a qualified testing agency.

B. Preinstallation Conference: Conduct conference at site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver cementitious materials in original packages, containers, or bundles, labeled with manufacturer's name, product brand name, and lot number.

B. Store materials inside under cover, and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.

1.6 PROJECT CONDITIONS

A. Comply with applicable requirements of ASTM C 926.

B. Environmental Requirements: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.

C. Cold Weather Requirements: Provide heat and protection, temporary or permanent, as required to protect each coat of plaster from freezing for at least 24 hours after application. Distribute heat uniformly to prevent concentration of heat on plaster near heat sources; provide deflection or protective screens.

D. Warm Weather Requirements: Protect plaster against uneven and excessive evaporation and from strong flows of dry air, both natural and artificial. Apply and cure plaster as required by climatic and job conditions to prevent dry out during cure period. Provide suitable coverings, moist curing, barriers to deflect sunlight and wind, or combinations of these, as required.

E. Exterior Plasterwork:
1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
2. Apply plaster when ambient temperature is greater than 40 degrees F (4.4 degrees C).
3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred.

F. Protect contiguous work from soiling and moisture deterioration caused by plastering. Provide temporary covering and take precautions necessary to minimize spattering of plaster on adjacent work.

G. Factory Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufacturers: Subject to compliance with requirements, provide products of one of the following:
1. Metal Lath and Accessories:
   a. Alabama Metal Industries (AMICO).
   b. CEMCO.
   c. ClarkDietrich Building Systems.
   d. Marino/WARE.
   e. Phillips Manufacturing.
2. Plastic Accessories:
   a. Alabama Metal Industries (AMICO).
   b. Phillips manufacturing.
   c. Plastic Components.
   d. Vinyl Corp.
3. Ready Mixed Finish Coat Plaster:
   a. California Stucco Product.
   b. El Rey Solutions.
   c. Omega Products International.
   d. Quikrete.
   e. Shamrock Stucco.

4. Acrylic Based Finish Coat:
   a. California Stucco Product.
   b. Dryvit Systems.
   c. El Rey Solutions.
   d. Finestone, BASF Corp.
   e. LaHabra, a brand of Parex USA, Inc.
   f. Omega Products International.
   g. Senergy, BASF Corp.
   h. Sto Corp.

B. Metal Lath:
   1. Expanded Metal Lath: ASTM C 847, cold rolled carbon steel sheet with ASTM A 653/A 653M, G60 (Z180), hot dip galvanized zinc coating.
      a. Diamond Mesh Lath: Self furring, 3.4 lb/sq. yd. (1.8 kg/sq. m).
      b. Comply with DSA IR 25-4 for the installation of Self-Furring Metal Lath.

C. Accessories: Comply with ASTM C 1063, and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.
   1. Metal Accessories:
      a. Foundation Weep Screed: Fabricated from hot dip galvanized steel sheet, ASTM A 653/A 653M, G60 (Z180) zinc coating.
      b. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot dip galvanized-zinc coating.
      c. Outside Corner Reinforcement: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot dip galvanized zinc coating.
      d. Cornerbeads: Fabricated from zinc or zinc coated (galvanized) steel.
         1) Smallnose cornerbead with expanded flanges; use unless otherwise indicated.
         2) Smallnose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing unit masonry corners.
      e. Casing Beads: Fabricated from zinc or zinc coated (galvanized) steel; square edged style; with expanded flanges.
      f. Control Joints: Fabricated from zinc or zinc coated (galvanized) steel; one piece type, folded pair of unperforated screeds in M shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
      g. Expansion Joints: Fabricated from zinc or zinc coated (galvanized) steel; folded pair of unperforated screeds in M shaped configuration; with expanded flanges.
      h. Two Piece Expansion Joints: Fabricated from zinc or zinc coated (galvanized) steel; formed to produce slip joint and square edged reveal adjustable from 1/4 to 5/8 inch (6 to 16 mm) wide; with perforated flanges.
   2. Plastic Accessories: Manufactured from high impact PVC.
      a. Cornerbeads: With perforated flanges.
         1) Smallnose cornerbead; use unless otherwise indicated.
         2) Bullnose cornerbead, radius 3/4 inch (19 mm) minimum; use at locations indicated on Drawings.
      b. Casing Beads: With perforated flanges in depth required to suit plaster bases indicated and flange length required to suit applications indicated.
         1) Square edge style; use unless otherwise indicated.
         2) Bullnose style, radius 3/4 inch (19 mm) minimum; use at locations indicated on Drawings.
      c. Control Joints: One piece type, folded pair of unperforated screeds in M shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
      d. Expansion Joints: Two piece type, formed to produce slip joint and square edged 1 inch (25 mm) wide reveal; with perforated concealed flanges.

3. Aluminum Reveals and Moldings: Where applicable.
   a. Manufacturer: Fry Reglet
   b. Width: 2 inch
   c. Material: Extruded 6063 T5 Aluminum
   d. Finish: Kynar - Silver Satin.
   e. Provide all required accessories, moldings, and prefabricated intersection/corner transition pieces for a complete installation.
4. Aluminum Soffit Vents: Where applicable.
   a. Manufacturer: Fry Reglet
   b. Width: 3 inch
   c. Material: Extruded 6063 T5 Aluminum
   d. Finish: Kynar - Silver Satin
   e. Provide all required accessories, moldings, and prefabricated intersection/corner transition pieces for a complete installation.

D. Miscellaneous Materials:
1. Water for Mixing and Finishing Plaster: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
2. Fiber for Base Coat: Alkaline resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in cement plaster.
3. Bonding Compound: ASTM C 932.
4. Fasteners for Attaching Metal Lath to Substrates: ASTM C 1063.
5. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475 inch 1.21 mm diameter unless otherwise indicated.
6. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   a. Fire Resistance Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Plaster Materials:
1. Portland Cement: ASTM C 150/C 150M, Type II.
   a. Color for Finish Coats: Integral color plaster shall match exterior paint color as indicated, provide sample/mock-up for approval by Architect.
2. Colorants for Job Mixed Finish Coats: Colorfast mineral pigments that produce finish plaster color selected by Architect.
3. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
4. Sand Aggregate: ASTM C 897.
   a. Color for Job Mixed Finish Coats: White**.**
5. Exposed Aggregates for Finish Coats: Match existing.
6. Ready Mixed Finish Coat Plaster: Mill mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
   a. Color: Integral color plaster shall match exterior paint color as indicated, provide sample/mock-up for approval by Architect.
7. Acrylic Based Finish Coatings: Factory mixed acrylic emulsion coating systems formulated with colorfast mineral pigments and fine aggregates; for use over cement plaster base coats. Include manufacturer's recommended primers and sealing topcoats for acrylic based finishes.
   a. Color: Integral color plaster shall match exterior paint color as indicated, provide sample/mock-up for approval by Architect.

2.2 PLASTER MIXES

A. Comply with ASTM C 926 for applications indicated.
1. Fiber Content: Add fiber to base coat mixes after ingredients have mixed at least two

minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.

B. Base Coat Mixes for Use over Metal Lath: Scratch and brown coats for three coat plasterwork:
   1. Portland Cement Mix:
      a. Scratch Coat: For cementitious material, mix 1 part portland cement and **3/4 to 1-1/2** parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
      b. Brown Coat: For cementitious material, mix 1 part portland cement and **3/4 to 1-1/2** parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.

C. Job Mixed Finish Coat Mixes:
   1. Portland Cement Mix: For cementitious materials, mix 1 part portland cement and **3/4 to 1-1/2** parts lime. Use 1-1/2 to 3 parts aggregate per part of cementitious material.

D. Factory Prepared Finish Coat Mixes: For ready mixed finish coat plasters or acrylic based finish coatings, comply with manufacturer's written instructions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the work. Proceed with installation after correcting unsatisfactory conditions.

3.2 PREPARATION

A. Remove plaster to nearest joint where possible. Saw cut joint for patch at location agreed upon with Architect prior to work.

B. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.

C. Prepare smooth, solid substrates for plaster according to ASTM C 926.

3.3 INSTALLATION

A. Metal Lath: Install according to ASTM C 1063.
   1. Partition Framing and Vertical Furring: Flat diamond mesh lath.
   2. Horizontal Framing: Flat diamond mesh lath.

B. Accessories: Install according to ASTM C 1063 and at locations indicated on Drawings.
   1. Reinforcement for External (Outside) Corners:
      a. Install cornerbead at exterior corner locations.
      b. Install cornerbead at interior corner locations.
   2. Control Joints: Locate as approved by Architect for visual effect where not illustrated on drawings.
      a. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
         1) Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
         2) Horizontal and Other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).
      b. At distances between control joints of not greater than 12 feet o.c.

c. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
d. Where control joints occur in surface of construction directly behind plaster.
e. Where plasterwork areas change dimensions, to delineate rectangular shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
f. Where plasterwork repair involves any of the above referenced conditions.

3.4 PLASTER APPLICATION

A. Comply with ASTM C 926.
1. Do not deviate more than plus or minus 1/4 inch in 10 feet (6 mm in 3 m) from a true plane in finished plaster surfaces when measured by a 10-foot (3-m) straightedge placed on surface.
2. Finish plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated. Where casing bead does not terminate plaster at metal frame, cut base coat free from metal frame before plaster sets and groove finish coat at junctures with metal.
3. Provide plaster surfaces ready to receive field applied finishes indicated.

B. Flat Surface Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet (3 mm in 3 m) from a true plane in finished plaster surfaces, measured by a 10 foot (3m) straightedge placed at any location on surface.

C. Walls; Base Coat Mixes for Use over Metal Lath: For scratch and brown coats, for three coat plasterwork with 3/4 inch (19 mm) total thickness:
1. Portland cement mixes.

D. Plaster Finish Coats: Apply to provide dash finish.

E. Acrylic Based Finish Coatings (Contractor Option to Plaster Finish Coat): Apply coating system, including primers, finish coats, and sealing topcoats, according to manufacturer's written instructions.

F. Concealed Exterior Plasterwork: Where plaster application is used as a base for adhered finishes, omit finish coat.

3.5 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

B. Cut, patch, replace, repair, and point up plaster as necessary to accommodate other work. Repair cracks and indented surfaces. Point up finish plaster surfaces around items that are built into or penetrate plaster surfaces. Repair or replace work to eliminate blisters, buckles, check cracking, dry outs, efflorescence, excessive pinholes, and similar defects. Repair or replace work as necessary to comply with required visual effects.

3.6 TOLERANCES

A. Maximum Variation from True Lines and Levels: 1/8 inch in 10 feet (3mm in 3 m).

B. Maximum Variation from True Position: 1/8 inch (3mm).

3.7 CLEANING AND PROTECTION

A. Remove temporary protection and enclosure of work after plastering is complete. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.

B. Remove unused materials, containers, equipment, and plaster debris.

C. Protect plaster and maintain conditions ensuring finished plaster is without damage or deterioration at time of Substantial Completion.

END OF SECTION 09 24 00

SECTION 22 05 00 – COMMONG WORK FOR PLUMBING

PART 1 GENERAL

1.1 SUMMARY

A. This section includes general mechanical materials and methods required within the project. Items included within this specification section include:
   1. Piping Supports
   2. Roof Flashing
   3. Dielectric Unions
   4. Pipe and Equipment Identification
   5. Fireproofing
   6. Painting
   7. Commissioning and preliminary operational tests

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

1.3 SUBMITTALS:

A. Product data: submit complete data of materials proposed including:
   1. Manufacturer and model number
   2. Clearly indicate all options, trim, and accessories.
   3. Cross reference manufacturer's cut sheet to specification section on submittal sheet.

B. Operation and Maintenance Data: where applicable, submit complete O&M data including:
   1. Maintenance data and parts lists for each component.
   2. Provide "trouble- shooting" maintenance guide
   3. Include this data within maintenance manual

PART 2 PRODUCTS

2.1 PIPING SUPPORTS:

A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2013 California Building Code, Section 1616A.1.18 through 1616A.1.26 and ASCE 7-10, chapters 13, 16, and 30.

B. Mechanical equipment supports shall be designed by a licensed Structural Engineer.

C. Provide seismic sway bracing for all suspended piping and ductwork in accordance with the Seismic Restraint System Guidelines, OPM-0052-13 by Cooper B-Line / Tolco or equivalent OPM-0043-13 by Mason.

D. Provide all piping and ductwork with seismic restraints using seismic hazard level (SHL) "A" as called for in SMACNA's Seismic Restraint Manual Second Edition 1998.

E. Acceptable Manufacturer:

1. B-Line
2. Mason
3. Or Equal

2.2 ROOF FLASHING:

A. Flashings in metal deck or membrane type roofing:
   1. Flashing for penetrations of the roof for mechanical items such as flues, ducts, and pipes will be furnished and installed under other sections of these specifications. The work of this section shall include layout, sizing, and coordination of penetrations required for the mechanical work.
   2. Furnish and install counterflashings above each flashing required in the mechanical work. Flues and ducts shall have 24-gauge galvanized sheet metal storm collar securely clamped to the flue or duct above the flashing.
   3. Sewer vents and other piping extending through roof structure shall have flashing provided and installed as part of the roofing work. This contractor shall coordinate his Work accordingly.

B. Flashing in built-up roofing assemblies:
   1. Where flashing is not provided and installed as part of other Work, furnish and install a waterproof flashing and counterflashing for pipe, duct, and flue passing through roof. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe, flue, or duct.
   2. Sewer vents and other piping extending through roof structure shall have four-pound sheet lead flashings and Semco, Smith, or equal to Semco #1100-4, counterflashing sleeves installed as detailed.
      a. Provide Hydroseal at underside of counterflashings as recommended in Semco installation instructions.
   3. Flues shall have 24-gauge galvanized steel flashings on all roofs. Securely clamp a storm collar (counterflashing) around the flue above the flashing. Storm collars shall be of same material as flashing.
   4. Seal all pipes, flues, or ducts passing through exterior walls in an approved, watertight manner.

2.3 DIELECTRIC UNIONS:

A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal-to-metal contact. Heavily line the couplings with a hard, insulating, phenolic plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.

B. Acceptable Manufacturers:
   1. Watts Regulator Co.
   2. Eclipse, Inc.
   3. Perfection Corp.

2.4 PIPING AND EQUIPMENT IDENTIFICATION:

A. Pipe Identification:

   1. Each piping system furnished and installed under this work shall be identified and the direction of flow indicated by a prefabricated coiled plastic colored label.

2. Labels shall comply with ASME A13.1 with regard to color, letter height, and marker size. The labels shall have black or white lettering and flow arrows on colored backgrounds and shall not require adhesive. The background colors shall conform to the color schedule shown in this Article.

3. For use outdoors use Polyester/Tedlar laminated material, MSI model MS-977, or equal. For piping with OD greater than 6" provide the label manufacturers stainless steel straps to secure label to piping.

4. The size of the lettering and label shall be such that the lettering can be easily read from the floor and the colors easily discernible.

5. Acceptable Manufacturers:
   a. Marking Services Incorporated (MSI)
   b. Idento Metal Products Co., Idento Bands
   c. Setmark

2.5 FIREPROOFING

A. Fireproofing to be installed at all pipe and duct penetrations of rated assemblies.

B. Fireproofing to be UL Rated fire stop material.

C. Acceptable Manufacturers:
   1. Hilti
   2. 3M Pro-Set
   3. Or Equal

PART 3 EXECUTION

3.1 INSTALLATION OF HANGERS AND SUPPORTS:

A. Fasten all piping securely to structure with hangers, supports, guides, anchors, or sway braces to maintain pipe alignment, to prevent any sagging, and to prevent noise or excessive strain on the piping due to uncontrolled movement under operating conditions. Relocate hangers as necessary to correct unsatisfactory conditions that may become evident when system is put into operation.

B. Follow drawing requirements and details where special pipe support requirements are detailed on the Drawings.

C. Do not support piping by perforated tape, wire, rope, wood, nails, or other makeshift devices.

D. Design hangers and supports to support the weight of the pipe, weight of fluid, and weight of the pipe insulation with a minimum factor of safety of five based on the ultimate tensile strength of the material used.

E. Burning or welding on any structural member under load shall not be attempted. Field welding not called for on the Drawings or reviewed shop Drawings may only be done with consent and advice of the Architect and after proper provisions have been made to relieve the stress on the member. The boring of holes in beam flanges or narrow members will not be allowed.

F. Install hanger on insulated piping in a manner which will not produce damage to insulation. Provide steel pipe saddles as required to protect pipe covering. Install pipe hangers on

piping covered with insulation on the outside of the insulation and not in contact with the pipe.

G. Fasten hanger rods to concrete structural members with concrete inserts set flush with surface. Install a reinforcing rod through the opening provided in the concrete inserts. Fasten hanger rods to structural members with suitable beam clamps, and provide beam clips to lock clamp securely to beam.

H. Use of powder-actuated fasteners will not be permitted for the support of any overhead piping.

I. Turnbuckles, if used, shall have a load-carrying capacity at least equal to that of the pipe hanger with which they are being used.

J. All threaded parts of pipe hanger assemblies shall have full length of thread in service while in use.

K. Hanger material shall be reviewed by the Architect before installation.

L. Pipe Hanger or Support Spacing:
1. Provide pipe hangers or supports at 6-foot maximum spacing on steel pipe 3/4-inch diameter and smaller and for copper pipe 1-1/2 inches and smaller.
2. Support steel piping 1" and larger and copper larger than 1-1/2 inches at 10-foot maximum spacing.
3. Support steel piping used for gas at the following lengths:
   a. 1/2-inch diameter at 6-feet maximum
   b. 3/4-inch and 1-inch at 8-feet maximum
   c. 1-1/4-inch and larger at 10-feet maximum spacing

M. Provide hangers or supports for horizontal and vertical cast-iron drainage pipe at every other joint, except that when the developed length between hangers or supports exceeds 4 feet, provide hangers or supports at each joint. Provide adequate sway bracing to prevent shear.

3.2 ROOF FLASHING:

A. Provide pipe flashings as noted on the Drawings.

B. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.3 DIELECTRIC UNIONS:

A. Install dielectric unions in the following locations:
1. In all metallic water and gas service connections into the building within 5 feet of the building wall. Install adjacent to the shut-off valve or cock and above ground where possible.
2. At points of connections where copper water lines connect to steel domestic water heater tanks and other equipment.
3. At points in piping where dissimilar metal pipes are connected together.
4. Any special applications shown on the Drawings.
5. Where steel or cast-iron pipe in the ground connects to copper or brass piping above the ground, the transition from steel or cast- iron pipe to the copper or brass pipe shall be made above ground in all cases and in an accessible location where practicable.
6. Where copper or brass piping is connected to steel or cast-iron piping and the connection is buried in the ground, the connection shall be covered with coal tar protective tape extending outward a minimum of 5 feet on all pipes, from the point of

connection. The tape shall have a minimum thickness of 10 mils and a maximum thickness of 12 mils and shall be applied so as to provide at least two full thicknesses of the tape over the piping. A primer, specifically designed for use with the tape, shall be used. The piping shall be thoroughly cleaned before any tape or primer is applied.

3.4 PIPE AND EQUIPMENT IDENTIFICATION:

A. Identification shall be applied to all piping, except piping located in furred spaces without access to permit entrance of personnel, and piping buried in the ground or concrete.

B. Underground pipe identification shall consist of a buried, continuous, preprinted, bright colored, plastic ribbon cable marker provided for each underground pipe.

C. The legend and flow arrow shall be applied at the following locations:
   1. All valve locations,
   2. All points where piping enters or leaves a wall, partition, cluster of piping, or similar obstruction
   3. All exposed locations
   4. At approximately 20-foot intervals on pipe runs.

D. Practical variations or changes in locations and spacing may be made with the specific approval of the Architect to meet specific conditions.

E. Wherever two or more pipes run parallel, the printed legend and other markings shall be applied in the same relative location so that all piping is easily identified.

F. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.

G. Lettering size and label colors are to be per ASME/ANSI A13.1 Pipe Marking Standards.

3.5 FIREPROOFING:

A. Pack the annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls with UL listed fire stop.

B. Fireproofing system to be installed in strict accordance with manufacturer's written instructions and details.

3.6 PAINTING:

A. Perform all priming and painting on the equipment and materials as specified herein.

B. Exposed piping and unfinished portions of equipment to be painted shall be cleaned of grease, oil, rust, or dirt in preparation for painting.

C. Where applicable, remove pipe clamps prior to painting so that entire pipe is painted. Provide temporary support as required. Re-install clamps after priming/painting is complete.

D. Priming:
   1. Contractor to prime all exposed ferrous metals, including piping, which are not galvanized or factory-finished.
      a. Black steel pipe exposed to weather shall be cleaned and primed with one coat of Rust-Oleum, or equal, #1069 primer prior to painting. Color to be Grey.

E. See Painting Section for detailed requirements.

3.7 DEMOLITION

A. Refer to Division 1 sections for general demolition requirements and procedures.

B. Disconnect, dismantle, and remove plumbing systems, equipment, and components indicated to be removed. Coordinate with all other trades
   1. Piping to be removed: Remove portion of piping indicated to be removed. Cap or plug remaining piping with same or compatible piping material.
   2. Piping to be abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material.
   3. Equipment to be removed: Drain down and cap remaining services and remove equipment.
   4. Equipment to be removed and re-installed: Disconnect and cap services and remove, clean, and store equipment. When appropriate, re-install, reconnect, and make equipment operational.
      a. If existing equipment which is to be re-installed is damage, contact architect prior to removal. Contractor to take pictures of any damaged equipment prior to its removal and submit pictures to Architect.
      b. Equipment damaged during removal, storage, or re-installation shall be the Contractor's responsibility and is to be replaced with new at no additional cost to the owner.
   5. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, removed damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.8 CARE AND CLEANING:

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

B. Drain and flush piping to remove grease and foreign matter. Thoroughly clean out flush valves, traps, strainers, and pressure-reducing valves.

C. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.9 OPERATION TEST:

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.10 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 22 05 00

SECTION 22 05 23 - VALVES AND ACCESSORIES FOR PLUMBING

PART 1 GENERAL

1.1 SUMMARY

A. This section includes plumbing accessories including the following:
   1. Valves
   2. Miscellaneous piping products

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

C. Requirements of Regulatory Agencies: Contractor to conform to the publications listed below. Requirements of these publications are to be considered as a minimum standard. If details and specifications which require more stringent work are indicated within project, Contractor to provide the more stringent.
   1. California Plumbing Code (CPC) Compliance: Comply with applicable portions of the California Plumbing Code pertaining to selection and installation of plumbing materials and products. Fabricate and install natural gas systems in accordance with CPC.
   2. ANSI Compliance: Fabricate and install natural gas piping in accordance with ANSI B21.2, *Fuel Gas Piping*.
   3. NFPA Compliance: Fabricate and install natural gas systems in accordance with latest edition of NFPA 54, *National Fuel Gas Code*.
   4. Utility Compliance: Fabricate and install natural gas systems in accordance with local gas utility company requirements.
   5. ASME B31.9 for building services piping valves.
   6. NSF Compliance: NSF 61 for valve materials for potable-water service

D. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 SUBMITTALS

A. Product data: submit complete data of materials proposed including:
   1. Manufacturer and model number
   2. Clearly indicate all options, trim, and accessories.
   3. Cross reference manufacturer's cut sheet to fixture callout ID on submittal sheet.

B. Operation and Maintenance Data: submit complete O&M data including:
   1. Maintenance data and parts lists for each component.
   2. Provide "trouble- shooting" maintenance guide
   3. Include this data within maintenance manual

PART 2 PRODUCTS

2.1 VALVES

A. General:
1. Similar valves to be by the same manufacturer.
2. Bronze valves shall be made with dezincification-resistant materials. Bronze valves made with copper alloy (brass) containing more than 15 percent zinc are not permitted.
3. Bronze Valves: 2”Øand smaller with threaded ends, unless otherwise indicated.
4. Ferrous Valves: 2 ½” Ø and larger with flanged ends, unless otherwise indicated.
5. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
6. Valve Sizes: Same as upstream piping unless otherwise indicated.
7. Valve Actuator Types:
   a. Handwheel: For valves other than quarter-turn types.
8. Valve-End Connections:
   a. Valve solder-joint connections are common in smaller sizes of plumbing piping. Soldering and brazing methods used to achieve required pressure-temperature ratings may damage internal valve parts. Special installation requirements for soldered valves may make threaded valves more cost-effective.
   b. Threaded: With threads according to ASME B1.20.1.

B. Acceptable Manufacturers:

1. Ball, gate, butterfly, and check valves:
   a. Nibco
   b. Appollo
   c. Milwaukee
   d. Hammond

C. Lever handle Gas Cock:
1. Gas Ball valve, with lever handle
2. Valve to be rated for 250 psi compressed gas.
3. UL Listed for gas and oil
4. CSA listed
5. Nibco, Model T-FP-600A or equal
   a. CWP Rating: 600 psig for 1/4” – 2”, 400 PSI for 2-1/2” - 4”
   b. Body: Forged Brass ASTM B283
   c. Ball: Chrome Plated Brass
   d. Ball Seat: PTFE
   e. Stem: Brass

PART 3 EXECUTION

3.1 INSTALLATION OF VALVES:

A. Valve Applications:

1. Natural Gas
   a. At connection to equipment: Lever handle Gas Cock

B. General:
1. Install valves with stems upright or horizontal. Valves stem position to be arranged to allow access for maintenance.

2. Do not install swing check valves in vertical position.
3. Provide gas cocks for gas service.
4. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
5. Operate valves in positions from fully open to fully closed prior to installing within system.
6. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
7. Locate valves for easy access and provide separate support where necessary.
8. Install valves in horizontal piping with stem at or above center of pipe.
9. Install valves in position to allow full stem movement.
10. Install valves where required for proper operation of piping and equipment, including valves in branch lines where necessary to isolate sections of piping. Locate valves so as to be accessible and so that separate support can be provided when necessary.
11. Provide union at each connection to equipment and downstream of each valve. Provide unions at both ends of valves when valves can not be turned due to an obstruction.
12. Install seismic gas valve downstream of gas meter.
13. After piping systems have been tested and put into service, but before final testing, adjusting, and balancing, inspect each valve for possible leaks. Adjust or replace packing to stop leaks; replace valve if leak persists.
14. Tag each valve and provide a complete listing of valve locations and functions.

3.2 CARE AND CLEANING:

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work.

B. At completion of work, carefully clean and adjust equipment and trim installed as part of this work.

C. Leave systems and equipment in satisfactory operating condition.

3.3 OPERATION TEST:

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

END OF SECTION 22 05 23

SECTION 22 11 23 – NATURAL GAS PIPING

PART 1 GENERAL

1.1 SUMMARY

A. This section includes piping and supports as required for the natural gas piping.

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

C. Requirements of Regulatory Agencies: Contractor to conform to the publications listed below. Requirements of these publications are to be considered as a minimum standard. If details and specifications which require more stringent work are indicated within project, Contractor to provide the more stringent.
   1. California Plumbing Code (CPC) Compliance: Comply with applicable portions of the California Plumbing Code pertaining to selection and installation of plumbing materials and products. Fabricate and install natural gas systems in accordance with CPC.
   2. ANSI Compliance: Fabricate and install natural gas piping in accordance with ANSI B21.2, *Fuel Gas Piping*.
   3. NFPA Compliance: Fabricate and install natural gas systems in accordance with latest edition of NFPA 54, *National Fuel Gas Code*.
   4. Utility Compliance: Fabricate and install natural gas systems in accordance with local gas utility company requirements.

D. Welding materials and labor shall comply with ASME Code and applicable state labor regulations.

E. Welders shall be fully qualified and certified b a state approved welding bureau for the types of welds required for the project.
   1. Each welder shall identify their work with a marking stamped on each weld joint of pipe, valve, or fitting.

F. Supports to be in accordance with SMACNA's Seismic Restraint Manual Second Edition 1998.

G. All plumbing components intended to dispense water for human consumption shall comply with requirements of California Assembly Bill AB1953. Components to include (but not limited to): piping, faucets, angle stops, valves, bubblers, drinking fountains, piping, etc.

1.3 SUBMITTALS

A. Submit manufacturer's catalog cut sheets, specifications, installation instructions, and dimensioned drawings for each type of pipe, support, anchor, and seal indicated within this section that is applicable to the project. Clearly indicate item being submitted.
   1. Indicate pipe schedules, pressure classes, etc.
   2. Indicate all options being submitted.

B. Provide Welding and Brazing Certifications. Submit reports as required for piping work applicable to the project.

1. Welders that do not have current Certifications shall not be permitted to weld and/or braze on the project.

PART 2 GENERAL

2.1 GENERAL:

A. Provide piping materials and factory fabricated piping products of sizes, types, pressure and temperature ratings, and capacities as indicated. Materials and products to comply with the California Plumbing Code.

B. Where more than one type of material is indicated, selection is the Contractors option.
1. Contractor to provide submittal information on material which is to be installed.
2. Where more than one material is indicated, the Contractor shall only install one material per system and materials shall not be mixed within the same system.

C. Malleable Iron Threaded Fittings: ANSI B16.3; plain or galvanized to suit piping. For use above grade only, except where indicated otherwise.

D. Malleable-Iron Threaded Unions: ANSI B16.39; selected by Contractor for proper piping fabrication and service requirements, including style, end connections, and metal-to- metal seats (iron, bronze, or brass); plain or galvanized as indicated.

E. Forged-Steel Socket Welding and Threaded Fittings: ANSI B16.11, except MSS SP-79 for threaded reducer inserts; rated to match schedule of connected pipe.

F. Wrought-Steel Buttwelding Fittings: ANSI B16.9, except ANSI B16.28 for short-radius elbows and returns; rated to match connected pipe.

G. Pipe Nipples: Fabricated from same pipe as used for connected pipe; except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1-1/2 inches and where pipe size is less than 1-1/2 inches, and do not thread nipples full length (no close-nipples).

H. Welding Materials: Except as otherwise indicated, provide welding materials as determined by Contractor to comply with installation requirements. Comply with Section II, Part C, ASME Boiler and Pressure Vessel Code for welding materials.

I. Soldering Materials: Joints in copper tubing for all installations shall be made with brazing alloy sil-fos, or equal. Clean surfaces to be jointed shall be free of oil, grease, rust, and oxides.
1. Harris Stay-Safe 50 solder, or equal, may be permitted on plumbing lines above slab or ground only with prior review for piping sizes 2 inches and smaller only. Solders used shall contain no lead.

J. Comply with SFA-5.8, Section II, ASME Boiler and Pressure Vessel Code for brazing filler metal materials.

K. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast- iron flanges; raised-face for steel flanges, unless otherwise indicated.

2.2 PIPING AND FITTINGS:

A. Natural Gas Piping:

1. Black Steel Pipe: ASTM A53, A106, or A120; except comply with ASTM A53 or A106 where close coiling or bending is required.
2. Pipe Size 2 inches and Smaller: Black steel pipe; Schedule 40; malleable-iron threaded fittings.
3. Pipe Size 2-1/2 inches and Larger: Black steel pipe; Schedule 40; wrought-steel buttwelding fittings.
4. All piping exposed to weather to be cleaned and painted.
    a. Paint entire gas pipe. Remove/re-install pipe clamps as may be required to paint entire pipe system.
        a. Black steel pipe exposed to weather shall be cleaned and primed with one coat of Rust-Oleum, or equal, #1069 primer prior to painting. Color to be Grey.
    b. Final coat to be outdoor rated paint, yellow color (or color as directed by owner).

PART 3 EXECUTION

3.1 GENERAL

A. Examine areas and conditions under which plumbing piping systems are to be installed. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to Contractor.

B. Comply with ANSI B31 Code for Pressure Piping.

C. Install pipes and pipe fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without piping failure. Install each run with minimum joints and couplings but with adequate and accessible unions for disassembly and maintenance/replacement of valves and equipment. Reduce sizes where indicated by use of reducing fittings. Align piping accurately at connections, within 1/16-inch misalignment tolerance.

D. Locate piping runs, unless detailed otherwise, vertically and horizontally (pitched to drain). Install piping parallel and perpendicular to adjacent building walls/structure and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details and notations. Hold piping close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of building; limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping; locate insulated piping for 1” clearance outside insulation. Wherever possible in finished and occupied spaces, conceal piping from view by locating in column enclosures, in hollow wall construction, or above suspended ceilings; do not encase horizontal runs in solid partitions, except as indicated.

E. Should structural difficulties or work of other contractors prevent the running of pipes or the setting of equipment at the points shown, Contractor to make the necessary deviations to the piping system, as determined by the Contractor, with the Architect's review, without additional cost to Owner.

F. Inspect each piece of pipe and each fitting to see that there is no defective workmanship on pipe or obstructions in pipes and fittings.

G. Installation Of Protective Pipe Wrap:

3.2 INSTALLATION OF NATURAL GAS PIPING:

A. Run piping generally level, free of unnecessary bends, arranged to conform to the building requirements, and to suit clearance for other mechanical work such as ducts, flues, conduits, and other work

B. Use sealants on metal gas piping threads which are chemically resistant to natural gas. Use sealants sparingly, and apply to only male threads of metal joints.

C. Connect gas piping to each gas-fired equipment item, with drip leg and shutoff gas cock. Comply with equipment manufacturer's instructions.
   1. Appliance fuel connectors, as indicated in 1202 of the California Plumbing Code, are not acceptable for connection of equipment, except where specifically indicated on the Contract Documents.

D. Install exposed polished or enameled connections from fixtures or equipment with special care, showing no tool marks or threads at fittings.

E. Cap or plug openings in pipe and fittings immediately to exclude all dirt until fixtures are installed or final connections made.

F. Use reducing fittings where any change in pipe size occurs. Bushings shall not be used.

G. Couplings shall not be used except where required pipe runs between fittings are longer than a standard length of the type of pipe being used and except where their use is specifically reviewed by the Architect.

H. Conceal piping in finished portions of building, above the floor line, except where otherwise shown or noted. Cutting of walls and floors shall be held to the minimum possible to secure the proper installation.

I. Install piping subject to expansion or contraction in a manner permitting strains to be evenly distributed and alleviated by expansion loops installed as required.

J. Sleeves for branches through walls from adjacent mains shall be of sufficient size to allow for free side motion of covered pipe in sleeve.

K. Remove cutting and threading burrs before assembling piping.

L. Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped, or damaged.

M. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping or equipment connections are completed.

N. Ground gas piping electrically and continuously within project, and bond tightly to grounding connection. Provide listed isolation fitting above grade prior to entry into building. Provide independent ground systems for above ground and below grade.

O. Install drip-legs in gas piping where indicated and where required by code or regulation.

P. Install piping parallel to other piping and walls unless detailed otherwise.

Q. Contractor to use extreme care when working with galvanized fittings as to not damage galvanized finish. If finish is damaged, contractor to paint damaged area with “Brite Zinc” paint by “Brite Products” or equal. Follow requirements as outlined in ASTM A780.

3.3 PIPING SYSTEM JOINTS:

A. General: Provide joints of type indicated in each piping system.

B. Cut all steel pipe and hard copper tubing by power hacksaw, a circular cutting machine using an abrasive wheel or in square end vise by means of hand hacksaw. Wheel cutters may be used for steel pipe provided that pipe shall have ends reamed to full inside diameter and beveled before being made up into fittings. Pipe shall have round edges or burrs removed so that a smooth and unobstructed flow will be obtained.

C. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, Rector- Seal #5, on male threads at each joint and tighten joint to leave not more than 3 threads exposed. Teflon tape may be used on piping smaller than 2 inches.

D. Weld pipe joints in accordance with recognized industry practice and as follows:
1. Welding shall be done by qualified welders in a first-class, workmanlike manner, conforming to the American Standard Code for Pressure Piping USA B-31-1 and B-31-1A.
2. Bevel pipe ends at a 37.5 degree angle where possible, smooth rough cuts, and clean to remove slag, metal particles, and dirt.
3. Do not weld-out piping system imperfections by tack-welding procedures; re-fabricate to comply with requirements.

3.4 TEST OF PIPING:

A. Test piping at completion of roughing in, in accordance with the following schedule. Show no loss in pressure or visible leaks after a minimum duration of 4 hours at the test pressures indicated. Tests to be verified by Inspector of Record.

SYSTEM TESTED	TEST PRESSURE PSIG	TEST WITH
Steel Gas Piping	100 lbs.	Air

B. Testing equipment, materials, and labor shall be furnished by this Contractor.

C. Repair piping systems sections which fail required piping test, by disassembly and reinstallation, using new materials to extent required to overcome leakage. Do not use chemicals, stop-leak compounds, mastics, or other temporary repair methods.

D. Drain test water from piping systems after testing and repair work has been completed.

3.5 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 22 11 23

SECTION 22 00 00 – HVAC GENERAL CONDITIONS

PART 1 GENERAL

1.1 GENERAL:

A. This Section specifies the Division 23 Work coordination requirements with general work provisions.

B. For convenience and reference the Division 23 Specifications are separated into Divisions and Sections. Such separations shall not operate to make the Engineer an arbitrator to establish subcontract limits between the Prime Contractor and his Subcontractors. In any case, the Prime Contractor is responsible to the owner for a complete job.

C. This section consists of General Requirements and Standard Specifications covering certain parts of work under Division 23 and is supplemented by other Division 23 sections covering additional work, requirements, and materials specifically applicable to the work of each section.
   1. Requirements of subsequent sections of the specifications, if in conflict with these General Requirements, shall govern.

D. No material installed as part of this WORK shall contain asbestos in any form.

1.2 CONDITIONS OF THE CONTRACT

A. The Conditions of the Contract (General, Supplementary, and other Conditions) and the General Requirements (Sections of Division 1) are hereby made a part of this Section.

B. This section is a Division-23 Basic Materials and Methods section and is a part of each Division -23 section.

1.3 DESCRIPTION OF REQUIREMENTS

A. Provide finished work, tested and ready for operation including apparatus, appliances, materials, and work. Provide incidental accessories necessary to make the work complete and ready for operation without additional expense to the Owner.

B. Before beginning work or ordering materials, consult Architect for clarification of discrepancies between, or questionable intent, of the Contract Documents.

C. Contractor shall visit the site and field survey the existing site conditions prior to bid. Any site conditions which may cause significant deviation from the design drawings shall be brought to the attention of the Owner's representative for clarification prior to bid.

1.4 REQUIREMENTS OF REGULATORY AGENCIES:

A. Provide work and materials in full accordance with the latest rules and regulations of the following:
   1. California Code of Regulations - Title 24 - Parts 2, 3, 4,5, and 9
   2. California Code of Regulations - Title 22 - Chapter 7
   3. California Building Code, 2016
   4. California Mechanical Code, 2016
   5. California Plumbing Code, 2016
   6. California Electric Code, 2016
   7. California Fire Code, 2016
   8. California Building Energy Efficiency Standards 2016

9. California Green Building Standards 2016
10. California Energy Code 2016
11. National Fire Protection Association
12. CAL-OSHA
13. Occupational Safety and Health Administration
14. State Fire Marshal, Title 19 CCR
15. Other applicable state laws

B. Nothing in Drawings or specifications shall be construed to permit work not conforming to these codes.

C. Conform to State of California Energy Conservation Standards for all systems, equipment, and construction.

D. The above Codes and Standards define minimum requirements required for the project. Where Contract Documents differ from governing codes, furnish and install higher standard.

1.5 FEES, PERMITS, AND UTILITY SERVICES:

A. Arrange for required inspections and permits required in installation of the work.

B. The Owner will pay charges for permits required.

1.6 SITE EXAMINATION:

A. Examine site, verify dimensions and locations against Drawings, and inform self of conditions under which work is to be done before submitting proposal. No allowance will be made for extra expense on account of error.

B. Information shown relative to existing services is based upon available records and data but is approximate only. Make minor deviations found necessary to conform with actual locations and conditions without extra cost. Verify location and elevation of utilities prior to commencement of excavation for new piping or its installation.

C. Exercise care in excavating near existing utilities to avoid any damage thereto. This Contractor is responsible for any damage caused by his operations.

1.7 MATERIAL LIST AND SUBSTITUTIONS:

A. Prior to commencement of work, and within 10 days after award of Contract, submit to Architect for review electronic copies of a complete list of equipment and materials to be furnished, including all substitutions. All submittals to be in electronic format as follows:
1. Submittals to be in PDF Format.
2. Individual PDF cut sheets shall be inserted into a single file for review.
3. All sheets to be “unprotected” and writable.

B. Provide submittal information for all materials proposed for use as part of this project. Provide standard items on specified equipment at no extra cost to the contract regardless of disposition of submittal data. Other material or methods shall not be used unless approved in writing by the Architect. The Architect’s review will be required even though “or equal” or synonymous terms are used.

C. It is the responsibility of the Contractor to assume all costs incurred because of additional work and/or changes required to incorporate the proposed substitute into the project including possible extra compensation due to the Architect. Refer to Division 1 for complete instructions.

D. Contractor to provide complete Submittal packages for each system. At a maximum, submittals to be broken into the following packages:
   1. Mechanical – Dry Side package including: Ductwork, Accessories, etc.
   2. Mechanical – AC Units and adaptor roof curbs.
   3. Mechanical – Exhaust Fans
   4. Mechanical – Building Automation System

E. Identify each item by manufacturer, brand, trade name, model number, size, rating, or whatever other data is necessary to properly identify and review materials and equipment.
   1. Where submittal sheets indicate more than one product, Contractor to clearly identify product being submitted. Contractor to cross-out information not being submitted for review.
   2. Submittals that do not clearly identify submitted item will be returned to the Contractor un-reviewed.

F. Identity each submitted item by reference to specification section number and paragraph in which item is specified. Cross reference submittals by equipment ID where applicable.

G. Quantities are the Contractor's responsibility and will not be reviewed.

H. If Contractor desires to make a substitution, he shall submit complete information or catalog data to show equality of equipment or material offered to that specified.
   1. Only one request for substitution will be considered on each item of material or equipment. No substitutions will be considered thereafter.
   2. Scheduled Products and first named manufacturer/product forms basis of design. All other manufacturers' products are substitutions.
   3. No substitutions will be allowed unless requested and reviewed in writing.
   4. The Architect shall review and take appropriate action on shop Drawings, product data, samples, and other submittals required by the Contract Documents. Such review shall be only for general conformance with the design concept and general compliance with the information given in the Contract Documents. It shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with the work of other trades, or construction safety precautions, all of which are the sole responsibility of the Contractor.
   5. Review of a specific item shall not indicate acceptance of an assembly of which the item is a component. The Architect shall not be required to review and shall not be responsible for any deviations from the Contract Documents not clearly noted by the Contractor, nor shall the Architect be required to review partial submissions or those for which submissions for correlated items have not been received. Architect reserves right to require originally specified item.

I. Installation of reviewed substitution is Contractor's responsibility. Any changes required for installation of reviewed substituted equipment must be made without additional cost to the owner. Review by the Architect of the substituted equipment and/or dimensional Drawings do not waive these requirements.

1.8 MAINTENANCE AND OPERATING INSTRUCTIONS:

A. Instruct the Owners' authorized representatives in the operation, adjustment, and maintenance of all mechanical equipment and systems. Provide 3 copies of certificate signed by Owner's representatives attesting to their having been instructed.

B. Furnish Architect with three complete sets of operating and maintenance (O&M) instructions.
   1. O&M manuals to be bound in hardboard binder and indexed.

2. O&M manuals to include: descriptive literature, catalog cuts, and diagrams covering all items of operation and maintenance for each and every mechanical system and piece of equipment furnished under these specifications.
3. Include in each set a copy of the air balance test report specified hereinafter.

C. Contractor must start compiling the above data (including obtaining operating and maintenance instruction data and catalog cuts and diagrams from the manufacturer of the reviewed equipment) immediately upon review of his list of materials, so as not to delay the final installation of the work.

D. Bind and index each set in a durable, hardboard binder. Final observation will not be made until booklets are submitted and have been reviewed by the Architect.

E. O&M manuals to incorporate the following:
1. Complete operating instructions for each item of heating, ventilating and air conditioning equipment and associated piping and ductwork systems.
2. Test data and system balancing reports as specified.
3. Temperature control diagrams and literature.
4. Manufacturer's bulletins with parts numbers, instructions, etc. for each item of equipment. Remove information not applicable to project.
5. Typewritten maintenance instructions for each item of equipment listing in detail the lubricants to be used, frequency of lubrications, inspections required, adjustment, etc.
6. A complete list and/or schedule of all major valves giving the valve ID, location of valve, and the rooms or area controlled by the valve.
7. Provide copies of start-up reports for each piece of mechanical equipment provided as part of this work.
8. Name, address, and phone number of contractors involved in work under this Division.
9. Detailed step-by-step instructions for starting, summer operation, winter operation, and shutdown of each system.
10. Detailed maintenance instructions for starting, summer operation, winter operation, and shutdown of each system.
11. Spare parts list.
12. Full size Record as built shop drawings in hard copies and in AutoCad 2004 CAD files.
    a. Contractor to incorporate field mark-ups into record drawings. Mark-up shop drawings not acceptable.

1.9 COORDINATION SHOP DRAWINGS

A. General:
1. Prepare and submit for review coordination drawings where work by separate entities requires fabrication of products and materials which must accurately interface or for which space provided is limited.
2. Coordination drawings shall indicate how the work will interface and installation will be sequenced. It is the intent of this provision to find, bring forth, and resolve potential constructability problems prior to actual construction, thereby allowing for the resolution of issues before construction cost and schedule are impacted.

B. The General Contractor shall oversee preparation of coordination drawings, assign priority space, and bring to the attention of the Architect any conflicts or interferences of an unresolved nature found during preparation of coordination drawings. Expedite conflict or interferences and submit solutions/ recommendations for approval review.

C. Drawings: Shop drawings shall include but are not necessarily limited to the following:

1. Submit 1/4" = 1'-0" minimum scale, a combined, comprehensive mechanical coordination drawing. Coordination drawing shall include all ductwork, mechanical piping, plumbing, sprinkler systems, and ceiling systems overlaid on structural frame and architectural plan. Shop drawings are to be coordinated with all electrical and Telecom systems.
2. Criteria: Ductwork, mechanical piping, plumbing, and sprinkler system components shall be sized as shown on Drawings. Seismic restraints shall be shown where required. Nonconforming Mechanical work installed within designated coordination areas is subject to removal and replacement by the installing contractor at no additional cost to Owner.
3. Provide sections for congested areas.
4. Identify typical areas, start preparation of coordination drawings for such areas first.

D. Where required for coordination purposes, Contractor to modify duct shape to an equivalent flattened size at no additional cost to the owner. Contractor to limit duct aspect ratio to 3:1 unless provided special written permission by the Architect.

E. Coordination drawings shall be signed and dated by individual trade contractors. By act of signature and submittal of singular combined coordination drawing, each trade contractor acknowledges their coordinated portion of the work with all other mechanical, electrical, telecom, architectural, and structural work contractors.

F. After completion of coordination shop drawings signed by individual trade contractors. Submit copies to the architect for review. Once approved, provide copy at the job site for reference. No work shall be performed without the complete coordination shop drawings.

G. No request for information regarding the routing of pipes, ductwork and placement of equipment will be reviewed and responded to without a completed shop drawings.

1.10 SITE CONDITIONS

A. Information of the drawings relative to existing conditions is approximate only. Deviations found necessary during progress of construction to conform to actual conditions as approved by the Architect shall be made without additional cost to the Owner. The Contractor shall be held responsible for any damage caused to existing services. Promptly notify the Architect if services are found which are not shown on the Drawings.

PART 2 PRODUCTS

2.1 GENERAL:

A. Mention herein or on Drawings requires that this Contractor provide each item listed of quality noted or equal. Refer to subsequence division 23000 specification sections for specific equipment and system materials and accessories.

B. All material shall be new, full weight, standard in all respects, and in first- class condition.

C. Provide materials of the same brand or manufacture throughout for each class of material or equipment wherever possible.

D. The grade or quality of materials desired is indicated by the trade names or catalog numbers stated herein.

E. Dimensions, sizes, and capacities shown are a minimum and shall not be changed without permission of the Architect.

F. Conform to the State Energy Conservation Standards for all material and equipment.

2.2 MATERIALS FURNISHED:

A. Identify all materials and equipment by manufacturer's name and model number. Remove unidentified materials and equipment from site.

B. Equipment specified by manufacturer's number shall include all accessories, controls, etc. listed in catalog as standard with equipment. Furnish optional or additional accessories as specified.

C. Equipment or material damaged during transportation, installation, or operation is considered as totally damaged. Replace with new equipment. Variance from this permitted only with written consent of the Architect.

D. Deliver, Protection, and Care:
1. Deliver materials or equipment to the Project in the manufacturer's original, unopened, labeled containers.
2. Added costs associated with reordering, expediting orders, or project delays due to rejected materials shall be borne by the Contractor.
3. Protect from damage which may be caused by theft, weather, and building operations. Failure to protect materials and apparatus adequately shall be sufficient cause for rejection of any damaged material or equipment.
4. Close pipe and equipment openings to prevent intrusion of obstructions and damage.
5. Owner or Architect will require removal and replacement of such material or work from the premises which is not in accordance with Contract Documents. Replace unsatisfactory work without delay, at no additional cost to the Owner.
6. All material and equipment shall be protected against moisture, dirt and damage. Protective coverings shall be provided for bearings, open connections to pumps and tanks, coils, ducts, pipes and similar equipment that is vulnerable to grit and dirt.
7. The interior of the pipes and ducts shall be kept clean at all times.

PART 3 EXECUTION

3.1 GENERAL:

A. General arrangement and location of piping, ductwork, equipment, etc. are shown on Drawings or herein specified. Carefully examine other work that may conflict with this work. Install this work in harmony with other crafts and at proper time to avoid delay of work. Provide all offsets as required to avoid other trades at no additional cost to the owner.

B. In advance of construction, work out minor changes and relocations to suit actual conditions and work of other trades to avoid conflict therewith. This shall not be cause for additional cost.

C. Execute any work or apparatus shown on the Drawings and not mentioned in the specifications, or vice versa, the same as if specifically mentioned by both. Omission from Drawings or specifications of any minor details of construction, installation, materials, or essential specialties does not relieve this Contractor from furnishing same in place complete.

D. Furnish and install any incidental work not shown or specified which can reasonably be inferred as part of the work and necessary to provide a complete and workable system.
1. Minor piping associated with instrumentation and control is generally not shown. Interconnection of sensors, transducers, control devices, instrumentation panels,

combustion control panel, burner control panels is the responsibility of the contractor. Small piping associated with water cooling, drips, drains and other minor piping may not be shown to avoid confusion in the plan presentation but shall be provided as part of contract work. Drains shall be piped to the nearest floor drains.

E. Furnish materials and work at proper time to avoid delay of the work.

F. Coordinate with testing and balancing contractor to review drawings for proposed additional balancing components required for proper system testing and balancing.

3.2 ACCESS:

A. Continuously check Architectural Drawings for clearance and accessibility of equipment specified herein to be placed. No allowance of any kind will be made for negligence on part of Contractor to foresee means of installing his equipment into proper position.

3.3 CLOSING IN OF UNINSPECTED WORK:

A. Do not allow or cause work installed to be covered up or enclosed before it has been inspected and tested. Should work be enclosed or covered up before it has been inspected and tested, uncover work at own expense. After it has been inspected and tested, make repairs necessary to restore work of other contractors to condition in which it was found at time of cutting.

3.4 PROJECT MODIFICATIONS:

A. During the progress of construction, if such conditions arise that require revisions, modifications, or relocations to any mechanical equipment or materials incorporated in this project, such alterations shall be immediately called to the attention of the Architect. Contractor shall then prepare necessary Drawings showing proposed changes. Submit proposed changes for review by the Architect prior to actual revision work in the field.

B. Two sets of Drawings showing all revisions shall be immediately presented to Architect for his records. Maintain additional copies on the project as necessary to comply with "RECORD DRAWINGS" requirement of the General Requirements.

C. Incorporate all revisions into record Drawings.

3.5 FORMING, CUTTING AND PATCHING:

A. Coordinate with other contractors as necessary to provide any special forming, recesses, chases, etc., and provide wood blocking, backing, and grounds as necessary for proper installation of mechanical work.

B. If this Contractor fails to coordinate with other contractors at proper time or fails to locate items properly, resulting in extra work, then this Contractor is responsible.

C. This Contractor is responsible for proper placement of pipe sleeves, hangers, inserts, and supports for work.

D. Cutting, patching, and repairing of existing (old) construction to permit installation of piping, etc. is responsibility of this Contractor. Repair or replace damage to existing work with skilled mechanics for each trade involved in first-class manner.

E. Core openings through existing construction as required for the passage of new piping and conduits. Cut holes of the minimum diameter to suit size of pipe installed and associated insulation.

3.6 DEMOLITION AND SALVAGE:

A. Provide demolition of mechanical work under this SECTION as indicated on Drawings.

B. Prior to demolition, Contractor to work with owner to get list of equipment to be returned to owner. Removed materials which will not be re-used and which are not claimed by the owner shall become the property of the Contractor and shall be removed from the premises. Consult Owner before removing any material from the premises. Carefully remove materials claimed by the owner to prevent damage. Coordinated delivery of such items to owner.
   1. Contractor to deliver items claimed by owner to owner's off site facility. Exact delivery site to be coordinated with owner.

C. Removed materials which are to be reused are to be removed, cleaned, and stored in a safe location. If such items are lost or damaged by the Contractor, item shall be replaced with new item at no added cost to owner. If item is found to be damaged prior to removal, inform Architect prior to removal so that item may be examined by Architect and owner for further instructions.

3.7 WELDING FOR MECHANICAL WORK

A. All mechanical welding and inspection requirement shall be in accordance with the California Mechanical Code.

B. Qualify welding procedures, welders and operators shall be in accordance with ASME boiler and pressure vessel code, section IX, welding and brazing qualifications. Welding procedures and testing shall comply with ANSI standard B31.9 - standard code for pressure piping, and the American Welding Society (AWS) welding handbook.

C. Soldering and brazing procedures shall conform to ANSI B9.1 standard safety code and NFPA 99.

D. All welders shall be certified by a state approved welding bureau. Fabricator shall have current and valid certificated registration by the building official for the types of welds required by the project. Prior to start of the project, the fabricator shall submit a copy of certificate of registration for approval. Prior to project close out, the fabricator shall submit a certificate of compliance that the work was performed in accordance with the approved plans and specifications to the building official and to the Engineer or Architect of record.

3.8 EXISTING SERVICES:

A. Provide and install all required connections to existing systems as required by the Drawings and specifications.

B. Integrate existing systems with all new work to provide a complete working system.

C. Provide minimum 72 hour notice to Owner of service interruptions. All service interruptions shall be kept to the minimum possible time. When requested by Owner service interruptions shall occur outside of normal working hours at no additional cost to owner.

3.9 ASBESTOS ABATEMENT:

A. Existing systems within the area of this scope of work may have asbestos-bearing materials. Testing, encapsulation, removal, treatment, or correction of existing asbestos-bearing materials is not a part of this scope of work and is not the responsibility of the mechanical contractors.

3.10 STRUCTURAL DESIGN OF EQUIPMENT AND SEISMIC RESTRAINTS:

A. All mechanical equipment supports shall be designed by a licensed Structural Engineer and shall comply with the 2016 California Building Code, Section 1616A.1.18 through 1616A.1.26 and ASCE 7-10, Chapters 6 and 30.

B. Provide seismic sway bracing for all suspended piping and ductwork in accordance with the OSHPD anchorage pre-approval OPA-0349, the “Mason Industries Seismic Restraint Guidelines for Suspended Piping, Ductwork, and Electrical Systems”.
   1. Badger, B-Line, Superstrut, or equal systems bearing current OPA numbers shall also be acceptable.

3.11 WARRANTY

A. Be responsible for work done and material installed under these plans and specifications. Repair or replace, as may be necessary, any defective work, material, or part which may show damage to itself or other materials, furnishing, equipment, or premises caused by such defects during this period, if in the opinion of the Architect said defect is due to imperfection of material or workmanship. Provide all such work and materials at no cost to Owner.

B. Be responsible for damage to any part of premises during guarantee period caused by leaks or breaks in work furnished and/or installed under this section. Replace refrigerant, lubricants, or gasses lost as result of defects, breaks, or leaks in work.

C. Provide manufacturer's written warranties covering defects in material and workmanship of products and equipment utilized for the project.

D. Warranties shall be for a period of 2 year from the date of substantial completion unless more stringently specified within individual Sections of this Division.

3.12 START-UP PROVISIONS FOR MECHANICAL WORK

A. General: Major equipment (such as air handling units, boilers, and chillers) start-up shall be performed by the equipment manufacturer or authorized representative.

B. Adjusting and Aligning Equipment: Adjust all equipment. Check all motors for proper rotation.

C. Lubrication:
   1. Extend grease fittings on bearings to points of ready and easy accessibility.
   2. Lubricate fan bearings, etc., before operation of any equipment.
   3. Provide a final lubrication to equipment immediately before turning over to Owner.

D. Upon completion of the mechanical work, or at such time prior to completion as may be determined by the Architect, operate and test all mechanical equipment and systems to demonstrate the satisfactory overall operation of the building or project as a complete unit. Commence tests after preliminary balancing and adjustments to equipment have been checked. Immediately before starting tests, install new air filters and lubricate all running

equipment. Notify the Architect at least seven calendar days in advance of starting the above tests. Test equipment and systems for a minimum as follows:

1. Packaged AC Units (under 20 tons), ductless split systems: 2 consecutive 8-hour days

E. Provide training and orientation of Owners operating staff in proper care and operation of equipment, systems and controls.

F. Neatly tabulate and deliver to the Architect complete operational data, including air flows, room temperatures, fan speeds, motor currents, plenum and duct static pressures, and other data as required. The Architect reserves the right to spot check results, and if discrepancies or errors are noted, Contractor will be required to redo balancing tests and tabulations entirely.

G. During test period, make final adjustments and balancing of equipment, systems, controls, and circuits so that all are placed in first-class operating condition.

H. Final observation will not be made until all of the above have been completed and a preliminary copy of the balance report has been submitted and reviewed.

3.13 POST-CONTRACT COMPLETION TESTS:

A. If the required full-load operation conditions cannot be obtained at the time of the Project Completion Tests due to outdoor seasonal temperatures, return to the job site when requested by the Architect and complete proper loading of equipment and systems as required. Changing of any air filters will not be required under these tests. Contractor will be allowed seven calendar days after notification to begin tests.

3.14 PRE-SEASON START UP:

A. When requested by the Owner within one year of the filing of Notice of Completion, and when full-load tests required under Project Completion Tests and Post Contract Completion Tests have not been performed, start up any equipment or systems required for heating or cooling season operation by the Owner when such equipment and systems have remained shut down immediately after the Project Completion Tests. Make proper assurance that all equipment and systems are operating properly before being turned over for the first operational use of the Owner within one year of filing of Notice of Completion. The changing of any air filters will not be required under these start-up requirements. The Contractor will be allowed seven calendar days after notification, to begin test.

3.15 MECHANICAL RECORD AS-BUILT DRAWINGS:

A. During the course of Project Construction, Mechanical Contractor shall maintain recorded “AS-built” information by distinctively marking up approved shop drawings prints to depict all actual work installed on a daily basis form but not limited to field conditions, addendums, architectural supplemental instructions (ASIs) , instruction bulletins (IBs), change orders (COs), responses to Request For Information (RFIs), and approved product substitutions.

B. The marked-up shop drawings will be made available at the Construction Site to the Architect upon request, at any time.

C. The marked up shop drawings with the recorded information shall then be used to create Record As-built drawings at the completion of the project. Contractor shall submit the Record As-built drawings in full size hard copies.

1. Hand marked shop drawings are not acceptable.
2. Provide 2 complete sets of full size drawings on 20 pound white bond paper.

3. Provide 1 CD (compact disc) with Record drawings.
4. Record as-built drawings are to be full size drawings (same size as Contract Documents) and all plans are to be to standard engineering scale. The minimum drawing scale to match those provided within the Contract Documents.

D. Record As-built drawings shall include the followings:

1. General:
   a. Work on Record As-built drawings shall be provided with horizontal and vertical dimensions. Underground work shall be provided with invert elevations. All dimensions shall be references to permanent building fixed points and/or column lines.
   b. Provide sufficient details and sections to depict actual installations.
   c. Equipment identifications and system labeling nomenclatures shall match the Project Design Documents.
   d. Identification of main shut-off valves shall be based on the approved valve tag list and as actually installed in field.

2. HVAC:
   a. Ductwork mains and branches, size and location with duct elevation information.
   b. Locations of all dampers, including but not limited to balancing dampers, fire dampers, combination fire and smoke, air inlets and outlets, terminal units reheat coils, humidifiers, duct access doors and ceiling access panels.
   c. Piping mains and branches, size and location with pipe elevation information and invert elevations for underground piping.
   d. Locations of all manual and automatic valves, pipe strainers, expansion joints and compensators, pipe guides and anchor points, steam traps and air vents.
   e. Equipment locations with dimensions from prominent building lines and required service access.
   f. Seismic bracing information for ductwork, piping and equipment.
   g. Locations of control system panels, control power transformer panels miscellaneous relay panels, control workstations, routing of control system communication loops.
   h. Locations of all installed instruction and control field devices in occupied space and above ceiling including but not limited to thermometers, pressure gauges, flow meters, airflow stations, temperature sensors, differential pressure sensors, thermostats and humidistats.

3.16 CLEANING UP:

A. Remove tools, scaffolding, surplus materials, barricades, temporary walks, debris, and rubbish from the Project promptly upon completion of the work of each Section. Leave the area of operations completely clean and free of these items.

END OF SECTION 23 00 00

SECTON 23 05 00 – COMMON WORK FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

A. This section includes general mechanical materials and methods required within the project. Items included within this specification section include:
   1. Roof Flashing
   2. Dielectric Unions
   3. Pipe and Equipment Identification
   4. Motors
   5. Motor Starter, Switches, And Wiring
   6. Fireproofing
   7. Painting
   8. Electrical Work
   9. Commissioning and preliminary operational tests

1.2 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturer of plumbing piping systems products, of types, materials, and sizes required whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Firm with at least 5 years of successful installation experience on projects with piping systems work similar to that required of project.

1.3 SUBMITTALS:

A. Product data: submit complete data of materials proposed including:
   1. Manufacturer and model number
   2. Clearly indicate all options, trim, and accessories.
   3. Cross reference manufacturer's cut sheet to specification section on submittal sheet.

B. Operation and Maintenance Data: where applicable, submit complete O&M data including:
   1. Maintenance data and parts lists for each component.
   2. Provide "trouble- shooting" maintenance guide
   3. Include this data within maintenance manual

PART 2 PRODUCTS

2.1 ROOF FLASHING:

A. Flashings in metal deck or membrane type roofing:
   1. Flashing for penetrations of the roof for mechanical items such as flues, ducts, and pipes will be furnished and installed under other sections of these specifications. The work of this section shall include layout, sizing, and coordination of penetrations required for the mechanical work.
   2. Furnish and install counterflashings above each flashing required in the mechanical work. Flues and ducts shall have 24-gauge galvanized sheet metal storm collar securely clamped to the flue or duct above the flashing.
   3. Sewer vents and other piping extending through roof structure shall have flashing provided and installed as part of the roofing work. This contractor shall coordinate his Work accordingly.

B. Flashing in built-up roofing assemblies:
   1. Where flashing is not provided and installed as part of other Work, furnish and install a waterproof flashing and counterflashing for pipe, duct, and flue passing through roof. The flashing shall extend a minimum of 9 inches in all directions from the outside of the pipe, flue, or duct.
   2. Sewer vents and other piping extending through roof structure shall have four-pound sheet lead flashings and Semco, Smith, or equal to Semco #1100-4, counterflashing sleeves installed as detailed.
      a. Provide Hydroseal at underside of counterflashings as recommended in Semco installation instructions.
   3. Flues shall have 24-gauge galvanized steel flashings on all roofs. Securely clamp a storm collar (counterflashing) around the flue above the flashing. Storm collars shall be of same material as flashing.
   4. Seal all pipes, flues, or ducts passing through exterior walls in an approved, watertight manner.

2.2 DIELECTRIC UNIONS:

A. Furnish and install dielectric unions at all locations described herein, whether shown on Drawings or not, and except as noted herein. Construct couplings and flanges so that the two pipes being connected are completely insulated from each other with no metal-to-metal contact. Heavily line the couplings with a hard, insulating, phenolic plastic threaded in standard pipe sizes. Make up the flanges with insulating components consisting of a hard, phenolic gasket, bolt sleeves, and bolt washers. Supplement the insulating gasket with neoprene faces to form a seal.

B. Acceptable Manufacturers:
   1. Watts Regulator Co.
   2. Eclipse, Inc.
   3. Perfection Corp.

2.3 PIPING AND EQUIPMENT IDENTIFICATION:

A. Pipe Identification:

   1. Each piping system furnished and installed under this work shall be identified and the direction of flow indicated by a prefabricated coiled plastic colored label.

   2. Labels shall comply with ASME A13.1 with regard to color, letter height, and marker size. The labels shall have black or white lettering and flow arrows on colored backgrounds and shall not require adhesive. The background colors shall conform to the color schedule shown in this Article.

   3. For use outdoors use Polyester/Tedlar laminated material, MSI model MS-977, or equal. For piping with OD greater than 6” provide the label manufacturers stainless steel straps to secure label to piping.

   4. The size of the lettering and label shall be such that the lettering can be easily read from the floor and the colors easily discernible.

   5. Acceptable Manufacturers:
      a. Marking Services Incorporated (MSI)
      b. Idento Metal Products Co., Idento Bands
      c. Setmark

B. Equipment Identification:

1. Provide white lamacoid plate for each and every piece of equipment installed in this work.
   a. Lettering on plate shall be black, with size of lettering to suit equipment.
   b. Lettering shall be minimum of 3/8-inch in height.
   c. Plates shall be riveted or bolted to equipment.

2. Equipment to include, but not limited to:
   a. Package Rooftop AC Units
   b. Exhaust Fans
   c. Relief Vents
   d. Etc.

C. Acceptable Manufacturers:
1. Marking Services Incorporated, (MSI)
2. LEM Products
3. Seton
4. Craftmark

2.4 ELECTRIC MOTORS:

A. General:
1. The following are basic requirements for simple or common motors. For special motors, more detailed and specific requirements are specified in the individual equipment specifications.

B. Electric Motors:
1. All electric motors shall comply with requirements of NEMA, UL, ANSI/IEEE 112 and NEC, suitable for intended load, voltage, phase, frequency, service, and location.

2. Limit maximum motor speeds to 1750 rpm, unless otherwise specified.

3. Motors 1/2 HP and larger shall be 3 phase, 60 Hz, squirrel cage induction motors unless specifically specified to the contrary in subsequent Sections of this Division.
   a. Refer to Drawings for voltage requirements.
   b. Totally enclosed motors rated 3/4 HP, 1200 rpm, or 1 HP and larger, and all drip-proof motors shall have a 1.15 continuous-duty service factor at 40^{o}C ambient temperature.
   c. Insulation system shall be NEMA Class F or better.
   d. Provide double-shielded, grease-lubricated ball bearings with grease pockets on each side for regreasing in service.
   e. Provide inlet and outlet grease connections in 7.5 HP and larger motor housings for each bearing.
   f. Motors 5 HP and smaller and all roof-mounted equipment motors shall be provided with factory sealed, permanently lubricated ball bearings.

4. Motors smaller than 1/2 HP shall be single phase, 110 volt permanent split-capacitor type with integral thermal overload protection. Bearings shall be factory sealed, permanently lubricated ball type.

5. Provide totally enclosed motors, or suitable protection per NEMA Standards, in locations exposed to the weather or dripping water and in air handling units downstream of cooling coils and heat recovery coils. Other motors shall be open drip-proof.

6. Multi-speed motors shall be provided where specifically scheduled.

7. Motors feed by variable frequency drives (VFD) shall be specifically designed by motor manufacturers for variable frequency drive application.

8. Minimum Efficiency and Power Factor: Minimum Power Factor shall be 85 percent minimum, in all sizes, and minimum efficiency shall be as follows, for 1,750 rpm motors as tested in accordance with NEMA Table 12-6D. The minimum efficiencies shall be guaranteed.

9. Overload protection: Built-in thermal overload protection and, where indicated, internal sensing device suitable for signaling and stopping motor at starter.

10. Noise rating: Comply with ANSI/NEMA MG 1."Quiet" rating on motors located in occupied spaces of building.

11. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.

C. Acceptable Manufacturers:
1. Reliance
2. Baldor
3. US Motors
4. Westinghouse
5. Lincoln
6. General Electric

2.5 MOTOR STARTERS, ELECTRICAL DEVICES, AND WIRING

A. Motor Starters:

1. Magnetic motor starters for equipment provided under the Mechanical Work shall be furnished by the Mechanical Contractor and turned over to the Electrical Contractor for installation, unless otherwise noted.
   a. Magnetic motor starters shall be provided as part of motor control centers shall be provided and installed by Electrical Contractor

2. Unless otherwise noted, magnetic motor starters shall be furnished in NEMA 4 enclosure for outside installation and NEMA 1 enclosure for inside installation, with three thermal overloads for three- phase motors and one overload element for single-phase motors. All overloads shall be ambient compensated.

3. Furnish single phase motors with manual motor starters having integral overload protection.

4. Furnish 3-phase motors with full voltage, magnetic across-the-line starters unless noted otherwise.

5. Provide thermal overload protection for all 3-phase legs. Provide motor starters with single phase protection.

6. Provide fail-open auxiliary contacts, pre-wired to a terminal strip, for future remote alarm wiring and run-time totalization. Refer to Division 16.

7. Provide equipment starters with an adequate control transformer, complete with fuse protection, to supply 120 volt source for control circuit, regardless of line voltage.

B. Manual switches shall have pilot lights and extra positions for multi-speed motors.

C. Overload protection: Melting alloy type thermal overload relays.

D. Magnetic Starters:
1. Maintained contact push buttons and pilot lights, properly arranged for single speed or multi-speed operation as indicated.
2. Trip-free thermal overload relays, each phase.
3. Interlocks, pneumatic switches, electric relays and similar devices as required for coordination with control requirements of Division 15 Controls Sections.
4. Externally operated manual reset.
5. Under-voltage release or protection.

E. Motor connections:
1. Flexible conduit, except where plug-in electrical cords are specifically indicated.

2.6 FIREPROOFING

A. Fireproofing to be installed at all pipe and duct penetrations of rated assemblies.

B. Fireproofing to be UL Rated fire stop material.

C. Acceptable Manufacturers:
1. Hilti
2. 3M Pro-Set
3. Or Equal

PART 3 EXECUTION

3.1 ROOF FLASHING:

A. Provide pipe flashings as noted on the Drawings.

B. Flue and duct flashings and storm collars shall be securely clamped around flue or duct storm collar or counterflashing, above flashing.

3.2 DIELECTRIC UNIONS:

A. Install dielectric unions in the following locations:
1. In all metallic water and gas service connections into the building within 5 feet of the building wall. Install adjacent to the shut-off valve or cock and above ground where possible.
2. At points of connections where copper water lines connect to steel domestic water heater tanks and other equipment.
3. At points in piping where dissimilar metal pipes are connected together.
4. Any special applications shown on the Drawings.
5. Where steel or cast-iron pipe in the ground connects to copper or brass piping above the ground, the transition from steel or cast- iron pipe to the copper or brass pipe shall be made above ground in all cases and in an accessible location where practicable.
6. Where copper or brass piping is connected to steel or cast-iron piping and the connection is buried in the ground, the connection shall be covered with coal tar protective tape extending outward a minimum of 5 feet on all pipes, from the point of connection. The tape shall have a minimum thickness of 10 mils and a maximum thickness of 12 mils and shall be applied so as to provide at least two full thicknesses

of the tape over the piping. A primer, specifically designed for use with the tape, shall be used. The piping shall be thoroughly cleaned before any tape or primer is applied.

3.3 PIPE AND EQUIPMENT IDENTIFICATION:

A. Identification shall be applied to all piping, except piping located in furred spaces without access to permit entrance of personnel, and piping buried in the ground or concrete.

B. Underground pipe identification shall consist of a buried, continuous, preprinted, bright colored, plastic ribbon cable marker provided for each underground pipe.

C. The legend and flow arrow shall be applied at the following locations:
1. All valve locations,
2. All points where piping enters or leaves a wall, partition, cluster of piping, or similar obstruction
3. All exposed locations
4. At approximately 20-foot intervals on pipe runs.

D. Practical variations or changes in locations and spacing may be made with the specific approval of the Architect to meet specific conditions.

E. Wherever two or more pipes run parallel, the printed legend and other markings shall be applied in the same relative location so that all piping is easily identified.

F. The marking shall be located so as to be readily conspicuous at all times from any reasonable point of vantage.

G. Lettering size and label colors are to be per ASME/ANSI A13.1 Pipe Marking Standards.

3.4 MOTORS:

A. Motors furnished in the Mechanical Work shall be furnished by the Mechanical Contractor, but such equipment shall be delivered to the Electrical Contractor for mounting and connecting to power wiring. Coordinate all motor starter requirements with Electrical Contractor.

3.5 MOTR STARTERS SWITCHES, AND WIRING:

A. Starters located in motor control centers will be provided under the Electrical Work. Contractor is referred to electrical drawings for motors served by motor control centers.

B. Starters furnished by the Mechanical Contractor to be delivered to the Electrical Contractor for mounting and connecting to power wiring. Coordinate all motor starter requirements with Electrical Contractor.

3.6 FIREPROOFING:

A. Pack the annular space between the pipe sleeves and the pipe and between duct openings and ducts through all floors and walls with UL listed fire stop.

B. Fireproofing system to be installed in strict accordance with manufacturer's written instructions and details.

3.7 PAINTING:

A. Perform all priming and painting on the equipment and materials as specified herein.

B. Exposed piping and unfinished portions of equipment to be painted shall be cleaned of grease, oil, rust, or dirt in preparation for painting.

C. Where applicable, remove pipe clamps prior to painting so that entire pipe is painted. Provide temporary support as required. Re-install clamps after priming/painting is complete.

D. Priming:

1. Contractor to prime all exposed ferrous metals, including piping, which are not galvanized or factory-finished.
   a. Black steel pipe exposed to weather shall be cleaned and primed with one coat of Rust-Oleum, or equal, #1069 primer. Color to be Grey.

E. See Painting Section for detailed requirements.

3.8 ELECTRICAL WORK:

A. Adequate working space shall be provided around electrical equipment in compliance with the National Electric Code and other applicable codes or ordinances. The mechanical work shall be coordinated with the Electrical Work in order to comply with these requirements. Any work which does not conform to these regulations shall be properly corrected without additional cost to the Owner.

B. Furnish and install all line voltage and low-voltage temperature control wiring in the Mechanical Work by the Temperature Control SubContractor, including all interlock wiring between motor starter coils, interlock relays, and temperature control equipment. Unless noted otherwise, this does not include primary control wiring between starters and push button or other manual starter switch or branch power circuits required for temperature control systems.

C. Temperature control equipment, including relays shown on control diagram, shall be furnished and installed by the Temperature Control Subcontractor.

D. Equipment furnished in this work that is factory wired but requires modification to internal wiring to meet specifications or drawing requirements shall have such internal modifications made at factory before shipment.

E. All electrical work and equipment, including internal wiring, must comply with applicable codes and applicable portions of electrical specifications. Run line and low-voltage control wiring in conduit. Conduit for temperature control wiring shall be responsibility of Mechanical Contractor and shall be of type specified in electrical specifications.

3.9 DEMOLITION

A. Refer to Division 1 sections for general demolition requirements and procedures.

B. Disconnect, dismantle, and remove mechanical systems, equipment, and components indicated to be removed. Coordinate with all other trades
1. Piping to be removed: Remove portion of piping indicated to be removed. Cap or plug remaining piping with same or compatible piping material.
2. Piping to be abandoned in Place: Drain piping and cap or plug piping to remain with same or compatible piping material. Refrigerant system to be evacuated per EPA requirements.
3. Equipment to be removed: Drain down and cap remaining services and remove equipment.

4. Equipment to be removed and re-installed: Disconnect and cap services and remove, clean, and store equipment. When appropriate, re-install, reconnect, and make equipment operational.
   a. If existing equipment which is to be re-installed is damage, contact architect prior to removal. Contractor to take pictures of any damaged equipment prior to its removal and submit pictures to Architect.
   b. Equipment damaged during removal, storage, or re-installation shall be the Contractor's responsibility and is to be replaced with new at no additional cost to the owner.
5. Equipment to be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, removed damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.10 CARE AND CLEANING:

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim that are installed as part of this work. Leave systems and equipment in satisfactory operating condition.

B. Drain and flush piping to remove grease and foreign matter. Thoroughly clean out flush valves, traps, strainers, and pressure-reducing valves.

C. Keep the interior of all ductwork free of dirt, dust, loose insulation, and other foreign materials at all times.

D. Clean out and remove surplus materials and debris resulting from the work, including surplus excavated material.

3.11 OPERATION TEST:

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.12 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 23 05 00

SECTION 23 05 93 – AIR AND WATER SYSTEM BALANCING

PART 1 GENERAL

1.1 SUMMARY

A. This section includes total system balance, as defined by AABC, which constitutes the process of testing, adjusting, and balancing each system component so that the entire system produces the results for which it was designed. Testing results of total system balance shall be accepted by the Mechanical Engineer of Record and Owner

1.2 QUALITY ASSURANCE

A. Obtain the service of an independent test and balance (TAB) agency that specializes in, and whose business is limited to, testing, analysis, and balancing of air distribution and hydronic systems.

B. Balance agency shall be a member of Associated Air Balance Council.

C. Balance agency shall be a member of Associated Air Balance Council (AABC), or National Environmental Balancing Bureau (NEBB).
   1. Company shall be a member of AABC or NEBB for a minimum of 5 years.

D. Work shall be done by qualified engineering technicians and trained personnel, using instruments certified accurate to limits used in standard practice for testing and balancing of hydronic and air distribution for heating-cooling systems. Agency shall field test air and hydronic flows in accordance with methods set up by Associated Air Balance Council, National Standard Volume 1, latest edition.

E. Approved Balancing Firms: Obtain service from one of the following firms (No others will be considered):
   1. RS Analysis
   2. Raglen System Balance
   3. MESA 3

F. AABC Compliance: Comply with AABC's "National Standards," Volume 1, as applicable to mechanical air and hydronic distribution systems and associated equipment and apparatus.

G. Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments and testing, adjusting and balancing, except as otherwise indicated.

H. Reference Standards: Comply with the following Standards:
   1. AABC - Associated Air Balance Council - A National Standard Volume 1.
   2. ASHRAE - American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.
   3. AMCA Publication 203, "A Guide to the Measurement of Fan System Performance in the Field."
   4. ASHRAE HVAC Applications Handbook, Chapters 34 and 42 as applicable.
   5. ADC Test Code No. 1062, "Equipment Test Code."
   6. ANSI A1.4, Specification for Sound Level Meters.
   7. ANSI S1.11, Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets.

1.3 WORK INCLUDED

A. Test and balance of existing and new air distribution system, hydronic systems, and associated equipment.

B. Setting and adjusting speed and volume of systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required by contract documents.

C. Component types of testing, adjusting, and balancing specified in this section includes the following as applied to mechanical equipment:
   1. Fans
   2. Packaged Rooftop AC Units
   3. Ductwork systems
   4. Relief vent and/or power exhaust section of economizers.

D. TAB agency shall perform the following during installation phase of systems:
   1. Study design specifications and engineering Drawings and prepare schedule to physically inspect mechanical equipment for hydronic and air distribution systems to be tested and balanced.
      a. Contractor shall provide TAB agency with one copy of Contract Drawings and specifications, mechanical equipment submittals, and change orders necessary for proper balancing of air distribution systems.
   2. TAB agency shall make periodic field inspections prior to closing in portions of systems to be balanced. Agency shall verify to its satisfaction that all work, fittings, dampers, balancing devices, etc. are properly fabricated and installed as shown or specified and that Agency will be able to properly balance system.
   3. Prepare test and balancing schedule, test record forms, and necessary technical information about hydronic and air distribution systems for installed heating-cooling equipment.
   4. Recommend adjustments and/or corrections to mechanical equipment and hydronic and air distribution systems that are necessary for proper balancing of systems.
      a. Corrections required based on TAB Contractor field inspections shall be made at no additional cost to the owner.

1.4 SUBMITTALS:

A. Contractor data:
   1. Provide TAB Contractor company information.

B. Field Inspection Report:
   1. TAB Contractor to provide written verification of field inspections.
      a. Include date of inspection and list of all items to be corrected prior to balance.

C. TAB Contractor to provide Test Reports as follows:
   1. Submit data on printed report forms published by AABC.
   2. Include identification and types of instruments used and their most recent calibration date with submission of final test report.
   3. Reports to have computer generated drawings. Drawings to include: general building layout, ductwork and piping layout, HVAC equipment, and air inlet/outlet locations.
      a. Hand drawn/numbered drawings shall not be accepted.
   4. Reports to be stamped and signed licensed TAB Contractor.
   5. Submit three copies of complete test report prior to final acceptance of project.

D. Balance agency shall submit the results of tests in this SECTION for review by the Architect.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS:

A. Except as otherwise indicated, use same products as used by original installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
   1. At tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

2.2 TEST INSTRUMENTS:

A. Utilize test instruments and equipment for test and balance work required, of type, precision, and capacity as recommended in the following test and balance standards:
   1. Comply with AABC's Manual "AABC National Standards," Volume 1.

PART 3 EXECUTION

3.1 BALACING:

A. Upon completion of HVAC installation, balance agency shall complete tests, analysis, and balance of air handling systems for heating-cooling equipment.
   1. It is the intent of the project to set total CFM at equipment along with outside air settings. For equipment within concealed ductwork, total AC Unit readings will only be required. For equipment with new rooftop ductwork distribution, readings at individual branch ducts will be required.

B. This report shall include as minimum, but not be limited to, following design and actual information:

   1. Air-Moving Equipment Data:
      a. Fan or unit number.
      b. Location.
      c. Area served.
      d. Manufacturer.
      e. Model number and serial number.
      f. Design and actual air-flow measurements:
         1) Total CFM.
         2) Return air CFM
         3) Outdoor air CFM
         4) Relief air CFM
         5) Total/external static pressure in w.g.
         6) Approximate suction static pressure in w.g.
         7) Approximate discharge static pressure in w.g.
         8) Fan rpm

   2. Rated and Actual Motor Data:
      a. Horsepower / Break-horsepower
      b. Phase
      c. Voltage.
      d. Amperage.

   3. Duct Velocity Traverse Data:
      a. Fan or unit number
      b. Design and actual CFM

c. Duct division signs and area.
d. Design and actual average velocity
e. Duct static pressure average velocity
f. Traverse location
g. Traverse measurements in fpm (show grid pattern)

4. Exposed Rooftop Ductwork:
   a. Design and actual velocity in feet per minute (FPM)
   b. Design and actual CFM

5. Other information required to establish completely balanced systems.

3.2 BALANCE REQUIREMENTS:

A. Make allowance for air filter resistance at time of tests. Balance main air supplies at design air quantities and at an air resistance across filter bank midway between design specifications for clean and dirty filters.

B. Balance work within the following tolerances:
   1. Packaged unit supply CFM, supply/return ducts, and exhausts fans: balance within -5% / +10% of design CFM.
   2. Outside Air Inlets: balance within -0% / +10% of design CFM.

C. HVAC systems shall be balanced at normal "minimum outside air" condition. Where such systems are required to deliver 100-percent return air or a variable amount of outside air, as indicated in specifications for automatic temperature control sequences, total CFM test shall be repeated for 100-percent return air and maximum outside air shall agree with conditions found under maximum outside air operation before system is considered to be in balance. Adjustments of proper dampers shall be made to achieve balance and marked so that control systems contractor may set damper motors accordingly.

D. Take static pressure readings with inclined manometer. Take air velocity readings with instruments of recent calibration. Take final velocity readings with Alnor Velometer, Anemotherm or Vane Type Anemometer, calibrated prior to test and recalibrated at end of test. Include certified correction curves for each calibration as part of record. Certify instruments accurate to standards currently used in common practice for system balance work. Use test cones for diffusers.

E. Run tests with supply, return, and exhaust systems operating and doors, windows, etc. closed or under regular traffic. If possible, make final readings with cooling coils under load to ensure that static pressures are at maximum.

F. Work with temperature Control Subcontractor in adjustment of automatic dampers, valves, thermostats, etc. required to maintain proper temperatures in all portions of building.

G. Contractor responsible for installing heating, cooling, and ventilating equipment shall make any changes, additions, or modifications to dampers, fan drives and motor sheaves, pump impellers, motors, and other equipment necessary for proper air and hydronic balance.

H. Balance of systems shall be reviewed by Architect and during this review Mechanical Contractor shall furnish men, materials, ladders, etc. to enable Architect to take all readings as he may direct. If errors are found, Balancing Agency shall readjust system to satisfaction of Architect.

END OF SECTION 23 05 93

SECTION 23 31 00 – DUCTWORK

PART 1 GENERAL

1.1 SUMMARY

A. This section includes sheet metal materials, fasteners, supports, and duct construction classifications for:
   1. Supply, return, and exhaust systems.

1.2 REFERENCES

A. AABC – Associated Air Balance Council Manual: National Standards for Total System Balance

B. ANSI – American National Standard Institute

C. ASHRAE Standards: Comply with American Society of Air Conditioning, Refrigeration, and Air Conditioning Engineers Handbook.

D. NFPA – Compliance. Comply with ANSI/NFPA 90A, *Standard for the Installation of Air Conditioning and Ventilating Systems,* and ANSI/NFPA 90B *Standard for the Installation of Warm Air Heating and Air Conditioning Systems,* latest accepted edition.

E. CBC – California Building Code

F. CFC – California Fire Code

G. CMC – California Mechanical Code

H. Local Codes

I. SMACNA – Sheet Metal and Air Conditioning Contractor's National Association, Inc.
   1. Duct Construction Standards
   2. Fire damper and heat stop guide.
   3. HVAC Systems testing adjusting and balancing.
   4. Guidelines for Seismic Restraints of Mechanical Systems and Plumbing Pipe systems.

J. UL – Underwriters' Laboratory Standards for Safety: referred to as UL 181, UL 555, etc.

1.3 QUALITY ASSURANCE

A. Contractor to comply with all the above referenced standards.

B. The above referenced standards may be superseded by notes and details on Drawings and in specification.

C. Where two or more references are in conflict, the most stringent, as determined by the Architect, shall take precedence.

D. Flame-Smoke Ratings: All products used in ductwork system to comply with flame-spread index of 25 or less, fuel-contributed index of 50 or less, and smoke-developed index of 50 or less.

E. Installer: A firm with at least three years of successful installation experience on projects similar to that required for this work.

F. Fabricate all ductwork with sheet metal. Fiberglass ductwork will not be accepted.

G. Duct liner to be certified by Greenguard: Greenguard Environmental Institute, independent testing of products for emissions of respirable particles and Volatile Organic Compounds (VOCs), including formaldehyde and other specific product-related pollutants. Provides independent, third-party certification of IAQ performance. Certification is based upon criteria used by EPA, OSHA and WHO

1.4 SUBMITTALS

A. Submit typical shop standards and/or SMACNA details for each class of duct specified. Indicate the following for each standard:
   1. Gauge sizes and joint details
   2. Pressure Class
   3. Seam Construction
   4. System type (e.g. supply air, return, air, etc.)

B. Submit shop drawings for ductwork including elevations and showing all terminal units and air devices connections. Drawings shall be a minimum scale of ¼”=1’-0” and be coordinated with all other trades.

C. Record Drawings: At project closet-out, submit Record Drawings of installed ductwork, duct accessories, and inlets / outlets in accordance with the requirements of Division 1.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Duct Connection Systems:
   1. Ductmate Industries, Inc.
   2. Travers Duct Connection (TDC)
   3. or equal

B. Duct Sealants
   1. United McGill Corp.
   2. Ductmate Proseal
   3. Or Equal

C. Duct Liner
   1. Johns Manville - Linacoustic
   2. Owens Corning Fiberglas Corporation – Aeroflex Plus
   3. Certainteed Corporation - Toughgard

D. Duct adhesives
   1. Fosters Adhesive – 85-462
   2. Swifts Adhesive – 7336
   3. Or Equal

2.2 DUCT CONSTRUCTION CLASSIFICATIONS:

A. General: Construct and seal ductwork in accordance with SMACNA pressure classifications and seal classes listed for ductwork systems involved.

1. Minimum duct gauge for concealed ductwork to be 26 gauge.

B. Rectangular Ductwork:
   1. +2" W.G. Class ductwork:
      a. Supply air Ductwork downstream of terminal boxes.
      b. Constant volume supply air ductwork in systems without terminal boxes

   2. -2" W.G. Class ductwork:
      a. General exhaust ductwork.
      b. Return Air Ductwork

2.3 GENERAL:

A. All duct sizes listed on drawings are external sizes.

B. Galvanized Sheet Steel to be lock-forming quality, ASTM A924 and ASTM. Coating to be Designation G90. Provide mill phosphatized finish for exposed surfaces of ducts exposed to view.
   1. Provide mill certification for galvanized material at request of IOR.

C. Tapers to be as follows:
   1. Limit diverging tapers to a maximum of 30 degrees.
   2. Limit expanding tapers to a maximum of 20 degrees.

D. Run ductwork parallel to adjacent walls unless shown otherwise on plans.

E. Ductwork exposed to weather to be cross-broken to shed water.
   1. At contractor's option, ductwork can be manufactured with a sloped top, with a minimum angle of 5 degrees.

F. Joint Sealing:
   1. Seal all concealed ductwork within the building, all ductwork within mechanical rooms, and all ductwork exposed to weather air tight. Seal all standing seams, transverse joints, manufactured joints and seams with duct sealant. Duct Sealant to be rated for indoor and outdoor use.
   2. Seal punched holes, corner cracks, and all sheet metal screws.
   3. After testing, reseal joints found to be leaking.
   4. At ductmate joints, in addition to ductmate gaskets, seal all bolted corners to eliminate air leakage at corners.
   5. Pressure sensitive tapes shall not be considered.

G. Provide sheet metal angle frame at all duct penetrations to wall, floor, roof, or ceiling.
   1. Ducts to penetrate perpendicular to walls, ceilings and floors.

H. Internal Duct Liner:
   1. Provide internal duct liner as follows:
      a. All supply and return air ductwork exposed to weather.
      b. Elsewhere as indicated on the drawings.

   2. Internal duct liner exposed to weather to be as follows:
      a. 2" thick, 1.5-pound density (minimum) with matt facing.
      b. Thermal Performance - C Value – 0.14 BTU / (h * FT^2 * ^oF) – minimum
      c. Thermal Performance - R Value – 8.3 (h * FT^2 * ^oF) / BTU – minimum
      d. Liner to be CertainTeed, ToughGard R Duct Liner, Type 150, or equal.

3. Cement duct liner in place with nonflammable, non-hardening duct adhesive. Seal up all raw edges of insulation inside ductwork with adhesive.

4. Provide sheet metal weld pin fasteners and washers on all duct work on 12-inch intervals with the first row within 3 inches of the leading edge of each piece of insulation and 4 inches from corners. No substitutions on fastening method will be allowed.

5. Duct liner and adhesive shall not exceed flame-spread rating of 25 and smoke-developed rating of 50, all in conformance with NFPA 90A.

6. Provide metal nosing at all locations where liner is preceded by unlined metal.

I. Ductwork Support: Provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork, unless noted otherwise.

J. Miscellaneous Ductwork Materials:
1. Duct Joints: Install duct sealers, pop rivets, or sheet metal screws at each fittings and joint. Use a minimum of #10 galvanized sheet metal screws.

2.4 2" W.G. RECTANGULAR DUCT CONSTRUCTION/FABRICATION:

A. Shop fabricate ductwork of gauges and reinforcement complying with the more stringent of the following standards, except as noted herein.
1. California Mechanical Code (CMC)
2. SMACNA HVAC Duct Construction Standards, latest Edition.

B. Fabricate Ducts with minimum gauges and joint reinforcement as follows:

Duct Dimension	Minimum Gauge	Joint Reinforcement per CMC
Up through 12"	26	Not Required
13" through 18"	24	Not Required
19" through 30"	24	C/4
31" through 42"	22	E/4

C. Fabricate duct fittings to match adjoining ducts and to comply with duct requirements as applicable to fittings. Fabricate elbows with center-line radius equal to 1.5 times associated duct width. Fabricate to include single thickness turning vane in elbows where space does not permit the above radius or where square elbows are shown.

D. Fabricate round supply connections at rectangular, plenum type fittings using spin-in type fittings, complete with extractor and volume control damper.

E. Provide drive slip or equivalent flat seams for ducts exposed in the condition space or where necessary due to space limitations. On ducts with flat seams, provide standard reinforcing on inside of duct. Duct connection to outlet on exposed duct shall be full size of outer perimeter of outlet flange.

PART 3 EXECUTION

3.1 INSTALLATION OF DUCTWORK:

A. Assemble and install ductwork in accordance with recognized industry practices which will achieve air tight (leakage class 12 for 2-inch pressure class and leakage class 3 for 4-inch pressure class) and noiseless (no objectionable noise) systems capable of performing each

indicated service. Install each run with minimum of joints. Align ductwork accurately at connections within 1/8- inch misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of type which will hold ducts true to shape and to prevent buckling.

B. Seal ductwork after installation to seal class required and method prescribed in SMACNA "HVAC Leakage Test Manual," latest edition.

C. Paint inside of duct visible through grille dull black.

D. Duct Supports:
   1. Support ductwork in manner complying with SMACNA "HVAC Duct Construction Standards," latest edition, hangers and supports sections. Where special hanging of ductwork is detailed or shown on Drawings, Drawings shall be followed.
      a. Except where modified in individual paragraphs in this section or detailed on drawings, provide hanger support with minimum 18 gauge straps, 1 inch wide. Fold duct strap under bottom of duct.
      b. Install duct supports to rectangular ducts with sheet metal screws. Provide one screw through strap at top of duct and one screw through strap at bottom of duct.

E. Where ductwork is exposed, Contractor to paint ductwork, supports, and accessories as directed by Architect.

3.2 CLEANING AND PROTECTION

A. Ductwork being stored on site to be covered and protected from elements. Internally lined ductwork to be stored on jobsite in clean / dry location. Any insulation exposed to water must be discarded immediately and removed from jobsite.

B. Clean ductwork internally, unit by unit as it is installed, of dust, dirt, and debris.

C. Clean external surfaces of dirt and foreign substances which might cause corrosive deterioration of metal or where ductwork is to be painted.

D. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until time connections are to be completed.

E. If HVAC System is operated prior to the completion of construction, Contractor to provide temporary filters at all return air and exhaust air grilles. Filters to be 2” thick, MERV 8 filters. Contractor to secure filters in place with tape or wiring. Filters to completely cover grille opening.

3.3 OPERATION TEST:

A. Test each piece of equipment to show that it will operate in accordance with indicated requirements.

3.4 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, and tools, and leave premises clean, neat, and orderly.

END OF SECTION 23 31 00

SECTION 23 33 00 – AIR DUCT ACCESSOREIS

PART 1 GENERAL

1.1 SUMMARY

A. This Section includes requirements for the following duct accessories:
   1. Volume Control Dampers
   2. Turning Vanes
   3. Flexible Connections

1.2 QUALITY ASSURANCE

A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) HVAC Duct Construction Standards (Metal and Flexible), latest edition, for all work in this section.

B. ASHRAE Standards: Comply with American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations, latest edition, for all work in this section.

C. NFPA Compliance: Comply with ANSI/NFPA 90A, "Standard for the Installation of Air Conditioning and Ventilating Systems," and ANSI/NFPA 90B, "Standard for the Installation of Warm Air Heating and Air Conditioning Systems."

D. The Diffuser, Register, Grille manufacturer shall provide published performance data for all air inlets/outlets. Performance tests shall be tested in accordance with ANSI/ASHRAE Standard 70-1991.

1.3 SUBMITTALS

A. Product data: submit complete data of materials proposed including:
   1. Manufacturer and model number
   2. Clearly indicate all options, trim, and accessories.
   3. Cross reference manufacturer’s cut sheet to fixture callout ID on submittal sheet.

B. Operation and Maintenance Data: submit complete O&M data including:
   1. Maintenance data and parts lists for each type of fixture.
   2. Provide "trouble- shooting" maintenance guide
   3. Include this data within maintenance manual

PART 2 PRODUCTS

2.1 VOLUME CONTROL DAMPERS:

A. General:
   1. Provide dampers throughout the duct system where indicated on the drawings to facilitate complete balancing.
   2. Provide any dampers not shown on drawings but requested by Test and Balance Contractor add no additional charge to the owner.
   3. Locate volume control dampers within 18” of the branch duct take off. Dampers shall not be located at or near the end of the duct branch run.
   4. Provide for each damper quadrant lock device on one end of shaft and end-bearing plate on other end.

a. Quadrant lock device to be Ventlock 641, or equal.
b. End bearing plate to be Ventlok 607, or equal.

5. Provide extended quadrant locks and extended bearing plates for externally insulated ductwork.

B. Rectangular Dampers with either height or width less than 16 inches:
1. Butterfly type damper with 18-gauge steel or duct casing angle reinforced as required.
2. Provide single thickness 16-gauge minimum, galvanized steel blades, welded or permanently bolted to continuous solid 3/8" minimum square shaft. Permanently mark end shaft to indicate blade position and fit with a locking quadrant mounted on outside of frame. Bearings shall be pressed into frame and designed for dynamic requirements

C. Rectangular Dampers with either height or width greater than or equal to 16 inches:
1. Frame with 5" by 1", 16-gauge galvanized steel channel. Blades to be 8" maximum width, extruded aluminum, airfoil blade, opposed blade, having shafts/bearings designed to meet dynamic requirements, positively locked to shafts.
2. Control shafts to be 3/8" square, plated steel, permanently marked to indicate blade position and fitted with locking quadrant mounted on outside of frame.
3. Provide single thickness 16-gauge minimum, galvanized steel blades, welded or permanently bolted to ½" minimum diameter through shaft. Permanently mark end shaft to indicate blade position and fit with a locking quadrant mounted on outside of frame. Bearings shall be pressed into frame and designed for dynamic requirements

D. Acceptable Manufacturers:
1. Air Balance Inc.
2. Ruskin Manufacturing Company
3. Greenheck

2.2 TURNING VANES

A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards," latest edition.

B. Acceptable Manufacturers:
1. Duro-Dyne Corporation
2. Ductmate
3. Or equal

2.3 FLEXIBLE CONNECTIONS

A. Furnish and install flexible connections at following locations:
1. Supply and return duct connection to packaged rooftop AC Units with horizontal ductwork.
2. Flexible connections will not be required for curb-mounted, roof- type exhaust fans or packaged downflow AC Units.

B. Flexible duct connections shall be preassembled flexible connectors constructed of coated glass fabric applied in accordance with manufacturer's recommendations.

C. Install sheet metal band completely around duct or fan outlet, at end of flexible connection. Fasten with metal screws through band and coated glass fabric. Space screws approximately 4" apart.
1. Provide with TDC/TDF connectors where connecting to like ductwork.

D. Flexible Connections to be as follows:

1. For all equipment: Duro-Dyne Model Metal Fab, or equal.
   a. Provide with Neoprene (commercial/specification grade) fabric.
      1) Neoprene to be 30 oz./square yard,
   b. Provide with 4" fabric with 4" metal connectors on each end.
   c. Minimum 24 gauge.

E. Provide galvanized sheet metal sun shield over flexible connections located outdoor.

F. Acceptable Manufacturers:
   1. Duro-Dyne Corporation
   2. Ventfabrics, Inc.
   3. Ductmate PROflex
   4. Or Equal

PART 3 EXECUTION

3.1 GENERAL:

A. Install duct accessories in accordance with manufacturer's installation instructions with applicable portions of details of construction as shown in SMACNA standards and in accordance with recognized industry practices to ensure that products serve intended function.

3.2 INSTALLATION OF VOLUME CONTROL DAMPERS:

A. Provide volume control dampers at all supply, return, and exhaust branch ductwork and elsewhere where shown on the drawings.

B. Locate volume control dampers at or near branch take off. Volume Control dampers shall not be located at the end of branch duct.

3.3 INSTALLATION OF TURNING VANES:

A. Install turning vanes in square or rectangular 90-degree elbows in supply, return, and exhaust air systems and elsewhere as indicated.

3.4 INSTALLATION OF FLEXIBLE CONNECTIONS:

A. Install flexible connection in accordance with manufacturer's installation instructions.

B. Furnish and install flexible connections at following locations:
   1. Duct connection of packaged rooftop equipment (both supply and return) which have horizontal connected ductwork.
      a. Flexible connections will not be required for curb-mounted, roof- type exhaust fans or downflow packaged AC Units.

3.5 CARE AND CLEANING:

A. Repair or replace broken, damaged, or otherwise defective parts, materials, and work. Leave entire work in condition satisfactory to Architect. At completion, carefully clean and adjust equipment, fixtures, and trim installed as part of this work. Leave systems and equipment in satisfactory operating condition.

3.6 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like, and leave premises clean, neat, and orderly.

END OF SECTION 22 33 00

SECTION 23 34 00 – EXHAUST FANS

PART 1 GENERAL

1.1 SUMMARY

A. This section includes exhaust systems including:
   1. Roof Exhaust Fans
   2. Kitchen exhaust fans
   3. Roof Mounted Air Intake/Relief Hoods
   4. Roof Curbs

1.2 REFERENCES

A. AFBMA 9 – Load Ratings and Fatigue Life for Ball Bearings.

B. AFBMA 11 – Load Ratings and Fatigue Life for Roller Bearings.

C. AMCA 99 – Standards Handbook

D. ACMA 300 – Test Code for Sound Rating Air Moving Devices

E. AMCA 301 – Method of Calculating Fan Sound Ratings form Laboratory Test Data

F. ANSI B3.15

G. California Electrical Code (C.E.C.)

H. SMACNA – HVAC Duct Construction Standards

1.3 QUALITY ASSURANCE

A. Conform to AMCA bulletins regarding construction and testing. Fans shall bear AMCA certified rating seal.

B. Fans of similar type shall be by the same manufacturer.

1.4 SUBMITTALS

A. Product Data: Submit complete data of materials proposed including the following:
   1. Manufacturer.
   2. Model.
   3. Fan Type
   4. Wheel type
   5. Fan Construction Class
   6. Fan size and arrangement
   7. Dimensional data including bolt hole locations
   8. Fan Weight
      a. Were fans are mounted on vibration isolators, provide corner operating weight data for each fan.
   9. Air flow capacity, fan curves, and efficiency data
   10. Static pressure
   11. Fan motor drive
   12. Motor HP and Fan bHP
   13. Sound Power: discharge and inlet for each octave band.

B. In cases of Substitution, equivalent fan shall not (when compared to basis of design fan):
   1. Increase motor horsepower
   2. Increase bHP by more than 5%
   3. Increase noise level
   4. Increase tip speed by more than 10%
   5. Increase air inlet velocity by more than 20%
   6. Change motor type

C. Maintenance Data: Submit operations and maintenance data and parts list for each fan type. Include this data in Maintenance Manual.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURES

A. General Exhaust Fans, Kitchen Exhaust, and Roof Exhaust fans:
   1. Loren Cook
   2. Greenheck
   3. Or Equal

B. Roof Mounted Air Intakes / Relief Hoods
   1. Loren Cook
   2. Greenheck
   3. Or Equal

C. Roof Curbs
   1. By Fan Manufacturer
   2. Or Equal

2.2 GENERAL

A. Provide motors so that they cannot be overloaded above nameplate rating throughout the full speed range of the adjustable pitch driving sheave.

B. Fan wheels shall be balanced statically and dynamically near operating speed.

C. Provide drives and guards conforming to the requirements hereinbefore specified.

D. Fan construction, speed, noise level, tip speeds, outlet velocities and efficiencies will be taken into consideration in approval of fans offered. Fans shall be as scheduled on drawings, or approved equal.

2.3 ROOFTOP CENTRIFUGAL EXHAUST FAN – UPBLAST – DIRECT DRIVE.

A. Roof exhaust fans shall be upblast centrifugal direct drive type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced.

B. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure. Windbands shall have a rolled bead for added strength and shall be joined to curb caps with a leak proof continuously welded seam.

C. Motors shall be mounted out of the air-stream on vibration isolators. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance.

D. A disconnect switch shall be factory installed and wired from the fan motor to a junction box within the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring.

E. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

F. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.

G. Provide with the following Options and Accessories:
1. Aluminum Birdscreen
2. Gravity backdraft Dampers
3. UL/cUL 705 Electrical
4. Drain connection
5. Speed Controls
6. NEMA 3R and EXP Disconnect Switches

2.4 ROOFTOP CENTRIFUGAL EXHAUST FAN – UPBLAST – BELT DRIVE.

A. Roof exhaust fans shall be upblast centrifugal belt driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure. Windbands shall have a rolled bead for added strength. Windband shall be welded to curbcaps with a leak proof continuous seam.

B. Motors shall be heavy duty ball bearing type, carefully matched to the fan load, and furnished at the specified voltage, phase and enclosure. Motors and drives shall be mounted on vibration isolators, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators.

C. Precision ground and polished fan shafts shall be mounted in permanently sealed, lubricated pillow block ball bearings. Bearings shall be selected for a minimum (L50) life in excess of 200,000 hours at maximum cataloged operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.

D. Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring.

E. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

F. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.

G. Provide with the following Options and Accessories:
1. Aluminum Birdscreen
2. Gravity backdraft Dampers

3. UL/cUL 705 Electrical
4. Drain connection
5. NEMA 3R and EXP Disconnect Switches

2.5 KITCHEN ROOFTOP CENTRIFUGAL EXHAUST FAN – UPBLAST – BELT DRIVE.

A. Roof exhaust fans shall be upblast centrifugal belt driven type. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure. Windbands shall have a rolled bead for added strength. Windband shall be welded to curbcaps with a leak proof continuous seam.

B. Motors shall be heavy duty ball bearing type, carefully matched to the fan load, and furnished at the specified voltage, phase and enclosure. Motors and drives shall be mounted on vibration isolators, out of the airstream. Fresh air for motor cooling shall be drawn into the motor compartment from an area free of discharge contaminants. Motors shall be readily accessible for maintenance. Drive frame assemblies shall be constructed of heavy gauge steel and mounted on vibration isolators.

C. Precision ground and polished fan shafts shall be mounted in permanently sealed, lubricated pillow block ball bearings. Bearings shall be selected for a minimum (L50) life in excess of 200,000 hours at maximum cataloged operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the fully machined cast iron type, keyed and securely attached to the wheel and motor shafts.

D. Motor pulleys shall be adjustable for final system balancing. A disconnect switch shall be factory installed and wired from the fan motor to a junction box installed within the motor compartment. A conduit chase shall be provided through the curb cap to the motor compartment for ease of electrical wiring.

E. All fans shall bear the AMCA Certified Ratings Seal for sound and air performance.

F. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number for future identification.

G. Provide with the following Options and Accessories:
1. Aluminum Birdscreen
2. Gravity backdraft Dampers
3. UL/cUL 705 Electrical
4. Drain connection
5. Speed Controls
6. NEMA 3R and EXP Disconnect Switches
7. Vented Curb Extensions
8. Heat Baffles
9. UL/cUL 762 Grease
10. Non-Stick Wheel
11. Clean Out Port
12. Grease Trap w/Drain Connection
13. Hinged Curb Cap Kit w/Cable
14. High Temp Grease Bearings

2.6 ROOF MOUNTED AIR INTAKE/RELIEF HOODS

A. Provide hoods, curb mounted, of size noted on drawings and as specified herein. Hood style and manufacturer shall match the centrifugal roof exhausters.

B. Bird Screens: Provide removable bird screens, 1/2" mesh, 16 gauge aluminum or brass wire.

C. Provide backdraft damper in neck of each relief air hood.

2.7 ADAPTOR CURBS

A. Provide manufacturer's standard shop-fabricated units, modified if necessary to comply with project requirements.

B. Unless scheduled otherwise, curbs to be fabricated of 14 gauge metal.

C. Contractor to field measure existing curbs to confirm adaptor curb size as may be required.

PART 3 EXECUTION

3.1 GENERAL

A. Install fans and ventilators in accordance with equipment manufacturer's installation instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes.

B. Supply and install sheaves as necessary for final air balancing.

C. Ensure air distribution equipment is wired properly, with rotation in direction indicated and intended for proper performance.

3.2 ADAPTOR ROOF CURBS:

A. Provide and install adaptor roof curb as required to transition from existing roof curb to new fan requirements.

B. Prior to ordering roof curbs, Contractor to field verify existing curb dimensions and provide new curbs to fit existing.

3.3 START UP

A. Inspect equipment after installation to verify installation is in accordance with specifications and manufacturers installation guidelines. Verify equipment is lubricated, proper belt tension, and that equipment is otherwise ready to operate.

B. Perform air side test and balance as applicable.

3.4 CLEANING UP:

A. Upon completion of Work remove materials, equipment, apparatus, tools, and the like and leave premises clean, neat and orderly.

END OF SECTION 23 34 00

SECTION 23 74 00 – PACKAGED AIR CONDITIONING UNITS

PART 1 GENERAL

1.1 SUMMARY:

A. This section provides requirements for split system ducted air conditioning units.

1.2 QUALITY ASSURANCE:

A. Flame-Smoke Ratings: Except as otherwise indicated, provide air conditioning unit thermal insulation with flame-spread index of 25 or less, fuel-contributed index of 50 or less, and smoke-developed index of 50 or less.

B. AMCA Standards: Comply with Air Movement and Control Association (AMCA) Standards as applicable to testing and rating fans.

C. SMACNA Compliance: Comply with Sheet Metal and Air Conditioning Contractors National Association (SMACNA) ductwork construction standards as applicable to air conditioning units.

D. AGA Certification: Gas fired equipment shall be AGA certified.

E. ARI Certification: Coils shall comply with ARI Standard 410.

F. UL Compliance: Provide electric components for air conditioning units which have been listed and labeled by Underwriters Laboratories or by a testing organization of equal standing.

G. Only Manufacturer's Authorized Commercial and Industrial Equipment Suppliers shall be allowed to supply equipment for this project. Equipment suppliers who's primary business is residential and are not a Manufacturer's Authorized Commercial and Industrial Equipment Supplier shall not be accepted on this project due to lack of a service company capable of proper support on a commercial quality project.

1.3 SUBMITTALS:

A. Submit the following information for each packaged unit:
   1. Manufacturer's product data and cut sheet for each unit.
   2. Submit manufacturer's specifications for air conditioning units showing dimensions, weights, capacities, ratings, certified fan performance with operating point clearly indicated on a fan curve, motor electrical characteristics, gauges, finishes of materials, and installation instructions.

B. In cases of Substitution, equivalent fan shall not (when compared to basis of design fan):
   1. Increase unit scheduled weight.
   2. Decrease unit SEER or EER Value
   3. Increase bHP by more than 5%
   4. Require an adaptor curb when one is currently not required.
   5. Increase the height of an adaptor curb from specified.
   6. Rotate unit to function with adaptor curb.

C. Maintenance Data:
   1. Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists.

2. Include this data in maintenance manuals only.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING:

A. Deliver air conditioning units with factory-installed shipping skids and lifting lugs; pack components in factory-fabricated protective containers.

B. Handle air conditioning units carefully to avoid damage to components, enclosures, and finish. Do not install damaged components; replace and return damaged components to air conditioning unit manufacturer.

PART 2 PRODUCTS

2.1 GENERAL:

A. Extent of air conditioning unit work is indicated by Drawings and schedules and by requirements of this section. Each unit shall include fan system, gas heat exchanger, cooling and dehumidifying coil, evaporator coil drain pan, foil-faced thermal insulation, economizer, and any other equipment specified or scheduled, all manufactured by one manufacturer.

B. The single-packaged units shall be a standard product of a firm regularly engaged in the manufacture of heating/cooling equipment.

C. The equipment shall be shipped completely factory assembled, pre-charged, piped, and wired internally ready for field connections.

D. Provide thermal overload protected motors.

E. Manufacturer shall test operate system at the factory before shipment.

F. Unit shall be U.L. listed.

G. All wiring shall be in compliance with Current NEC Codes.

H. Acceptable manufacturers:
1. Carrier, Trane, or equal

2.2 PACKAGED AIR CONDITIONING UNITS – CARRIER VG Series:

A. Cooling System:
1. The total certified cooling capacity shall not be less than scheduled.
2. Units to have two stage scroll compressors with crankcase heaters.
3. The compressor power input shall not exceed that of the unit specified.
4. The coils shall be non-ferrous construction with aluminum fins mechanically bonded to durable copper tubes.
   a. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1,775 psig.
   b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
5. The compressor shall be resiliently mounted and have built- in, three-mode crankshaft lubrication; crankcase heater; discharge temperature limiter; and current- and temperature- sensing motor overloads.
6. The cooling system shall be protected by high and low pressure switches, filter dryer, oil failure switch, and a five-minute, compressor, timed off cycle controller (anti-

recycle timer), and evaporator coil frostat that shall disable cooling when temperatures on the evaporator coil reach 10 degrees or below. Mechanical cooling will start again when temperatures on the evaporator coil rise to 50 degrees or above.

B. Cabinet:
1. Galvanized steel with a baked-on outdoor enamel paint finish.
2. Cabinet panels where conditioned air is handled shall be fully insulated.
3. Lifting lugs shall be provided for rigging.
4. Unit shall have a raised 1 1/8 inch lip around the supply and return openings.

C. Single-side Service Access:
1. All components, wiring, and inspection areas shall be completely accessible via one side of the unit.

D. Supply Air Blowers:
1. Centrifugal blowers shall be direct drive ECM.
2. The entire assembly shall be resilient rubber mounted.
3. Blower wheel assembly shall be statically and dynamically balanced.
4. Supply blower motors shall be thermally protected and meet the US EPACT 1992 Code.

E. Base unit controls:
1. Unit to be provided with base electromechanical controls.

F. Condenser Fans:
1. Propeller-type condenser fans shall discharge vertically.
2. Fan motor shall be totally enclosed with sleeve bearings, permanently lubricated, thermally protected and equipped with rain shield.
3. Fan shall be protected by a steel guard.

G. Condenser Coil Guard:
1. Factory installed tool-less panel guard shall be manufactured from minimum 20 gauge steel with G90-U corrosion protection.
2. The panel shall be powder coated to match the unit color.
3. Guard open area shall be between fifty percent and sixty percent.

H. Evaporator Coil Drain pan:
1. Drain pan shall be constructed of composite material.

I. Air Filters:
1. Provide two-inch thick, pleated MERV 8, 305%, filters with cardboard holding frames.
2. Air filters shall be of an approved type tested in accordance with test method SFM-31.6 as shown in Article 80, Title 19, California Code of Regulations. Pre-formed filters having combustible framing shall be tested as a complete assembly.
3. Air filters in all occupancies shall be Class 2 or better, as defined in the test method above.
4. Air filters shall be accessible for cleaning or replacement.
5. Provide sufficient filters for a single complete change for each unit.

J. Gas Heat Exchanger:
1. Unless noted otherwise, units shall be complete with gas heating section made up of aluminized steel heat exchanger capable of mixed air temperatures as low as 40 ^{O}F.
2. Where noted on drawings, units shall be complete with gas heating section made up of 304 stainless steel heat exchanger capable of mixed air temperatures as low as 20 ^{O}F.

3. Heat shall be single-stage with intermittent spark electric ignition system and flame sensor.

K. Economizer:
1. Provide dry-bulb 0-100% economizer with barometric relief.
   a. Economizer to be controlled by Controls Contractor and shall have approved fault detection and diagnostic (FDD) approved by CEC.
   b. Economizer to have low leak damper and Belimo Actuator.

L. TXV: Provide factory installed thermal expansion valve (TXV) for each refrigerant circuit.

M. Phase/Voltage Monitor and Protection Device:
1. Provide unit with standard factory installed and tested phase/voltage monitor.
2. Monitor shall have two LED indicator lights. One shall indicate a balanced, three-phase power supply circuit and the other shall indicate that unit operation has been prevented and that the power supply circuit is either not balanced, properly connected or that the line-to-line voltage is not between 180 volts and 633 volts.
3. The monitor shall protect unit from damage if any of the following occur:
   a. If power is lost on one of the three conductors of the three-phase power supply circuit.
   b. If voltage is not sufficiently balanced between the three conductors of the three-phase power supply circuit.
   c. If the three-phase power supply circuit does not have the proper phase sequence.

2.3 PACKAGED AIR CONDITIONING UNITS – CARRIER HC SERIES:

A. Cooling System:
1. The total certified cooling capacity shall not be less than scheduled.
2. The compressor power input shall not exceed that of the unit specified.
3. The coils shall be non-ferrous construction with aluminum fins mechanically bonded to durable copper tubes. Coils shall be leak tested under water with minimum 200 psi air at the factory prior to installation in the units.
4. The compressor shall be resiliently mounted and have built- in, three-mode crankshaft lubrication; crankcase heater; discharge temperature limiter; and current- and temperature- sensing motor overloads.
5. The cooling system shall be protected by high and low pressure switches, filter dryer, oil failure switch, and a five-minute, compressor, timed off cycle controller (anti-recycle timer), and evaporator coil frostat that shall disable cooling when temperatures on the evaporator coil reach 10 degrees or below. Mechanical cooling will start again when temperatures on the evaporator coil rise to 50 degrees or above.

B. Cabinet:
1. Unit cabinet shall be constructed of phosphated, zinc--coated, pre--painted steel capable of with standing 500 hours in salt spray.
2. Normal service shall be through multiple removable cabinet panels.
3. The unit shall be constructed on a rust proof unit base that has an externally trapped, integrated sloped drain.
4. Evaporator fan compartment top surface shall be insulated with a minimum ½ inch thick, 1 ½" density, flexible fiberglass insulation bonded with a phenolic binder, neoprene coated on the air side.
5. Gas heat compartment shall be insulated with aluminum foil-faced fiberglass insulation.

C. Service Access:

1. All components, wiring, and inspection areas shall be completely accessible through removable access panels.
2. Hinged access panels shall be provided at access to filter section, fan section, compressor section, heat section, and controls.

D. Supply Air Blowers:
1. The evaporator fan motor shall be a multi-speed, belt-drive, as shown on equipment drawings.
2. Supply air blower to be controlled via a factory installed variable frequency drive.
3. Fan wheel shall be made from steel, be double-inlet type with forward curved blades with corrosion resistant finish.
4. Fan wheel shall be dynamically balanced.
5. Supply blower motors shall be thermally protected and meet the US EPACT 1992 Code.
6. Supply blower motors to be high efficiency option.

E. Condenser Fans:
1. Condenser fan shall be direct drive propeller type with aluminum blades riveted to corrosion resistant steel spiders, be dynamically balanced, and discharge air vertically.

F. Condenser Coil Guard:
1. Factory installed guard shall be manufactured from minimum 18 gauge expanded steel.
2. The guards shall be powder coated to match the unit color.
3. Guard open area shall be between fifty percent and sixty percent.

G. Base unit controls:
1. Unit to be provided with base electromechanical controls.

H. Air Filters:
1. Provide two-inch thick, pleated MERV 8, 30%, filters with cardboard holding frames.
2. Air filters shall be of an approved type tested in accordance with test method SFM-31.6 as shown in Article 80, Title 19, California Code of Regulations. Pre-formed filters having combustible framing shall be tested as a complete assembly.
3. Air filters in all occupancies shall be Class 2 or better, as defined in the test method above.
4. Air filters shall be accessible for cleaning or replacement.

I. Economizer:
1. Provide dry-bulb 0-100% economizer with barometric relief.
   a. Economizer to be controlled by Controls Contractor and shall have approved fault detection and diagnostic (FDD) approved by CEC.
   b. Economizer to have low leak damper and Belimo Actuator.

J. Gas Heat Exchanger:
1. Induced-draft combustion type with energy saving direct spark ignition system and redundant main gas valve.
2. Induced-draft motors shall provide adequate airflow for combustion.
3. The heat exchangers shall be constructed of aluminized steel for corrosion resistance.
4. Burners shall be of the in-shot type constructed of aluminum coated steel.
5. All gas piping and electric power shall enter the unit cabinet at a single location.
6. Heat exchanger shall have limited 10 year parts warranty.

K. TXV: Provide factory installed thermal expansion valve (TXV) for each refrigerant circuit.

2.4 PACKAGED AIR CONDITIONING UNITS – CARRIER LC SERIES:

A. Cooling System:
1. The total certified cooling capacity shall not be less than scheduled.
2. Units to have two stage scroll compressors with crankcase heaters, and multi speed ECM condenser fan motors.
3. The compressor power input shall not exceed that of the unit specified.
4. The coils shall be non-ferrous construction with aluminum fins mechanically bonded to durable copper tubes.
   a. Evaporator coils shall be leak tested to 150 psig, pressure tested to 450 psig, and qualified to UL 1995 burst test at 1,775 psig.
   b. Condenser coils shall be leak tested to 150 psig, pressure tested to 650 psig, and qualified to UL 1995 burst test at 1980 psig.
5. The compressor shall be resiliently mounted and have built- in, three-mode crankshaft lubrication; crankcase heater; discharge temperature limiter; and current- and temperature- sensing motor overloads.
6. The cooling system shall be protected by high and low pressure switches, filter dryer, oil failure switch, and a five-minute, compressor, timed off cycle controller (anti-recycle timer), and evaporator coil frostat that shall disable cooling when temperatures on the evaporator coil reach 10 degrees or below. Mechanical cooling will start again when temperatures on the evaporator coil rise to 50 degrees or above.

B. Cabinet:
1. Galvanized steel with a baked-on outdoor enamel paint finish.
2. Cabinet panels where conditioned air is handled shall be fully insulated.
3. Lifting lugs shall be provided for rigging.
4. Unit shall have a raised 1 1/8 inch lip around the supply and return openings.

C. Single-side Service Access:
1. All components, wiring, and inspection areas shall be completely accessible via one side of the unit through hinged access panels.
2. Hinged access panels shall provide access to filter section.

D. Supply Air Blowers:
1. Centrifugal blowers shall have belt drive motors unless noted otherwise on the Drawings.
2. The entire assembly shall be resilient rubber mounted.
3. Blower wheel assembly shall be statically and dynamically balanced.
4. Supply blower motors shall be thermally protected and meet the US EPACT 1992 Code.

E. Base unit controls:
1. Unit to be provided with base electromechanical controls.

F. Supply Blower Variable Frequency Drive (VFD):
1. Provide variable air volume supply air temperature control with variable frequency drive without bypass where noted on drawings.
2. Unit shall be configured/field programmed for constant volume air delivery.

G. Condenser Fans:
1. Propeller-type condenser fans shall discharge vertically.
2. Fan motor shall be totally enclosed with sleeve bearings, permanently lubricated, thermally protected and equipped with rain shield.
3. Fan shall be protected by a steel guard.

H. Condenser Coil Guard:

1. Factory installed tool-less panel guard shall be manufactured from minimum 20 gauge steel with G90-U corrosion protection.
2. The panel shall be powder coated to match the unit color.
3. Guard open area shall be between fifty percent and sixty percent.

I. Evaporator Coil Drain pan:
1. Drain pan shall be constructed of stainless steel and shall be double-sloped.
2. Unit shall allow for drain on either side and shall have reversible drain pan provided.

J. Air Filters:
1. Provide two-inch thick, pleated MERV 8, 305%, filters with cardboard holding frames.
2. Air filters shall be of an approved type tested in accordance with test method SFM-31.6 as shown in Article 80, Title 19, California Code of Regulations. Pre-formed filters having combustible framing shall be tested as a complete assembly.
3. Air filters in all occupancies shall be Class 2 or better, as defined in the test method above.
4. Air filters shall be accessible for cleaning or replacement.
5. Provide sufficient filters for a single complete change for each unit.

K. Gas Heat Exchanger:
1. Unless noted otherwise, units shall be complete with gas heating section made up of aluminized steel heat exchanger capable of mixed air temperatures as low as 40 ^{O}F.
2. Where noted on drawings, units shall be complete with gas heating section made up of 304 stainless steel heat exchanger capable of mixed air temperatures as low as 20 ^{O}F.
3. Heat shall be single-stage with intermittent spark electric ignition system and flame sensor.

L. Economizer:
1. Provide dry-bulb 0-100% economizer with barometric relief.
   a. Economizer to be controlled by Controls Contractor and shall have approved fault detection and diagnostic (FDD) approved by CEC.
   b. Economizer to have low leak damper and Belimo Actuator.

M. Field installed power exhaust capable of approximately 35% of unit nominal airflow.

N. TXV: Provide factory installed thermal expansion valve (TXV) for each refrigerant circuit.

O. Phase/Voltage Monitor and Protection Device:
1. Provide unit with standard factory installed and tested phase/voltage monitor.
2. Monitor shall have two LED indicator lights. One shall indicate a balanced, three-phase power supply circuit and the other shall indicate that unit operation has been prevented and that the power supply circuit is either not balanced, properly connected or that the line-to-line voltage is not between 180 volts and 633 volts.
3. The monitor shall protect unit from damage if any of the following occur:
   a. If power is lost on one of the three conductors of the three-phase power supply circuit.
   b. If voltage is not sufficiently balanced between the three conductors of the three-phase power supply circuit.
   c. If the three-phase power supply circuit does not have the proper phase sequence.

2.5 EQUIPMENT MOUNTING:

A. Where noted, install new unit on existing curb.

1. Unit shall mate to the bottom perimeter of the equipment. When flashed into the roof, it shall make a unit mounting curb and provide weatherproof duct connection and entry into the conditioned area. Flashing shall be the responsibility of Roofing Contractor.

B. Where noted, provide adaptor roof curb as scheduled and as follows:
1. Furnish and install an adaptor curb as scheduled. Contractor to confirm adaptor curb dimensions prior to ordering and confirm compatibility.
2. Total unit weight and adaptor curb weight shall not exceed scheduled weight.
3. Maximum curb height to be 24".
4. Adaptor curbs shall not be configured such that the unit is rotated on the existing curb.
5. Contractor to field verify existing curb dimensions and, duct configurations prior to submitting on adaptor curbs.

2.6 CONDENSATE DRAINS:

A. Provide type-L, hard-drawn copper tubing with wrought copper solder joint fittings; no iron-to-copper connections; copper fittings with IPS outlets and threaded brass nipples at connections to equipment; di-electric couplings or unions at connections to dissimilar materials

PART 3 EXECUTION

3.1 GENERAL:

A. Examine areas and conditions under which air conditioning units are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Warranty:
1. Unit manufacturer shall provide 2 year parts and labor warranty on entire unit including any accessories provided for field installation on the unit.
2. This warranty period shall begin at upon signoff of substantial completion of the project.
3. Unit manufacturer shall provide 5 year compressor parts warranty and limited 10 year heat exchanger parts warranty.

C. Maintenance:
1. Equipment supplier shall perform the scheduled maintenance as detailed in the published maintenance manuals for the packaged air conditioning units for a period of 1 year upon startup of the units.
2. All Preventative maintenance procedures shall be adhered to, including required periodic inspections as prescribed in the manufacturer's published operations and maintenance literature.

3.2 INSTALLATION OF AIR CONDITIONING UNITS:

A. Install air conditioning units where indicated in accordance with equipment manufacturer's written instructions and with recognized industry practices to ensure that units comply with requirements and serve intended purposes.

B. Units shall be configured for constant volume airflow. VFD shall be programmed to deliver constant volume (not single zone VAV).

3.3 TESTING AND STARTUP:

A. Equipment manufacturer's commercial and industrial local service company shall conduct check, test, and start-up of units and shall complete one startup form for each unit listing the refrigerant suction line pressure and temperature, liquid line pressure and temperature, charge in pounds of refrigerant, charge in pounds of refrigerant as required by the unit nameplate, supply blower rpm and supply blower amps drawn. Startup forms shall be submitted to the Architect and Mechanical Engineer for approval upon completion. If necessary, units shall be field charged with refrigerant for proper operation. Startup by installing contractor or others shall not be acceptable.

END OF SECTION 23 74 00

SECTION 26 28 16

OVERCURRENT PROTECTIVE DEVICES

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
   1. Fuses.
   2. Molded case circuit breakers.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated or specified:
   1. Federal Specification (FS):
      FS W-C-375; Circuit Breakers, Molded Case, Branch Circuit and Service.
      FS W-F-870; Fuseholders (for Plug and Enclosed Cartridge Fuses.
   2. Underwriters Laboratories, Inc. (UL):
      UL 248(1-16); Low-Voltage Fuses.
      UL 489; Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures.
      UL 512; Fuseholders.
   3. National Electrical Manufacturer Association (NEMA):
      NEMA AB 1; Molded Case Circuit Breakers.

1.3 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
   1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
   2. Describe product operation, equipment and dimensions and indicate features of each component.
   3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
   4. Provide factory certification of trip characteristics for each type and rating of circuit breaker.
   5. Provide current let-through and melting time information for each type and rating of fuses.
   6. Submit Manufacturer's installation instructions.
   7. Complete bill of material listing all components.
   8. Warranty.

1.4 OPERATION AND MAINTENANCE MANUAL

A. Supply operation and maintenance manuals in accordance with the requirements of Section 260010: Basic Electrical Requirements, to include the following:

1. A detailed explanation of the operation of the system.
2. Instructions for routine maintenance.
3. Parts list and part numbers.
4. Telephone numbers for authorized parts and service distributors.
5. Final testing reports.

1.5 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Delivery: Overcurrent Protective Device components shall not be delivered to the Project site until protected storage space is available. Storage outdoors covered by rainproof material is not acceptable. Equipment damaged during shipment shall be replaced and returned to Manufacturer at no cost to Owner.

B. Storage: Store in a clean, dry, ventilated space free from temperature extremes. Maintain factory wrapping or provide a heavy canvas/plastic cover to protect units from dirt, water, construction debris and traffic. Provide heat where required to prevent condensation.

C. Handling: Handle in accordance with Manufacturer's written instructions. Be careful to prevent internal component damage, breakage, denting and scoring. Damaged units shall not be installed. Replace damaged units and return equipment to Manufacturer.

1.7 WARRANTY

A. Units and components offered under this Section shall be covered by a 1 year parts and labor warranty for malfunctions resulting from defects in materials and workmanship. Warranty shall begin upon acceptance by the Owner.

1.8 EXTRA MATERIAL

A. Three (3) spare fuses of each size and type or a minimum of 10 percent of the number installed, whichever is greater, shall be supplied to the Owner in the specified spare fuse cabinet(s).

B. Provide and locate a spare fuse cabinet(s) in the main electrical room. Cabinet shall have lockable piano hinged door, keyed to match panelboards, with fuse schedules mounted in a frame on interior. Size and quantity of cabinets shall be as required to accommodate spare fuses required.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
   1. Fuses:
      a. Bussmann Division, Cooper Industries.

b. Gould Shawmut Co.

2. Circuit breakers:
   a. Square D.
   b. Eaton Electrical/Cutler-Hammer.
   c. General Electric.
   d. Siemens/I-T-E.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 FUSES

A. General: All power fuses shall be time-delay, high interrupting (300 K AIC), current limiting type, unless otherwise noted on the Drawings. All fuses shall be the product of a single Manufacturer and shall be selectively coordinated when applied in 2:1 ratios. Types of fuses shall be as follows:
   1. 0 - 600 amperes: UL Class J, dual element, time delay type fuse with separate overload and short-circuit elements. The fuse shall hold 500% of rated current for a minimum of 10 seconds.

B. Control and instrument fuses shall be suitable for installing in blocks or fuseholders. Exact type and rating shall be as recommended by the Manufacturer of the equipment being protected.

2.3 MOLDED CASE CIRCUIT BREAKERS

A. Branch and feeder circuit breakers shall be molded case, bolt on and trip indicating. New breakers replacing existing shall be by the same manufacturer and same AIC rating as existing.

B. Where stationary molded case circuit breakers are indicated on the Drawings to be current limiting type, they shall be current limiting as defined by UL 489 and shall not employ any fusible elements.

C. Circuit breakers shall have interrupting capacity not less than that indicated on the Drawings or if not indicated, not less than 14,000 RMS symmetrical amps for 480 volt systems and 10,000 RMS symmetrical amps for 208 volt systems.

D. Covers shall be sealed on non-interchangeable breakers and trip unit covers shall be sealed on interchangeable trip breakers to prevent tampering. Circuit breaker ratings shall be clearly visible after installation or engraved nameplates shall be provided stating the rating. All ferrous parts shall be plated to minimize corrosion.

E. Circuit breakers shall be toggle, quick-make and quick-break operating mechanisms with trip-free feature to prevent contacts being held closed against overcurrent conditions in the circuit. Trip position of the breakers shall be clearly indicated by operating handles moving to a center position.

F. Multipole breakers shall have a single handle to open and close all contacts simultaneously in both manual operation and under automatic tripping. Interpole barriers shall be provided inside the breaker to prevent any phase-to-phase flashover. Each pole of the breaker shall have means for Arc extinguishing.

G. All terminals shall be rated for aluminum or copper wire.

H. Circuit breakers with trip ratings 100 amp and smaller shall be ambient temperature compensated, thermal magnetic type unless otherwise noted. Breakers shall be of full size, 1" per pole type. Panels with more than one branch breaker larger than 100 amps shall be installed in distribution type panels.

PART 3 EXECUTION

3.1 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of overcurrent protective device installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 INSTALLATION

A. Install overcurrent protective devices in accordance with Manufacturer's written instructions, as indicated on the Drawings and as specified herein.

B. Tighten electrical connectors and terminals; including screws and bolts, in accordance with equipment Manufacturers published torque-tightening values for equipment connectors. Where Manufacturers torque requirements are not indicated tighten connectors and terminals to comply with tightening torque specified in UL Standard 486A.

C. Install overcurrent protective devices and accessories in accordance with Manufacturer's written instructions and with recognized industry practices to ensure that protective devices comply with requirements. All devices shall be installed in accordance with applicable NEC and NEMA standards for installation.

D. Circuit breakers serving "Fire Alarm Control Panel(s)" shall be red in color.

3.3 FIELD QUALITY CONTROL

A. Prefunctional testing:
   1. Provide Testing Agency with Contract Documents and Manufacturer instructions for installation and testing.
   2. Visual and mechanical inspection:
      a. Inspect for physical damage, defects alignment and fit.
      b. Perform mechanical operational tests in accordance with Manufacturer's instructions.
      c. Compare nameplate information and connections to Contract Documents.
      d. Check tightness of all control and power connections.
      e. Check that all covers, barriers and doors are secure.

B. Contractor shall replace at no costs to the Owner all devices which are found defective or do not operate within factory specified tolerances.

3.4 CLEANING

A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean overcurrent protective devices per Manufacturer's approved methods and materials. Remove paint splatters and other spots, dirt and debris.

END OF SECTION 26 28 16

SECTION 26 28 19

DISCONNECT SWITCHES

PART 1 GENERAL

1.1 SUMMARY

A. Work included: Labor, materials and equipment necessary to complete the installation required for the item specified under this Division, including but not limited to:
   1. Disconnect Switches.

B. Related Work: Consult all other Sections, determine the extent and character of related Work and properly coordinate Work specified herein with that specified elsewhere to produce a complete installation.

1.2 REFERENCES

A. Comply with the latest edition of the following applicable Specifications and standards except as otherwise indicated on specified:
   1. Federal Specifications (FS):
      FS W-F-870; Fuseholders (for plug and enclosed cartridge fuses).
      FS W-S-865; Switch, Box (enclosed), Surface-Mounted.
   2. National Electrical Manufacturer Association (NEMA):
      NEMA KS 1; Enclosed Switches.
   3. Underwriters Laboratories, Inc. (UL):
      UL 512; Fuseholders.

1.3 SUBMITTALS

A. Submit in accordance with the requirements of Section 260010: Basic Electrical Requirements, the following items:
   1. Data/catalog cuts for each product and component specified herein, listing all physical and electrical characteristics and ratings indicating compliance with all listed standards.
   2. As a minimum the following characteristics shall be indicated:
      a. NEMA types.
      b. Current rating.
      c. Number of poles.
      d. Fuse provisions.
      e. Enclosure dimensions.
      f. Voltage.
      g. Horsepower rating (if applicable).
      h. Short circuit rating.
   3. Clearly mark on each data sheet the specific item(s) being submitted and the proposed application.
   4. Submit Manufacturer's installation instructions.

1.4 QUALITY ASSURANCE

A. All materials, equipment and parts comprising the units specified herein shall be new, unused and currently under production.

B. Only products and applications listed in this Section may be used on the Project unless otherwise submitted.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Products furnished by the following Manufacturers shall be acceptable if in compliance with all features specified herein and indicated on the Drawings.
   1. Square D.
   2. Eaton Electrical/Cutler-Hammer.
   3. General Electric.
   4. Siemens/I-T-E.

B. Substitutions: Under provisions of Section 260010: Basic Electrical Requirements.

2.2 DISCONNECT SWITCHES

A. Description: Provide NEMA heavy-duty type switches with dead front construction and padlock provisions for up to three locks in the “OFF” position.

B. Switch interior: Provide switch with switchblades that are fully visible in the “OFF” position when the door is open. Provide UL listed lugs for copper conductors, lugs to be front removable. Provide plated current carrying part.

C. Switch mechanism: Provide switches with a quick-make, quick-break, position indicating, operating handle and mechanism and a dual cover interlock to prevent unauthorized opening of the switch door in the “ON” position or closing of the switch mechanism with the door open. Furnish an electrical interlock to de-energize control wiring when the disconnect switch is opened.

D. Enclosures: Provide switches with hinged cover in NEMA 1 general purpose, sheet steel enclosure for dry locations and NEMA 3R weatherproof galvanized enclosures for exterior, damp or wet locations, unless otherwise noted on the Drawings. Provide an enclosure treated with a rust-inhibiting phosphate primer and finished in gray baked enamel.

E. Ratings: Provide switches that are horsepower rated for 240 VAC or 600 VAC as required for the circuit involved and that meet “I-SQUARED-T” requirements. Fusible switches to have provisions for the types of fuses specified in Section 262816: Overcurrent Protective Devices. UL listed short circuit rating, when equipped with fuses to be 200,000 amperes RMS symmetrical. Furnish with provisions for RK-1 fuses for switches up to 600 amps. 800 amp switches and larger to have provisions for Class L fuses.

PART 3 EXECUTION

3.1 EXAMINATION

A. Contractor shall thoroughly examine Project site conditions for acceptance of disconnects switch installation to verify conformance with Manufacturer and Specification tolerances. Do not commence with installation until all conditions are made satisfactory.

3.2 PREPARATION

A. Coordinate locations of switches and equipment in the field to provide code required clearances in front of switches and to ensure that switches are insight of the controller as described in NEC Article 430.

3.3 INSTALLATION

A. Install disconnect switches where indicated on the Drawings.

B. Install fuses in fusible disconnect switches.

C. Include construction channel and mounting hardware as required to support disconnect switch.

3.4 IDENTIFICATION

A. Provide engraved, machine screw retained type 'NP' nameplate on each disconnect switch. See Section 260553: Electrical Identification.

3.5 CLEANING

A. Upon completion of Project prior to final acceptance the Contractor shall thoroughly clean both the interior and exterior of enclosure of all construction debris, scrap wire, paint splatters, dirt, etc.

END OF SECTION 26 28 19

GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

MARENGO RANCH ELEMENTARY SCHOOL

CONSTRUCTION DOCUMENTS

DATE: SEPTEMBER 07, 2018

BOARD OF TRUSTEES

JOHN GORDON	GRACE MALSON	MATTHEW FELIX	WESLEY CAGLE
PRESIDENT	VICE PRESIDENT	CLERK	REPRESENTATIVE

DESIGN TEAM

OWNER
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT
CONTACT: LOIS YOUNT
1018 C STREET
GALT, CA 95632
P: 209-744-4545
F: 209-744-4554

ARCHITECT
PBK ARCHITECTS
CONTACT: GARY GERY
2520 VENTURE OAKS WAY, SUITE 440
SACRAMENTO, CA 95833
P: 916-682-9494
F: 916-682-0990

STRUCTURAL
KPFF CONSULTING ENGINEERS
CONTACT: TIM MATHEWSON
2250 DOUGLAS BLVD, SUITE 200
ROSEVILLE, CA 95661
P: 916-482-7688

MECHANICAL
WESTON AND ASSOCIATES
CONTACT: ADAM DAVIS
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
P: 916-482-0820

ELECTRICAL
THE ENGINEERING ENTERPRISE
CONTACT: DANNY McKEVITT
1125 HIGH STREET
AUBURN, CA 95603
P: 530-886-8556

PBK

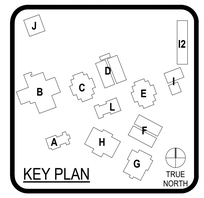
ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0800 P WESTON-ME.COM

ELECTRICAL THE ENGINEERING ENTERPRISE
1125 HIGH STREET
AUBURN, CA 95603
530-886-8556 P ENGINT.COM

STRUCTURAL KPFF CONSULTING ENGINEERS
2250 DOUGLAS BLVD, SUITE 200
ROSEVILLE, CA 95661
916-772-7688 P KPFF.COM

MARENGO RANCH ELEMENTARY SCHOOL
ROOF AND HVAC REPLACEMENT
1000 ELK HILS DRIVE, GALT, CA 95632
ADDEDUM #02



LICENSED PROFESSIONAL

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233
DATE: 08/03/2018
DRAWN BY: JE
CHECKED BY: KJ

REVISIONS

No.	Description	Date

ADDEDUM #02

COVER SHEET

G0.00

DRAWING CONVENTIONS

PROPERTY LINE

AREA DRAIN

EXISTING ELEVATION

FINISH GRADE ELEVATION

NORTH ARROW

COLUMN LINE

FLOOR LINE

MATCH LINE

SECTION CALLOUT SYMBOL

EXTERIOR ELEVATION SYMBOL

INTERIOR ELEVATION SYMBOL

DOOR DESIGNATION

WINDOW DESIGNATION

PARTITION TYPE

EXISTING PARTITION

NEW PARTITION

REVISION NUMBER

DETAIL ENLARGED

PLAN OR DETAIL ENLARGED

DETAIL SECTIONS
AND VERTICAL SECTIONS

DIMENSIONS

NOTE: all dimensions to face of wall unless otherwise noted

SPOT ELEVATION

SPOT COORDINATE

MATCH LINE
SEE XX/X-XXX
SHEET NUMBER ON WHICH CONTINUATION IS FOUND

PROPERTY LINE

FENCING (WITH POSTS)

BREAK LINE

KEY NOTE

Room name
101
150 SF
ROOM NAME AND NUMBER

FIRE HOSE CABINET
(RECESSED AND SURFACE MOUNTED)

FIRE EXTINGUISHER CABINET
(RECESSED AND SURFACE MOUNTED)

EQUIPMENT DESIGNATION

TOILET ACCESSORY SYMBOL

SHOWER HEAD

FLOOR SINK

FLOOR DRAIN

OVERFLOW DRAIN AND ROOF DRAIN

ROOF TOP UNIT
REFER TO MECHANICAL FOR TYPE

GRAPHIC SCALE

GENERAL NOTES

1. CONSTRUCTION DOCUMENTS DESCRIBE THE PRODUCTS, SYSTEMS, QUANTITIES, CONFIGURATION AND PERFORMANCE SPECIFICATIONS THAT DELIVER THE OVERALL DESIGN INTENT OF THE PROJECT.
2. THE CONSTRUCTION DOCUMENT DRAWINGS AND SPECIFICATIONS ARE COMPLIMENTARY, AND WHAT IS REQUIRED BY ONE SHALL BE AS BINDING AS IF REQUIRED BY BOTH.
3. PERFORMANCE BY THE CONSTRUCTION TEAM SHALL BE CONSISTENT WITH THE CONSTRUCTION DRAWINGS AND SPECIFICATIONS AS NECESSARY TO DELIVER THE INDICATED RESULTS OF THE DESIGN INTENT.
4. ALL MATERIALS AND WORKMANSHIP SHALL COMPLY WITH ALL GOVERNING CODES, ORDINANCES, REGULATIONS AND LAWS.
5. THE DESIGN ADEQUACY AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS AND SCAFFOLDING IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
6. WHERE ANY CONFLICT OCCURS BETWEEN THE REQUIREMENTS OF LAWS, CODES, ORDINANCES, RULES AND REGULATIONS, THE MOST STRINGENT SHALL GOVERN.
7. ENACT ALL MEASURES TO PROTECT AND SAFEGUARD ALL EXISTING ELEMENTS TO REMAIN FROM BEING DAMAGED. REPLACE OR REPAIR EXISTING ELEMENTS DAMAGED BY THE EXECUTION OF THIS CONTRACT TO EQUAL OR BETTER CONDITION.
8. CUTTING, BORING, SAWCUTTING OR DRILLING THROUGH THE EXISTING OR NEW STRUCTURAL ELEMENTS SHALL NOT BE STARTED UNTIL THE DETAILS HAVE BEEN REVIEWED AND APPROVED BY THE ARCHITECT, AND STRUCTURAL ENGINEER OF RECORD.
9. VERIFY DIMENSIONS AND EXISTING CONDITIONS BEFORE COMMENCING WORK. REPORT DISCREPANCIES TO THE ARCHITECT PRIOR TO PROCEEDING WITH AFFECTED WORK.
10. REFLECTED CEILING PLAN DIMENSIONS ARE REFERENCED FROM FINISHED SURFACES UNLESS NOTED OTHERWISE. CEILING HEIGHTS ARE DIMENSIONED FROM FLOOR TO FINISHED CEILING HEIGHT.
11. DIMENSIONS NOTED AS "FIELD VERIFY" SHALL BE CHECKED AT THE SITE BY THE CONTRACTOR AND REVIEWED WITH THE ARCHITECT BEFORE INCORPORATING INTO THE WORK.
12. DO NOT SCALE DRAWING. WRITTEN DIMENSIONS TAKE PRECEDENCE. IF CLARIFICATION IS REQUIRED IN ORDER TO DETERMINE THE INTENT OF THE CONTRACT DOCUMENTS, CONTACT THE ARCHITECT.
13. NOTES OR DIMENSIONS LABELED "TYPICAL" SHALL APPLY TO SITUATIONS THAT ARE THE SAME OR SIMILAR.
14. ALL DIMENSIONS ARE TO FACE OF STUD, UNLESS NOTED OTHERWISE.
15. ALL SPACES WITH FLOOR DRAINS TO HAVE FINISHED FLOORS SLOPED TO DRAIN NOT TO EXCEED ONE IN FIFTY.
16. ALL FLOORS FINISH CHANGES SHALL OCCUR AT THE CENTERLINE OF DOORS UNLESS NOTED OTHERWISE. ALL FLOOR FINISH CHANGES SHALL HAVE THRESHOLDS OR REDUCER STRIPS.
17. COORDINATE HOUSEKEEPING PAD DIMENSIONS AND LOCATIONS WITH EQUIPMENT TO BE INSTALLED.
18. ALL DOORS IN INTERIOR GYP. BD STUD WALLS SHALL BE SET 4" OFF THE PERP. ADJ. WALL ON THE HINGE SIDE OF THE DOOR UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL CONTACT THE ARCHITECT IF ANY CONFLICTS OCCUR.
19. ALUM. THRESHOLDS TO BE SET IN FULL BED OF SEALANT AT ALL EXT. DOORS.
20. COORDINATE ROOF DRAIN LEADER LOCATIONS WITH FLOOR PLAN PRIOR TO SLAB CONSTRUCTION.
21. PROVIDE VINYL REDUCER AT ALL DISSIMILAR FLOOR MATERIALS UNLESS OTHERWISE NOTED.
22. UNLESS OTHERWISE NOTED, ALL ELECTRICAL AND MECHANICAL OPERABLE DEVICES SHALL BE MOUNTED WITH THE HIGHEST OPERABLE CONTROL AT MAX. OF 42" AFF.
23. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE DSA APPROVED DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS, A CONSTRUCTION CHANGE DOCUMENT, OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED REPAIR WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE REPAIR WORK, PER CAC, 2013, 4-317(e)

SHEET INDEX

ABBREVIATIONS

A.D.	AREA DRAIN
A.D.A.	AMERICANS WITH DISABILITIES ACT
A.F.F.	ABOVE FINISH FLOOR
A.F.G.	ABOVE FINISH GRADE
A.H.J.	ATHORITY HAVING JURISDICTION
A/C	AIR CONDITIONING
ACP.	ACOUSTICAL PANEL
ACT.	ACOUSTICAL TILE
ADJ.	ABADJUSTABLE
ALT.	ALTERNATE
ALUM.	ALUMINUM
ASPH.	ASPHALT
∠	ANGLE
B.U.R.	BUILT-UP ROOF
BD.	BOARD
BLDG.	BUILDING
BLK.	BLOCK
BM.	BEAM
C	CHANNEL
C.J.	CONTROL JOINT
C.M.U.	CONCRETE MASONRY UNIT
C.W.	COLD WATER
CAB, CABT	CABINET
CFMF	COLD FORMED METAL FRAMING
CL	CENTERLINE
CLG.	CEILING
CLR	CLEAR
COL.	COLUMN
COMP.	COMPRESSIBLE
CONC.	CONCRETE
COND.	CONDITION
CORR.	CORRIDOR
CPT.	CARPET (ED)
CT.	CERAMIC TILE
CTG	CLEAR TEMPERED GLAZING
CTSK.	COUNTER SINK
D	DRYER
D.F.	DRINKING FOUNTAIN
D.P.	DAMPPROOFING
D.S.	DOWN SPOUT
DIA.	DIAMETER
DIM.	DIMENSION
DTL.	DETAIL
DWG.	DRAWING
E.J.	EXPANSION JOINT
E.Q.	EQUAL
EA.	EACH
EDF	ELECTRIC DRINKING FOUNTAIN
EL.	ELEVATION (HEIGHT)
ELECT.	ELECTRICAL
ELEV	ELEVATION (DRAWING)
EQUIP	EQUIPMENT
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
F.E.	FIRE EXTINGUISHER
F.E.C.	FIRE EXTINGUISHER CABINET
F.H.C.	FIRE HOSE CABINET
FB.	FACE BRICK
FD.	FLOOR DRAIN
FIN.	FINISH (ED)
FIXT.	FIXTURE
FLR.	FLOOR (ING)
FLSHG.	FLASHING
FLUOR	FLUORESCENT
G.B.	GRAB BAR
G.I.	GALVANIZED IRON
GA.	GAUGE
GALV.	GALVANIZED
GCMU	GLAZED CONCRETE MASONRY UNIT
GEN.	GENERAL
GEN.	GENERAL
GL.	GLASS / GLAZING
GL.	GLASS
GR.	GRADE
GTP.	GLAZED TILE PAVER
GYP.	GYPSUM DRYWALL
H.W.	HOT WATER
HM	HOLLOW METAL FRAME
HORIZ.	HORIZONTAL
HT.	HEIGHT
I.D.	INSIDE DIAMETER
I.P.S.	IRON PIPE SIZE
INSUL	INSULATE (ED), (ION)
INT.	INTERIOR
ISA	INTERNATIONL SYMBOL OF ACCESSIBILITY
JT.	JOINT
L.P.	LIGHT POLE
LAM.	LAMINATE (D)
LAV.	LAVATORY
LT.	LIGHT
LT. WT.	LIGHTWEIGHT
M.O.	MASONRY OPENING
MAS.	MASONRY
MATL	MATERIAL (S)
MAX.	MAXIMUM
MB.	MARKER BOARD
MECH.	MECHANICAL
MEM	MEMBRANE
MEM. WP.	MEMBRANE WATERPROOFING
MEP	MECHANICAL, ELECTRICAL AND PLUMBING
MEZZ.	MEZZANINE
MFR.	MANUFACTURE (R)
MH.	MANHOLE
MIN.	MINIMUM
MISC.	MISCELLANEOUS
MOD	MODULAR
MTL	METAL
MTP.	METAL TOILET PARTITION
N.D.	NAPKIN DISPOSAL
N.I.C.	NOT IN CONTRACT
N.R.	NOT RATED
N.T.S.	NOT TO SCALE
N.V.	NAPKIN VENDOR
NO.	NUMBER
O.C.	ON CENTER (S)
O.C.E.W.	ON CENTER EACH WAY
O.D.	OUTSIDE DIAMETER
O.F.C.I.	OWNER FURNISHED, CONTRACTOR INSTALLED
O.H.	OPPOSITE HAND
OPNG.	OPENING
OPP.	OPPOSITE
P. LAM.	PLASTIC LAMINATE
P.C.	PRECAST
P.H.	PAPER HOLDER
P.L.	PROPERTY LINE
P.P.	POWER POLE
P.W.B.	PREFINISHED WALL BOARD
PL.	PLATE
PLUMB.	PLUMBING
PLYWD.	PLYWOOD
POL.	POLISHED
PR.	PAIR
PREFIN.	PRE-FINISHED
PT.	POINT
PTD.	PAINTED
Q.T.	QUARRY TILE
R / RAD	RADIUS
RD.	ROOF DRAIN
RE. , REF.	REFER TO / REFERENCE / SEE
RECP.	RECEPTACLE
REINF.	REINFORCE (D), (ING)
REQ'D.	REQUIRED
RES.	RESILIENT
REV.	REVISION (S), REVISED
RF	RECREATIONAL RESILIENT FLOORING
RPG.	RELOCATABLE PAINTED GYPSUM BOARD
RSS.	ROD STOCK AND SEALANT
S.C.	SEALED CONCRETE
S.D.	SOAP DISPENSER
SCHED	SCHEDULE
SCPL	SOLID CORE PLASTIC LAMINATE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SPC	SPECIAL COATING SYSTEM
SPEC	SPECIFICATION (S)
SQ.	SQUARE
SS.	SOUND STRIP
SS. STL.	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STRUC	STRUCTURAL
SUSP	SUSPENDED
SVDF	SHEET VINYL DANCE FLOORING
T.B.	TACK BOARD
T.D.R.	TOWEL DISPENSER AND RECEPTACL
T.O.	TOP OF
T.O.B.	TOP OF (WOOD) BLOCKING
T.O.M.	TOP OF MASONRY
T.O.S.	TOP OF STEEL
T.T.D.	TOILET TISSUE DISPENSER
TCNA	TILE COUNCIL OF NORTH AMERICA
TEL	TELEPHONE
TERR	TERRAZZO
THK	THICK (NESS)
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
UR.	URINAL
V	VENT
V.C.T.	VINYL COMPOSITION TILE
V.I.F.	VERIFY IN FIELD
VENT.	VENTILATING, VENTILATED
VER.	VERIFY
VERT.	VERTICAL
VGB	(PREFINISHED) VINYL CLAD GYPSUM BOARD
VWC	VINYL WALL COVERING
W	WASHING MACHINE
W.P.	WATER PROOFING
W.S.	WEATHERSTRIP
W.W.	WATER WELL
W.W.F	WELDED WIRE FABRIC
W/	WITH
WC	WATER CLOSET
WD	WOOD
WDW	WINDOW
WT	WEIGHT

CODES AND STANDARDS

PARTIAL LIST OF APPLICABLE CODES

2016 CALIFORNIA ADMINISTRATIVE CODE (CAC) ..... (PART 1, TITLE 24, CCR)
2016 CALIFORNIA BUILDING CODE (CBC) ..... (PART 2, TITLE 24, CCR)
(2015 INTERNATIONAL BUILDING CODE VOL. 1-2 AND 2016 CALIFORNIA AMENDMENTS)
2016 CALIFORNIA ELECTRICAL CODE (CEC) ..... (PART 3, TITLE 24, CCR)
(2014 NATIONAL ELECTRICAL CODE AND 2016 CALIFORNIA AMENDMENTS)
2016 CALIFORNIA MECHANICAL CODE (CMC) ..... (PART 4, TITLE 24, CCR)
(2015 UNIFORM MECHANICAL CODE AND 2016 CALIFORNIA AMENDMENTS)
2016 CALIFORNIA PLUMBING CODE (CPC) ..... (PART 5, TITLE 24, CCR)
(2015 UNIFROM PLUMBING CODE AND 2016 CALIFORNIA AMENDMENTS)
2016 CALIFORNIA ENERGY CODE (CEC) ..... (PART 6, TITLE 24, CCR)
2016 CALIFORNIA FIRE CODE (CFC) ..... (PART 7, TITLE 24, CCR)
(2015 INTERNATIONAL FIRE CODE AND 2016 CALIFORNIA AMENDMENTS)
2016 CALIFORNIA GREEN BUILDING STANDARDS CODE ..... (PART 11, TITLE 24, CCR)
2016 CALIFORNIA REFERENCED STANDARDS CODE ..... (PART 12, TITLE 24, CCR)
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARCHALL REGULATIONS
2013 ASME A17.1 SAFETY CODE FOR ELEVATOR AND ESCALATORS

PARTIAL LIST OF APPLICABLE STANDARDS

NFPA 13 AUTOMATIC FIRE SPRINKLER SYSTEMS ..... (2016 EDITION)
NFPA 14 STANDPIPE AND HOSE SYSTEMS ..... (2013 EDITION)
NFPA 17 DRY CHEMICAL EXTINGUISHING SYSTEMS ..... (2013 EDITION)
NFPA 17a WET CHEMICAL EXTINGUISHING SYSTEMS ..... (2013 EDITION)
NFPA 20 STATIONARY PUMPS FOR FIRE PROTECTION ..... (2016 EDITION)
NFPA 22 WATER TANKS FOR PRIVATE FIRE PROTECTION ..... (2013 EDITION)
NFPA 24 PRIVATE FIRE MAINS AND THEIR APPURTENANCES ..... (2016 EDITION)
NFPA 25 STANDARD FOR INSPECTION, TESTING AND MAINTENANCE OF WATER-BASED FIRE PROTECTION SYSTEMS ..... (2013 EDITION)
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE ..... (2016 EDITION)
NFPA 80 FIRE DOORS AND OTHER OPENING PROTECTIVES ..... (2016 EDITION)
NFPA 92 STANDARD FOR SMOKE CONTROL SYSTEMS ..... (2015 EDITION)
NFPA 253 CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS ..... (2015 EDITION)
NFPA 2001 CLEAN AGENT FIRE EXTINGUISHING SYSTEMS ..... (2015 EDITION)
ICC 300 ICC STANDARDS ON BLEACHERS, FOLDING AND TELESCOPING SEATING AND GRAND STANDS ..... (2012 EDITION)
UL 300 FIRE TESTING OF FIRE EXTINGUISHING SYSTEM FOR PROTECTION OF RESTAURANT COOKING AREAS ..... (2005 EDITION)
UL 464 AUDIBLE SIGNAL APPLIANCES ..... (2003 EDITION)
UL 521 HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS ..... (1999 EDITION)

- REFERENCE CODE SECTION FOR NFPA STANDARDS - 2016 CBC (SFM) CHAPTER 35.
SEE CHAPTER 35 FOR STATE OF CALIFORNIA AMENDMENTS TO NFPA STANDARDS.

STATEMENT OF GENERAL CONFORMANCE

FOR ARCHITECTS/ENGINEERS WHO UTILIZE PLANS, INCLUDING BUT NOT LIMITED TO SHOP DRAWINGS, PREPARED BY OTHER LICENSED DESIGN PROFESSIONALS AND/OR CONSULTANTS
(Application No. 02-116659 File No. 34-25)

☒ The drawings or sheets listed on the cover or index sheet (see asterisk *)
☐ This drawing, page of specifications/calculations

have been prepared by other design professionals or consultants who are licensed and/or authorized to prepare such drawings in this state. It has been examined by me for:

1) design intent and appears to meet the appropriate requirements of Title 24, California Code of Regulations and the project specifications prepared by me, and
2) coordination with my plans and specifications and is acceptable for incorporation into the construction of this project.

The Statement of General Conformance "shall not be construed as relieving me of my rights, duties, and responsibilities under Sections 17302 and 81138 of the Education Code and Sections 4-336, 4-341 and 4-344" of Title 24, Part 1. *(Title 24, Part 1, Section 4-317 (b))*

I certify that: ☒ The drawings or sheets listed on the cover or index sheet ☐ This drawing or page

☒ is/are in general conformance and ☐ have been coordinated	☐ is/are in general conformance and ☐ have been coordinated
Signature: [signature] Date: 04-05-2018	Signature: Date:
Architect or Engineer designated to be in general responsible charge	Architect or Engineer delgated responsibility for this portion of the work
Print Name: GARY J. GERY	Print Name:
License Number: C-17626 Expiration Date: 10-31-2019	License Number: Expiration Date:

NOTES

1. ALL WORK SHALL CONFORM TO TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
2. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY A CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY THE DIVISION OF THE STATE ARCHITECT AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
3. A PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-32, PART 1, TITLE 24, CCR: CLASS 2
4. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.
5. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(C), PART 1, TITLE 24, CCR)
6. FINAL CERTIFICATION OF THIS PROJECT IS DEPENDANT ON THE COMPLETION AND CERTIFICATION OF DSA APP.# 62934

DEFERRED SUBMITTALS

NO DEFERRED SUBMITTALS

CODE ANALYSIS

BLDG #	DESCRIPTION	BLDG AREA	OCCY	TYPE	ALLOWABLE AREA	DSA APPLICATION NO.
A	(E) ADMINISTRATION BUILDING	2,625 SQ.FT.	B2	V-B	9,000 SQ.FT.	62934
B	(E) MULTI-PURPOSE BUILDING	9,854 SQ.FT.	A3	V-B1HR	6,000 SQ.FT.	62934
C	(E) CLASSROOM BUILDING	5,111 SQ.FT.	E	V-B	9,500 SQ.FT.	62934
D1	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
D2	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
D3	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
D4	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
D5	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
D6	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-100484
E	(E) CLASSROOM BUILDING	5,111 SQ.FT.	E	V-B	9,500 SQ.FT.	62934
F1	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
F2	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
F3	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
F4	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
F5	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
F6	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
G	(E) CLASSROOM BUILDING	5,689 SQ.FT.	E	V-B	9,500 SQ.FT.	62934
H	(E) CLASSROOM BUILDING	6,174 SQ.FT.	E	V-B	9,500 SQ.FT.	62934
I1	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
I2	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-101195
I3	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-102248
I2-1	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-104505
I2-2	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-104505
I2-3	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-104505
I2-4	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-104505
I2-5	(E) CLASSROOM PORTABLE	960 SQ.FT.	E	V-B	9,500 SQ.FT.	02-104505
J	(E) CLASSROOM PORTABLE	1893 SQ.FT.	E	V-B	9,500 SQ.FT.	02-102248
R1	(E) RESTROOM PORTABLE	480 SQ.FT.	E	V-B	9,500 SQ.FT.	02-102248
L	(E) LIBRARY	2868 SQ.FT.	E	V-B	9,500 SQ.FT.	62934

SHEET NUMBERING

SHEET NUMBER A2.01A
- **BUILDING AREA**
- **SEQUENCE (,01 - ,99.....etc.)**
- **SHEET DISCIPLINE TYPE**
- **DISCIPLINE**

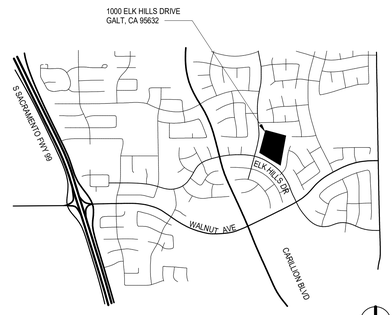
G	GENERAL
C	CIVIL
L	LANDSCAPE
CA	SPORTS
S	STRUCTURAL
D	DEMOLITION
A	ARCHITECTURAL
M	MECHANICAL
E	ELECTRICAL
P	PLUMBING
T	TECHNOLOGY
FS	FOOD SERVICE
AV	ACOUSTICAL
TH	THEATRICAL

0	GENERAL
1	SITE
2	FLOOR PLANS (Note: Flip Sheets are Schedules)
3	ROOF
4	ENLARGED PLANS
5	PLAN DETAILS
6	ELEVATIONS (Exterior and Interior)
7	PARTITION TYPES, WALL SECTIONS
8	CASEWORK
9	DOORS, WINDOWS, FRAMES
10	CEILINGS

SCOPE OF WORK

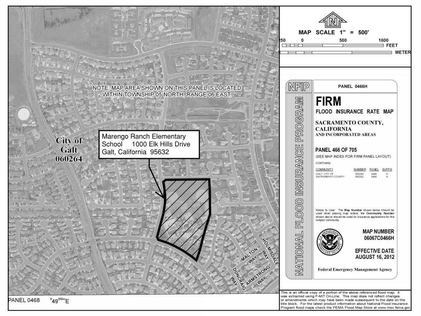
- REMOVAL AND REPLACEMENT OF EXISTING BUILT-UP ROOFING WITH NEW PVC ROOFING SYSTEM.
- REMOVAL AND REPLACEMENT OF EXISTING HVAC UNITS.

VICINITY MAP



TRUE NORTH

FLOOD PLAIN MAP



PANEL 0468 "eg""""E

PBK

ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL — **WESTON & ASSOCIATES**
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0800 P WESTON-ME.COM

ELECTRICAL — **THE ENGINEERING ENTERPRISE**
1120 HIGH STREET
AUBURN, CA 95603
530-886-8556 P ENGENT.COM

STRUCTURAL — **KPFF CONSULTING ENGINEERS**
2250 DOUGLAS BLVD, SYUITE 200
ROSEVILLE, CA 95661
916-772-7688 P KPFF.COM

MARENGO RANCH ELEMENTARY SCHOOL
ROOF AND HVAC REPLACEMENT
1000 ELK HILS DRIVE, GALT, CA 95632
ADDEDUM #02

Building a Bright Future for All Learners
Galt Joint Union Elementary School District

KEY PLAN

LICENSED PROFESSIONAL

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE: 08/03/2018
DRAWN BY: Author
CHECKED BY: Checker

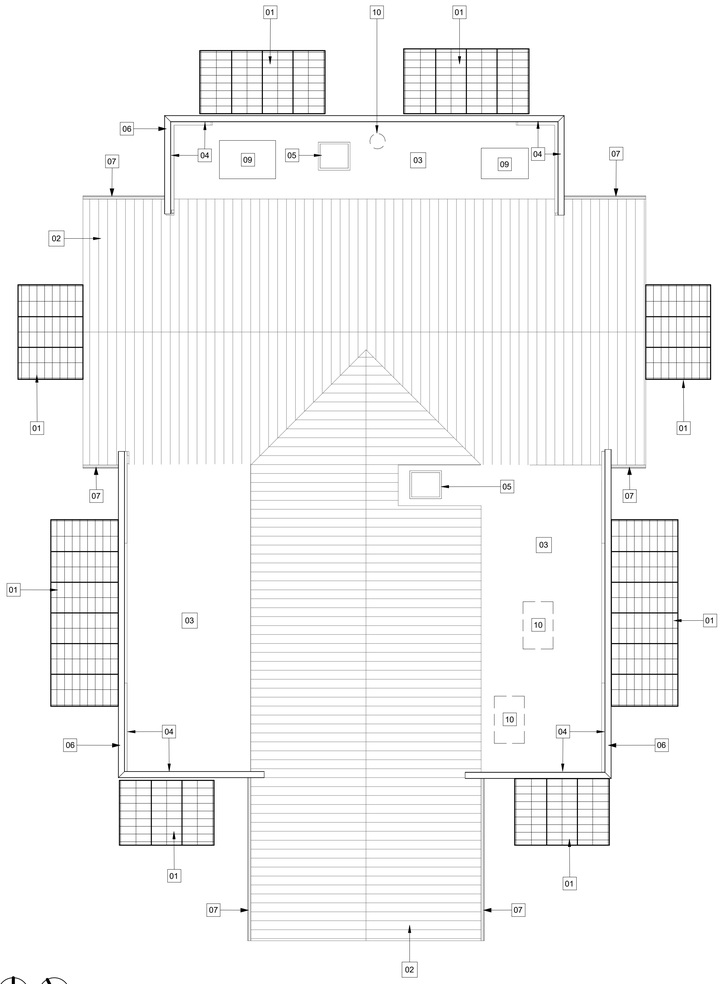
REVISIONS

No.	Description	Date

ADDEDUM #02

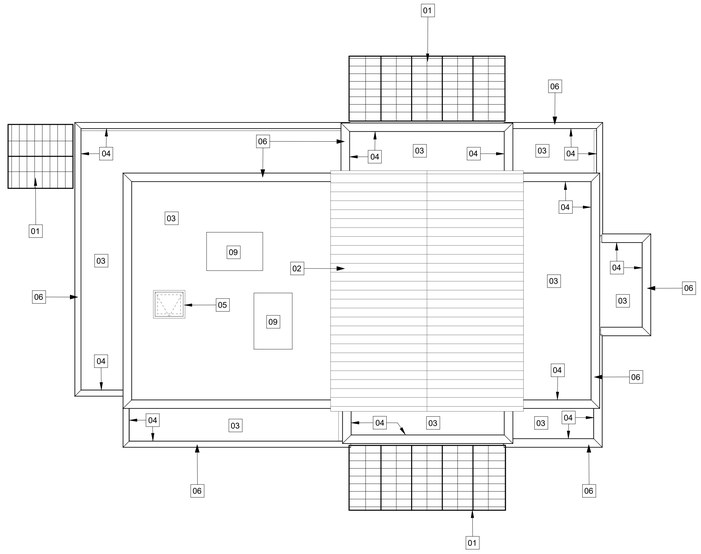
INDEX, DRAWING CONVENTIONS, AND LOCATION MAP

G0.01



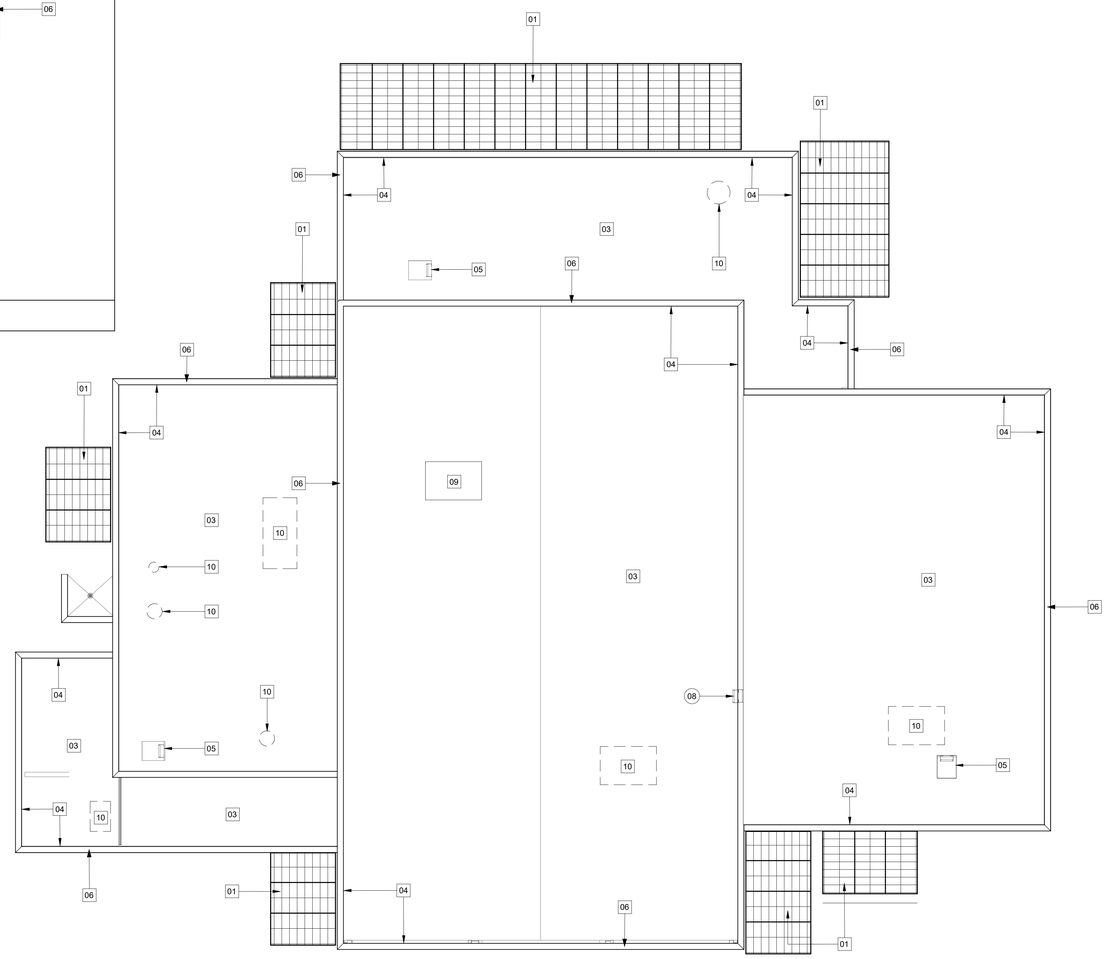
PLAN NORTH | TRUE NORTH

2 ROOF PLAN - BLDG G
1/8" = 1'-0"



PLAN NORTH | TRUE NORTH

3 ROOF PLAN - BLDG A
1/8" = 1'-0"



PLAN NORTH | TRUE NORTH

1 ROOF PLAN BLDG B
1/8" = 1'-0"

GENERAL DEMOLITION NOTES

1. DEMOLITION PLANS INDICATE SOME OF THE SCOPE-OF-WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL REVIEW ALL SHEETS FOR ADDITIONAL DEMOLITION SCOPE.
2. CONTRACTOR SHALL VERIFY EXISTING SITE AND BUILDING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO DEMOLITION ACTIVITIES AND WORK.
3. CONTRACTOR SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES IN WRITING.
4. CONTRACTOR SHALL NOTIFY ARCHITECT AND OWNER OF ANY POSSIBLE ASBESTOS CONTAINING MATERIALS DISCOVERED BEFORE PROCEEDING WITH WORK. PROTECT INTERIOR CONSTRUCTION TO REMAIN DURING DEMOLITION AND CONSTRUCTION.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE COMMENCING WORK.
6. AFTER AWARD OF THE CONTRACT, CHANGE ORDER REQUESTS FOR ADDITIONAL MONEY WILL NOT BE APPROVED IF THE WORK COULD HAVE BEEN ANTICIPATED DURING A SITE VISIT BY THE CONTRACTOR.
7. CONTRACTOR SHALL NOT SCALE DRAWINGS.
8. CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY SHORING, TEMPORARY BRACING, AND OR TEMPORARY SUPPORTS AS REQUIRED TO MAINTAIN STRUCTURAL INTEGRITY OF EXISTING STRUCTURE TO REMAIN AND OR EXISTING BUILDING ELEMENTS TO REMAIN.
9. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES AND WORK.
10. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS REGULARLY AS NECESSARY TO ELIMINATED INTERFERENCE WITH ROADS, STREET, WALKS, AND ALL OTHER ADJACENT FACILITIES.
11. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
12. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND OR SOUND PARTITION BETWEEN CONSTRUCTION AREA AND AREAS NOT IN SCOPE AS NECESSARY. DEMOLITION ACTIVITIES SHALL BE PERFORMED SO AS TO PRODUCE MINIMAL DISTURBANCE TO EXISTING FACILITY AND OCCUPANTS (I.E. MINIMIZE EXCESSIVE AND PROLONGED NOISE LEVELS AND DUST).
13. CONTRACTOR SHALL REPAIR, REPLACE, OR PATCH EXISTING BUILDINGS, DRIVEWAYS, SIDEWALKS, CANOPIES, AND OR PARKING AREAS DAMAGED, MODIFIED, AND OR DISTURBED BY DEMOLITION WORK AT NO COST TO THE OWNER.
14. ALL EXISTING EQUIPMENT THAT REMAINS SHALL BE PROTECTED DURING DEMOLITION AND OR CONSTRUCTION TO PREVENT DAMAGE. ANY DAMAGE TO REMAINING EXISTING EQUIPMENT SUSTAINED DURING DEMOLITION AND OR CONSTRUCITON SHALL BE EQUIVALENTLY REPLACED OR EQUIVALENTLY REPAIRED AT NO COST TO THE OWNER.
15. CONTRACTOR SHALL PROVIDE TRAFFIC HANDLING MEASURES TO PROTECT THE GENERAL PUBLIC AT ALL TIMES, AS NECESSARY AND AS REQURED BY AUTHORITIES HAVING JURISDICTION.
16. DO NOT INTERRUPT EXISTING UTILITIES, EXCEPT WHEN AUTHORIZED IN WRITING BY AUTHORITIES HAVING JURISDICTION. PROVIDE TEMPORARY SERVICES DURING INTERRUPTIONS TO EXISTING UTILITIES, AS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
17. WHEN UTILITY SERVICES ARE REQUIRED TO BE REMOVED, RELOCATED, OR ABANDONED, PROVIDE BYPASS CONNECTIONS TO MAINTAIN CONTINUITY OF SERVICE BEFORE PROCEEDING WITH DEMOLITION.
18. CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES INCLUDING BUT NOT LIMITED TO THE FOLLOWING: ELECTRIC, GAS, WATER, TELEPHONE, STORM SEWER, AND SANITARY SEWER FOR FIELD LOCATION OF ALL UNDERGROUND AND OVERHEAD UTILITY LINES. PRIOR TO COMMENCEMENT OF ANY DEMOLITION WORK, CONTRACTOR SHALL IDENTIFY ALL ELECTRICAL CIRCUITS SERVICING THE AREA INVOLVED WITH THIS DEMOLITION. THOSE CIRCUITS SHALL THEN BE LOCKED OUT AND TAGGED OUT IF THEY DO NOT SERVICE ANY OF THE REMAINING BUILDING. THOSE CIRCUITS WHICH ARE IDENTIFIED TO SERVICE BOTH THE AREA TO BE DEMOLISHED AND THE REMAINING BUILDING SHALL BE SPLIT SO AS TO KILL ALL ELECTRICAL POWER TO THE AREA TO BE DEMOLISHED WHILE MAINTAINING POWER TO THE REMAINDER OF THE BUILDING.
19. CONTRACTOR SHALL RELOCATE UTILITIES AND EQUIPMENT AS REQUIRED TO ACCOMMODATE NEW HVAC, ELECTRICAL, PLUMBING, AND TECHNOLOGY REQUIREMENTS FOR NEW WORK.
20. PROTECT EXISTING SITE ELEMENTS AND EXISTING LANDSCAPING TO REMAIN. PROTECTION SHALL INCLUDE BUT NOT BE LIMITED TO EXISTING TREES AND OTHER EXISTING VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIAL OR EXCAVATED MATERIAL WITHIN DRIP LINES.
21. CONTRACTOR SHALL REGRADE AND HYDROMULCH AREAS AFFECTED BY DEMOLITION.
22. OWNER HAS RIGHT OF FIRST REFUSAL OF ALL ITEMS REMOVED AS PART OF THE SOCPE OF WORK, WHETHER IDENTIFIED AS SALVAGE OR NOT.
23. NOTIFY THE BUILDING OWNER OF ANY MATERIALS, FIXTURES, ETC. TO BE REMOVED THAT ARE DEEMED SALVAGEABLE. TURN OVER ANY REQUESTED ITEMS TO THE BUILDING OWNER IN GOOD CONDITION.
24. ALL FURNITURE WILL BE REMOVED OR RELOCATED BY THE OWNER AS NECESSARY PRIOR TO THE DEMOLITION WORK OF THIS PROJECT. CONTRACTOR SHALL COORDINATE WITH OWNER AS REQUIRED.
25. REMOVE EXISTING CONSTRUCTION TO THE EXTENT INDICATED ON THE DRAWINGS. SHOULD ANY DAMAGE OCCUR TO ANY EXISTING CONSTRUCTION TO REMAIN, THE CONTRACTOR SHALL REPAIR THE DAMAGE TO MATCH EXISTING AND OR ADJACENT CONSTRUCTION AT NO COST TO THE OWNER.
26. MAINTAIN ANY AND ALL EXISTING FIRE-RATED ASSEMBLIES THAT ARE TO REMAIN, AND THEIR ASSOCIATED FIRE-RATINGS, INCLUDING BUT NOT LIMITED TO ALL ASSOCIATED EXISTING FIRE-RATED OPENINGS, ALL ASSOCIATED EXISTING FIRE-RATED PENETRATIONS, AND ALL ASSOCIATED EXISTING FIRE-RATED FIRESTOPPNG CONDITIONS.
27. WHEN UNANTICIPATED MECHANICAL, ELECTRICAL, OR STRUCTURAL ELEMENTS THAT CONFLICT WITH THE INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, DETERMINE THE NATURE AND EXTENT OF THE CONFLICT AND NOTIFY THE ARCHITECT IMMEDIATELY FOR RESOLUTION.
28. REMOVE, PATCH, AND REPAIR ALL ABANDONED ROOF PENETRATIONS RESULTING FROM WORK.
29. SAW-CUT AND REMOVE EXISTING FLOOR FINISHES AND FLOOR SLAB AS REQUIRED TO INSTALL NEW FIXTURES, ITEMS, AND OR DEVISES FOR ALL SCOPE-OF-WORK PERTAINING TO NEW MECHANICAL WORK, NEW PLUMBING UTILITIES, NEW PLUMBING WORK, NEW ELECTRICAL WORK, AND NEW TECHNOLOGY WORK. SPLICE NEW REINFORCING BARS DOWELLED INTO EXITISTING CONCRETE AND PROVIDE NEW VAPOR RETARDER AND NEW CONTINUOUS WATERSTOPS AT JOINT BETWEEN NEW CONCRETE FLOOR SLAB AND EXISTING CONCRETE FLOOR SLAB. PATCH WITH NEW 3,500 PSI MINIMUM CONCRETE AND PREPARE FLOOR, INCLUDING NEW CONCRETE, TO RECEIVE NEW FLOOR FINISHES. COORDINATE WITH STRUCTURAL.
30. EXISTING WALLS (OR PORTIONS OF WALLS) TO BE REMOVED SHALL BE CUT FLUSH WHERE INTERSECTING WITH WALLS TO REMAIN. REMAINING WALLS TO BE PATCHED AND FINISHED SMOOTH.
31. NEW OPENING TO BE CUT IN EXISTING WALLS SHALL BE SAW-CUT AT LOCATIONS INDICATED TO THE HEIGHT AND WIDTH INDICATED. NEW LINTELS SHALL BE INSTALLED TO SUPPORT EXISTING WALL CONSTRUCTION ABOVE AS INDICATED ON THE DRAWINGS, OR IF NOT INDICATED, AS REQUIRED FOR NEW WALL CONSTRUCTION PER STRUCTURAL DRAWINGS. COORDINATE LOCATIONS OF ALL NEW OPENINGS IN EXISTING WALLS AND PARTITIONS WITH ARCHITECTURAL PLANS.
32. WHERE EXISTING WALL OPENINGS ARE TO BE NEWLY CLOSED-OFF, REMOVE ANY EXISTING OPENING FRAME AND PATCH AND REPAIR EXISTING WALL TO MATCH EXISTING ADJACENT MATERIALS AND FINISHES, U.N.O.
33. WHERE EXISTING INTERIOR WALLS ARE REPLACED OR REMOVED, REMOVE MEPT SYSTEMS BACK TO PANEL, OR MECHANICAL ROOM, OR FARTHEST POSSIBLE POINT WITHOUT DISTURBING EXISTING CONSTRUCTION. REMOVE EXISTING MECHANICAL EQUIPMENT, RELOCATE POWER PER MEPT DRAWINGS
34. REFER TO MEPT DRAWINGS FOR DEMOLITION OF MEPT SYSTEMS. IDENTIFY WORK REQUIRED BY THIS CONTRACTOR WHICH MAY AFFECT DEMOLITION AND OR REPAIRS OF ARCHITECTURAL ELEMENTS. COORDINATE WITH RELATED SUB CONTRACTORS THE EXTENT OF ALL DEMOLITION WORK.
35. PATCH FLOORS, WALLS CEILINGS WHICH REMAIN AT LOCATIONS WHERE PIPES, CONDUITS, ETC. ARE REMOVED AS REQUIRED TO MATCH EXISTING CONDITIONS OR TO RECEIVE NEW FINISHES.
36. WHERE EXISTING FINISH FLOOR IS REMOVED, PREPARE FLOOR SURFACE TO RECEIVE NEW FLOORING.
37. ALL DASHED LINES ARE DEMOLITION LINES UNLESS NOTED OTHERWISE.

KEY NOTES

01	(E) CANOPY TO REMAIN
02	(E) METAL ROOFING TO REMAIN
03	(E) BUILT UP ROOFING TO BE DEMOLISHED
04	(E) PLYWOOD PANELING AND FLASHING AT MECHANICAL WELLS
05	(E) ROOF ACCESS HATCH TO REMAIN
06	(E) PARAPET METAL COPING TO REMAIN
07	(E) METAL GUTTER TO REMAIN
08	(E) ROOF LADDER TO REMAIN
09	(E) HVAC UNIT TO REMAIN
10	(E) HVAC UNIT TO BE DEMOLISHED

PBK

ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL — WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0800 P WESTON-ME.COM

ELECTRICAL — THE ENGINEERING ENTERPRISE
1120 HIGH STREET
AUBURN, CA 95603
530-886-8556 P ENGENT.COM

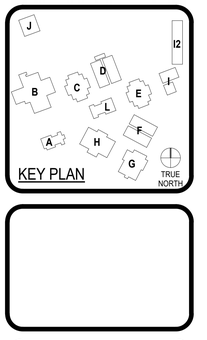
STRUCTURAL — KPFF CONSULTING ENGINEERS
2250 DOUGLAS BLVD, SYUITE 200
ROSEVILLE, CA 95661
916-772-7688 P KPFF.COM

MARENGO RANCH ELEMENTARY SCHOOL
ROOF AND HVAC REPLACEMENT

1000 ELK HILLS DRIVE, GALT, CA 95632

ADDEDUM #02

Building a Bright Future for All Learners
Galt Joint Union Elementary School District



KEY PLAN

LICENSED PROFESSIONAL

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

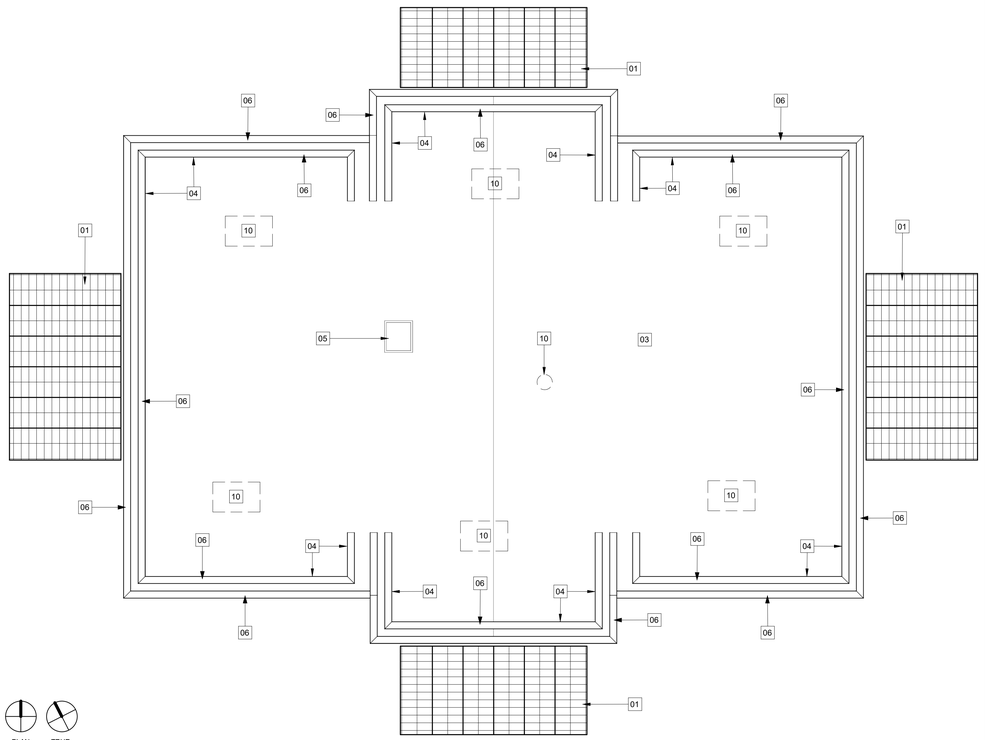
PROJECT NUMBER 17233
DATE: 08/03/2018
DRAWN BY: CR
CHECKED BY: KJ
REVISIONS

No.	Description	Date

ADDEDUM #02

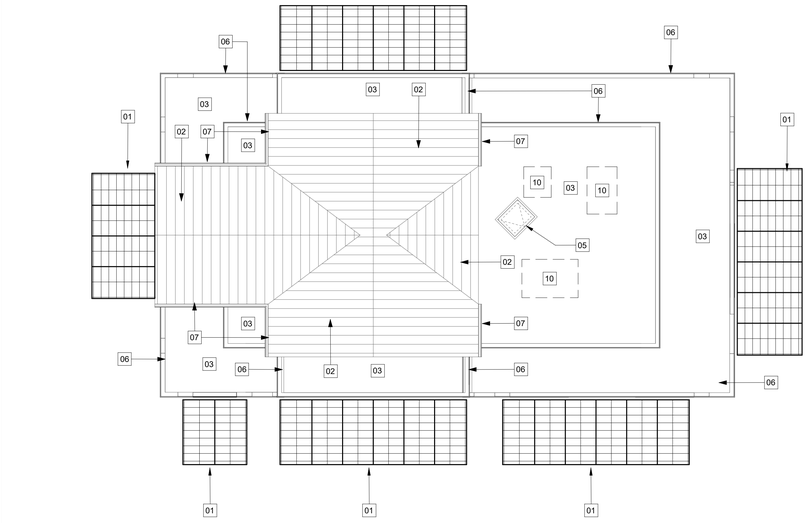
DEMOLITION ROOF PLANS - BLDG A,B & G

D3.01



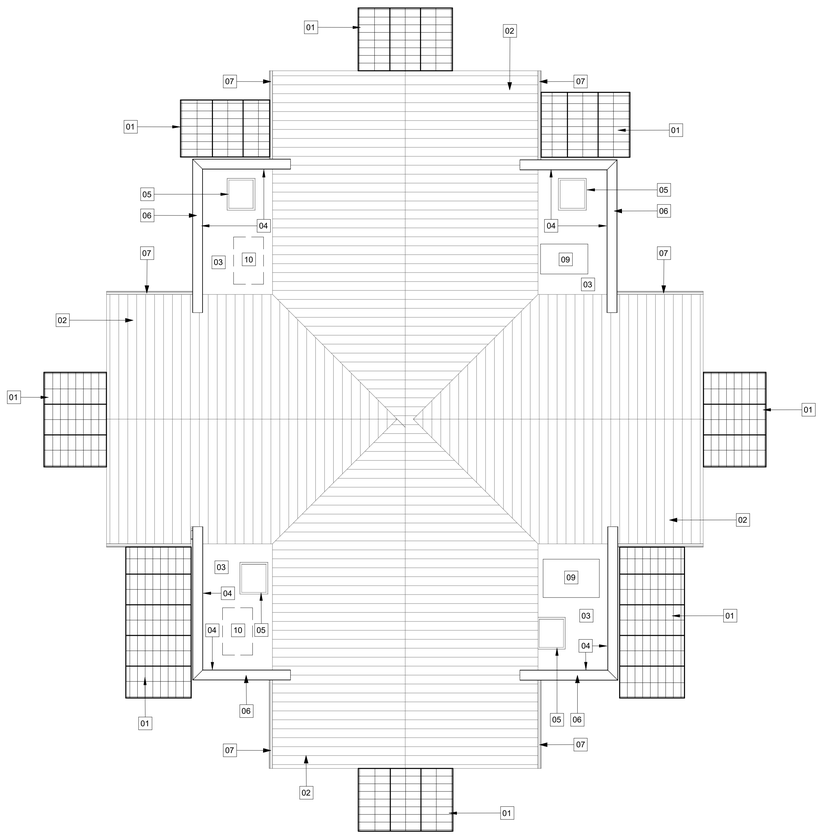
PLAN NORTH | TRUE NORTH

4 ROOF PLAN - BLDG H
1/8" = 1'-0"



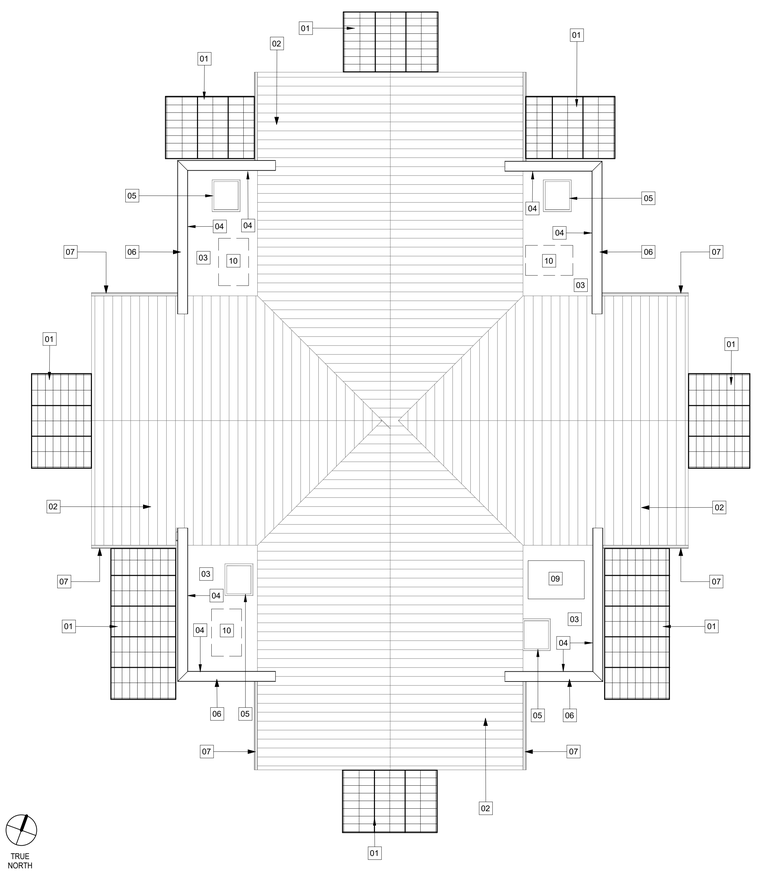
PLAN NORTH | TRUE NORTH

3 ROOF PLAN - BLDG L
1/8" = 1'-0"



PLAN NORTH | TRUE NORTH

2 ROOF PLAN - BLDG E
1/8" = 1'-0"



PLAN NORTH | TRUE NORTH

1 ROOF PLAN - BLDG C
1/8" = 1'-0"

GENERAL DEMOLITION NOTES

1. DEMOLITION PLANS INDICATE SOME OF THE SCOPE-OF-WORK INVOLVED FOR THE DEMOLITION PHASE OF THIS PROJECT. CONTRACTOR SHALL REVIEW ALL SHEETS FOR ADDITIONAL DEMOLITION SCOPE.
2. CONTRACTOR SHALL VERIFY EXISTING SITE AND BUILDING CONDITIONS AND DIMENSIONS IN THE FIELD PRIOR TO DEMOLITION ACTIVITIES AND WORK.
3. CONTRACTOR SHALL NOTIFY ARCHITECT OF ANY DISCREPANCIES IN WRITING.
4. CONTRACTOR SHALL NOTIFY ARCHITECT AND OWNER OF ANY POSSIBLE ASBESTOS CONTAINING MATERIALS DISCOVERED BEFORE PROCEEDING WITH WORK, PROTECT INTERIOR CONSTRUCTION TO REMAIN DURING DEMOLITION AND CONSTRUCTION.
5. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS BEFORE COMMENCING WORK.
6. AFTER AWARD OF THE CONTRACT, CHANGE ORDER REQUESTS FOR ADDITIONAL MONEY WILL NOT BE APPROVED IF THE WORK COULD HAVE BEEN ANTICIPATED DURING A SITE VISIT BY THE CONTRACTOR.
7. CONTRACTOR SHALL NOT SCALE DRAWINGS.
8. CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY SHORING, TEMPORARY BRACING, AND OR TEMPORARY SUPPORTS AS REQUIRED TO MAINTAIN STRUCTURAL INTEGRITY OF EXISTING STRUCTURE TO REMAIN AND OR EXISTING BUILDING ELEMENTS TO REMAIN.
9. CONTRACTOR IS TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO DEMOLITION ACTIVITIES AND WORK.
10. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS REGULARLY AS NECESSARY TO ELIMINATED INTERFERENCE WITH ROADS, STREET, WALKS, AND ALL OTHER ADJACENT FACILITIES.
11. CONTRACTOR SHALL REMOVE TRASH AND DEBRIS FROM THE SITE ON A DAILY BASIS.
12. CONTRACTOR IS RESPONSIBLE FOR CONSTRUCTION OF TEMPORARY DUST AND OR SOUND PARTITION BETWEEN CONSTRUCTION AREA AND AREAS NOT IN SCOPE AS NECESSARY. DEMOLITION ACTIVITIES SHALL BE PERFORMED SO AS TO PRODUCE MINIMAL DISTURBANCE TO EXISTING FACILITY AND OCCUPANTS (I.E. MINIMIZE EXCESSIVE AND PROLONGED NOISE LEVELS AND DUST).
13. CONTRACTOR SHALL REPAIR, REPLACE, OR PATCH EXISTING BUILDINGS, DRIVEWAYS, SIDEWALKS, CANOPIES, AND OR PARKING AREAS DAMAGED, MODIFIED, AND OR DISTURBED BY DEMOLITION WORK AT NO COST TO THE OWNER.
14. ALL EXISTING EQUIPMENT THAT REMAINS SHALL BE PROTECTED DURING DEMOLITION AND OR CONSTRUCITON TO PREVENT DAMAGE. ANY DAMAGE TO REMAINING EXISTING EQUIPMENT SUSTAINED DURING DEMOLITION AND OR CONSTRUCITON SHALL BE EQUIVALENTLY REPLACED OR EQUIVALENTLY REPAIRED AT NO COST TO THE OWNER.
15. CONTRACTOR SHALL PROVIDE TRAFFIC HANDLING MEASURES TO PROTECT THE GENERAL PUBLIC AT ALL TIMES, AS NECESSARY AND AS REQURED BY AUTHORITIES HAVING JURISDICTION.
16. DO NOT INTERRUPT EXISTING UTILITIES, EXCEPT WHEN AUTHORIZED IN WRITING BY AUTHORITIES HAVING JURISDICTION. PROVIDE TEMPORARY SERVICES DURING INTERRUPTIONS TO EXISTING UTILITIES, AS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
17. WHEN UTILITY SERVICES ARE REQUIRED TO BE REMOVED, RELOCATED, OR ABANDONED, PROVIDE BYPASS CONNECTIONS TO MAINTAIN CONTINUITY OF SERVICE BEFORE PROCEEDING WITH DEMOLITION.
18. CONTRACTOR SHALL CONTACT ALL UTILITY COMPANIES INCLUDING BUT NOT LIMITED TO THE FOLLOWING: ELECTRIC, GAS, WATER, TELEPHONE, STORM SEWER, AND SANITARY SEWER FOR FIELD LOCATION OF ALL UNDERGROUND AND OVERHEAD UTILITY LINES. PRIOR TO COMMENCEMENT OF ANY DEMOLITION WORK, CONTRACTOR SHALL IDENTIFY ALL ELECTRICAL CIRCUITS SERVICING THE AREA INVOLVED WITH THIS DEMOLITION. THOSE CIRCUITS SHALL THEN BE LOCKED OUT AND TAGGED OUT IF THEY DO NOT SERVICE ANY OF THE REMAINING BUILDING. THOSE CIRCUITS WHICH ARE IDENTIFIED TO SERVICE BOTH THE AREA TO BE DEMOLISHED AND THE REMAINING BUILDING SHALL BE SPLIT SO AS TO KILL ALL ELECTRICAL POWER TO THE AREA TO BE DEMOLISHED WHILE MAINTAINING POWER TO THE REMAINDER OF THE BUILDING.
19. CONTRACTOR SHALL RELOCATE UTILITIES AND EQUIPMENT AS REQUIRED TO ACCOMMODATE NEW HVAC, ELECTRICAL, PLUMBING, AND TECHNOLOGY REQUIREMENTS FOR NEW WORK.
20. PROTECT EXISTING SITE ELEMENTS AND EXISTING LANDSCAPING TO REMAIN. PROTECTION SHALL INCLUDE BUT NOT BE LIMITED TO EXISTING TREES AND OTHER EXISTING VEGETATION INDICATED TO REMAIN IN PLACE AGAINST UNNECESSARY CUTTING, BREAKING, OR SKINNING OF ROOTS, SKINNING OR BRUISING OF BARK, SMOTHERING OF TREES BY STOCKPILING CONSTRUCTION MATERIAL OR EXCAVATED MATERIAL WITHIN DRIP LINES.
21. CONTRACTOR SHALL REGRADE AND HYDROMULCH AREAS AFFECTED BY DEMOLITION.
22. OWNER HAS RIGHT OF FIRST REFUSAL OF ALL ITEMS REMOVED AS PART OF THE SOCPE OF WORK, WHETHER IDENTIFIED AS SALVAGE OR NOT.
23. NOTIFY THE BUILDING OWNER OF ANY MATERIALS, FIXTURES, ETC. TO BE REMOVED THAT ARE DEEMED SALVAGEABLE. TURN OVER ANY REQUESTED ITEMS TO THE BUILDING OWNER IN GOOD CONDITION.
24. ALL FURNITURE WILL BE REMOVED OR RELOCATED BY THE OWNER AS NECESSARY PRIOR TO THE DEMOLITION WORK OF THIS PROJECT. CONTRACTOR SHALL COORDINATE WITH OWNER AS REQUIRED.
25. REMOVE EXISTING CONSTRUCTION TO THE EXTENT INDICATED ON THE DRAWINGS. SHOULD ANY DAMAGE OCCUR TO ANY EXISTING CONSTRUCTION TO REMAIN, THE CONTRACTOR SHALL REPAIR THE DAMAGE TO MATCH EXISTING AND OR ADJACENT CONSTRUCTION AT NO COST TO THE OWNER.
26. MAINTAIN ANY AND ALL EXISTING FIRE-RATED ASSEMBLIES THAT ARE TO REMAIN, AND THEIR ASSOCIATED FIRE-RATINGS, INCLUDING BUT NOT LIMITED TO ALL ASSOCIATED EXISTING FIRE-RATED OPENINGS, ALL ASSOCIATED EXISTING FIRE-RATED PENETRATIONS, AND ALL ASSOCIATED EXISTING FIRE-RATED FIRESTOPPING CONDITIONS.
27. WHEN UNANTICIPATED MECHANICAL, ELECTRICAL, OR STRUCTURAL ELEMENTS THAT CONFLICT WITH THE INTENDED FUNCTION OR DESIGN ARE ENCOUNTERED, DETERMINE THE NATURE AND EXTENT OF THE CONFLICT AND NOTIFY THE ARCHITECT IMMEDIATELY FOR RESOLUTION.
28. REMOVE, PATCH, AND REPAIR ALL ABANDONED ROOF PENETRATIONS RESULTING FROM WORK.
29. SAW-CUT AND REMOVE EXISTING FLOOR FINISHES AND FLOOR SLAB AS REQUIRED TO INSTALL NEW FIXTURES, ITEMS, AND OR DEVISES FOR ALL SCOPE-OF-WORK PERTAINING TO NEW MECHANICAL WORK, NEW PLUMBING UTILITIES, NEW PLUMBING WORK, NEW ELECTRICAL WORK, AND NEW TECHNOLOGY WORK. SPLICE NEW REINFORCING BARS DOWELLED INTO EXITISTING CONCRETE AND PROVIDE NEW VAPOR RETARDER AND NEW CONTINUOUS WATERSTOPS AT JOINT BETWEEN NEW CONCRETE FLOOR SLAB AND EXISTING CONCRETE FLOOR SLAB. PATCH WITH NEW 3,500 PSI MINIMUM CONCRETE AND PREPARE FLOOR, INCLUDING NEW CONCRETE, TO RECEIVE NEW FLOOR FINISHES. COORDINATE WITH STRUCTURAL.
30. EXISTING WALLS (OR PORTIONS OF WALLS) TO BE REMOVED SHALL BE CUT FLUSH WHERE INTERSECTING WITH WALLS TO REMAIN. REMAINING WALLS TO BE PATCHED AND FINISHED SMOOTH.
31. NEW OPENING TO BE CUT IN EXISTING WALLS SHALL BE SAW-CUT AT LOCATIONS INDICATED TO THE HEIGHT AND WIDTH INDICATED. NEW LINTELS SHALL BE INSTALLED TO SUPPORT EXISTING WALL CONSTRUCTION ABOVE AS INDICATED ON THE DRAWINGS, OR IF NOT INDICATED, AS REQUIRED FOR NEW WALL CONSTRUCTION PER STRUCTURAL DRAWINGS. COORDINATE LOCATIONS OF ALL NEW OPENINGS IN EXISTING WALLS AND PARTITIONS WITH ARCHITECTURAL PLANS.
32. WHERE EXISTING WALL OPENINGS ARE TO BE NEWLY CLOSED-OFF, REMOVE ANY EXISTING OPENING FRAME AND PATCH AND REPAIR EXISTING WALL TO MATCH EXISTING ADJACENT MATERIALS AND FINISHES, U.N.O.
33. WHERE EXISTING INTERIOR WALLS ARE REPLACED OR REMOVED, REMOVE MEPT SYSTEMS BACK TO PANEL, OR MECHANICAL ROOM, OR FARTHEST POSSIBLE POINT WITHOUT DISTURBING EXISTING CONSTRUCTION. REMOVE EXISTING MECHANICAL EQUIPMENT, RELOCATE POWER PER MEPT DRAWINGS.
34. REFER TO MEPT DRAWINGS FOR DEMOLITION OF MEPT SYSTEMS. IDENTIFY WORK REQUIRED BY THIS CONTRACTOR WHICH MAY AFFECT DEMOLITION AND OR REPAIRS OF ARCHITECTURAL ELEMENTS. COORDINATE WITH RELATED SUB CONTRACTORS THE EXTENT OF ALL DEMOLITION WORK.
35. PATCH FLOORS, WALLS CEILINGS WHICH REMAIN AT LOCATIONS WHERE PIPES, CONDUITS, ETC. ARE REMOVED AS REQUIRED TO MATCH EXISTING CONDITIONS OR TO RECEIVE NEW FINISHES.
36. WHERE EXISTING FINISH FLOOR IS REMOVED, PREPARE FLOOR SURFACE TO RECEIVE NEW FLOORING.
37. ALL DASHED LINES ARE DEMOLITION LINES UNLESS NOTED OTHERWISE.

KEY NOTES

01	(E) CANOPY TO REMAIN
02	(E) METAL ROOFING TO REMAIN
03	(E) BUILT UP ROOFING TO BE DEMOLISHED
04	(E) PLYWOOD PANELING AND FLASHING AT MECHANICAL WELLS
05	(E) ROOF ACCESS HATCH TO REMAIN
06	(E) PARAPET METAL COPING TO REMAIN
07	(E) METAL GUTTER TO REMAIN
08	(E) ROOF LADDER TO REMAIN
09	(E) HVAC UNIT TO REMAIN
10	(E) HVAC UNIT TO BE DEMOLISHED

PBK

ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL — WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
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ELECTRICAL — THE ENGINEERING ENTERPRISE
1120 HIGH STREET
AUBURN, CA 95603
530-886-8556 P ENGENT.COM

STRUCTURAL — KPFF CONSULTING ENGINEERS
2250 DOUGLAS BLVD, SYUITE 200
ROSEVILLE, CA 95661
916-772-7668 P KPFF.COM

MARENGO RANCH ELEMENTARY SCHOOL
ROOF AND HVAC REPLACEMENT

1000 ELK HILS DRIVE, GALT, CA 95632

ADDEDUM #02

Building a Bright Future for All Learners
Galt Joint Union Elementary School District

LICENSED PROFESSIONAL

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE: 08/03/2018
DRAWN BY: CR
CHECKED BY: KJ

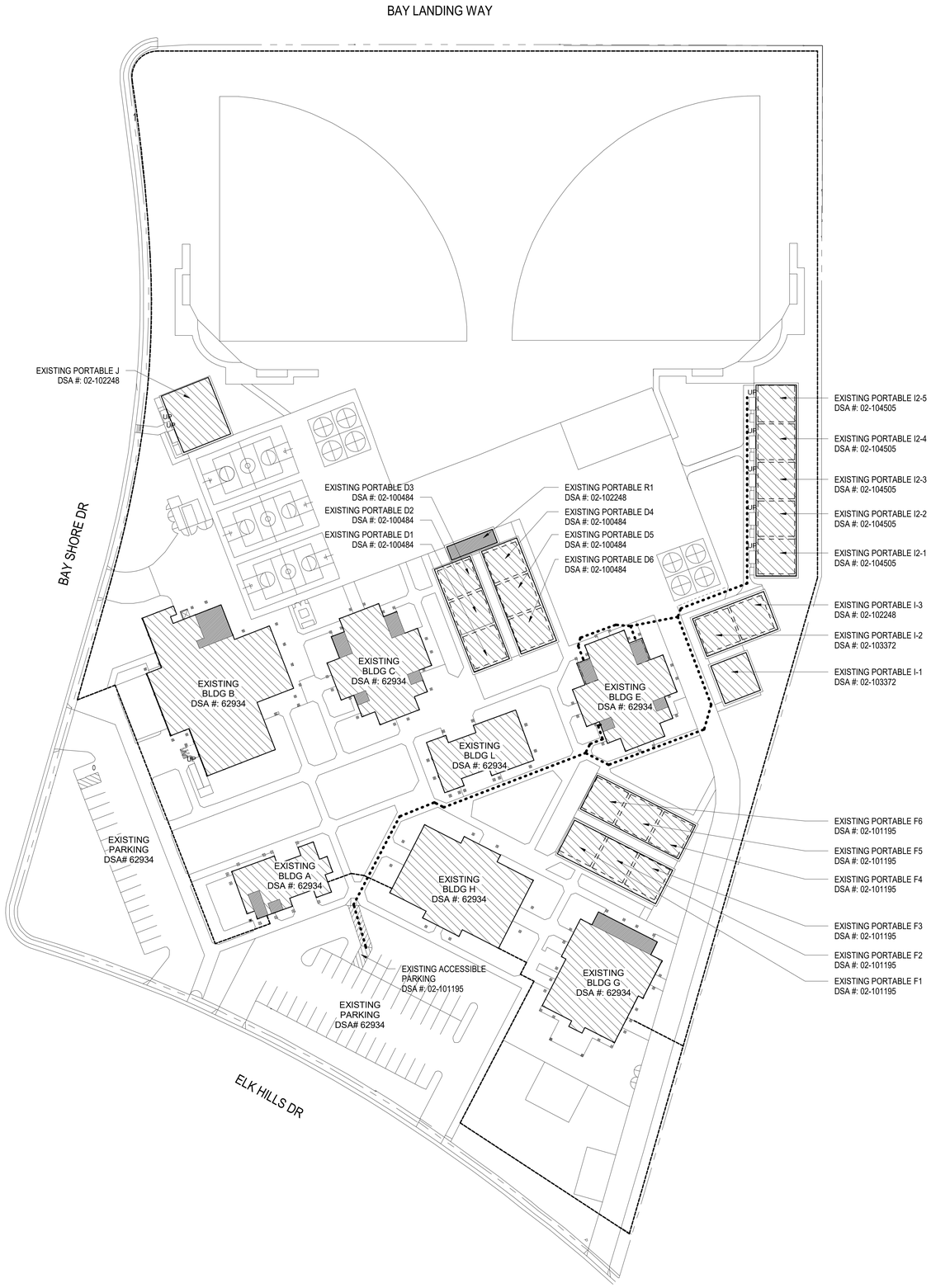
REVISIONS

No.	Description	Date

ADDEDUM #02

DEMOLITION ROOF PLANS - BLDG C,E,H & L

D3.02



5 SITE PLAN
1" = 40'-0"

PATH OF TRAVEL

DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE STATEMENT:

THE PATH OF TRAVEL IDENTIFIED IN THESE CONSTRUCTION DOCUMENTS IS COMPLIANT WITH THE CURRENT APPLICABLE CALIFORNIA BUILDING CODE ACCESSIBILITY PROVISIONS FOR PATH OF TRAVEL REQUIREMENTS FOR ALTERATIONS, ADDITIONS AND STRUCTURAL REPAIRS. AS PART OF THE DESIGN OF THIS PROJECT, THE PATH OF TRAVEL WAS EXAMINED AND ANY ELEMENTS, COMPONENTS OR PORTIONS OF THE PATH OF TRAVEL THAT WERE DETERMINED TO BE NON-COMPLIANT 1) HAVE BEEN IDENTIFIED 2) THE CORRECTIVE WORK NECESSARY TO BRING THEM INTO COMPLIANCE HAS BEEN INCLUDED WITHIN THE SCOPE OF THIS PROJECT'S WORK THROUGH DETAILS, DRAWINGS AND SPECIFICATIONS INCORPORATED INTO THESE CONSTRUCTION DOCUMENTS. ANY NON-COMPLIANT ELEMENTS, COMPONENTS OR PORTIONS OF THE PATH OF TRAVEL THAT WILL NOT BE CORRECTED BY THIS PROJECT BASED ON VALUATION THRESHOLD LIMITATIONS OR A FINDING OF UNREASONABLE HARDSHIP ARE SO INDICATED IN THESE CONSTRUCTION DOCUMENTS. DURING CONSTRUCTION, IF THE PATH OF TRAVEL ITEMS WITHIN THE SCOPE OF THE PROJECT REPRESENTED AS CODE COMPLIANT ARE FOUND TO BE NON-CONFORMING BEYOND REASONABLE CONSTRUCTION TOLERANCES, THEY SHALL BE BROUGHT INTO COMPLIANCE WITH THE CBC AS A PART OF THIS PROJECT BY MEANS OF A CONSTRUCTION CHANGE DOCUMENT.

(E) Path Of Travel

LEGEND

- EXISTING BUILDINGS
- EXISTING RESTROOMS
- EXISTING FENCELINE WITH PANIC HARDWARE
- PATH OF TRAVEL

PBK

ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
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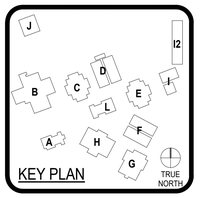


KEY PLAN

LICENSED PROFESSIONAL

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233
DATE: 08/03/2018
DRAWN BY: CR
CHECKED BY: KJ

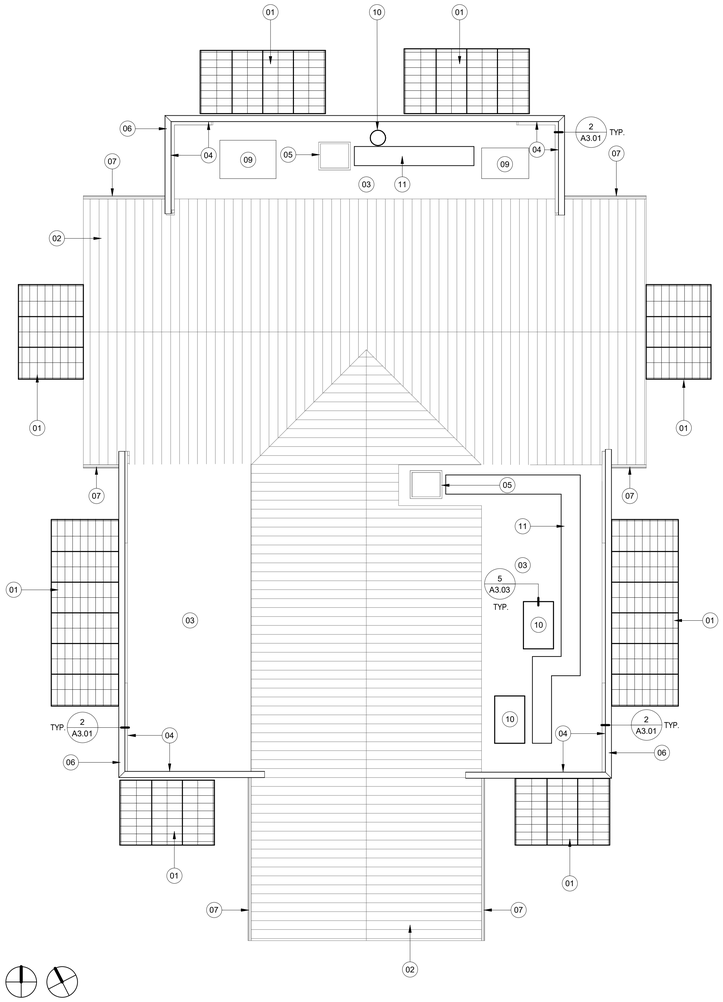
REVISIONS

No.	Description	Date

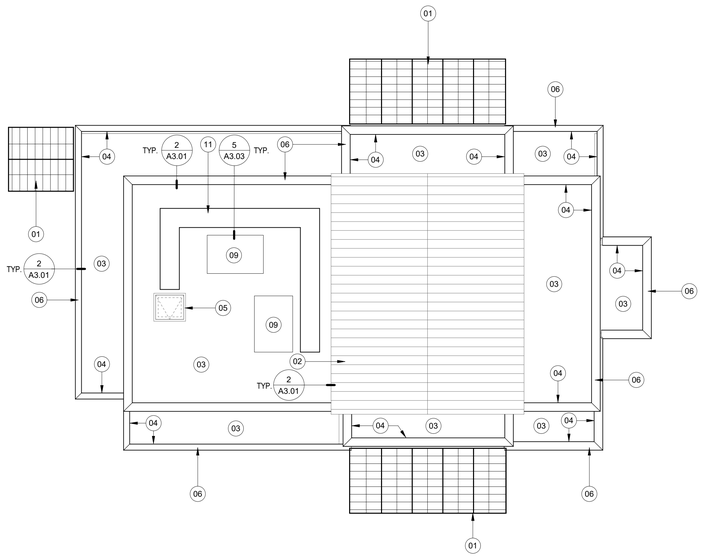
ADDEDUM #02

ARCHITECTURAL SITE PLAN

A0.01



4 ROOF PLAN - BLDG G
1/8" = 1'-0"



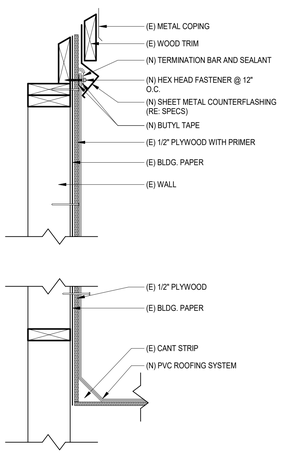
3 ROOF PLAN - BLDG A
1/8" = 1'-0"

GENERAL NOTES

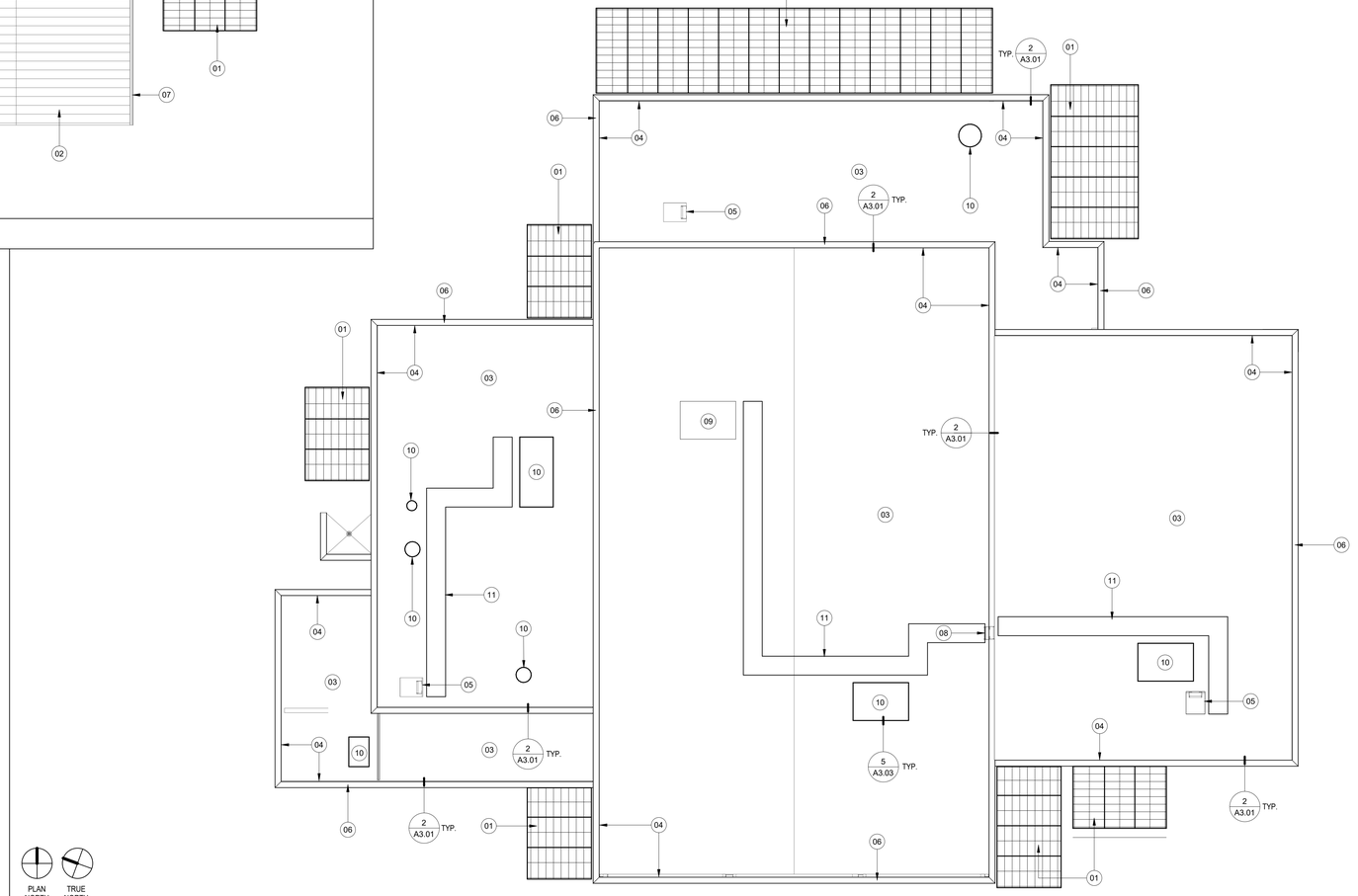
1. REPAIR AND REPLACE ALL DAMAGED GUTTERS AND PAINT TO MATCH EXISTING AS IDENTIFIED. ALL AREAS IDENTIFIED IN THESE DRAWINGS ARE BASED ON INITIAL SITE WALK OF EXISTING SURFACE CONDITIONS. THERE MAY BE ADDITIONAL AREAS WHERE REPAIRS ARE RECOMMENDED AND/OR NEEDED. IF UPON CLOSER INSPECTION THERE ARE ADDITIONAL AREAS REQUIREING REPAIRS, CONTRACTOR TO VERIFY THE AREAS OF CONCERN AND THEIR CONDITION AND REPAIR AS NECESSARY. CONTRACTOR TO NOTIFY ARCHITECT IF AREAS INVOLVING STRUCTURAL REPAIRS ARE FOUND.
2. VERIFY ALL DOWNSPOUTS ARE LEAK FREE. CONTRACTOR TO NOTIFY ARCHITECT IF LEAKS ARE FOUND.
3. CONTRACTOR TO VERIFY ALL EXISTING HVAC UNITS ARE PROPERLY ANCHORED AND FASTENED PER THE MANUFACTURER'S RECOMMENDED SPECIFCATIONS.
4. ALL EXISTING PAINTED AREAS TO BE TOUCHED UP AS NEEDED PER THE PAINTING SCHEDULE AS FOLLOWS:
   - PT-1 (SW-7622) HOMBURG GRAY
   - PT-2 (SW-6040) LESS BROWN
   - PT-3 (SW-7005) PURE WHITE

KEYNOTES

01 (E) CANOPY
02 (E) METAL ROOF
03 (N) PVC ROOFING SYSTEM
04 (E) PLYWOOD PANELING AND FLASHING AT MECHANICAL WELLS
05 (E) ROOF ACCESS HATCH
06 (E) PARAPET METAL COPING
07 (E) METAL GUTTER
08 (E) ROOF LADDER
09 (E) HVAC UNIT
10 (N) HVAC UNIT
11 (N) ROOF WALK OFF MAT



2 PLYWOOD @ MECHANICAL WELLS
1 1/2" = 1'-0"



1 ROOF PLAN BLDG B
1/8" = 1'-0"

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ARCHITECT
PBK Architects, Inc.
2520 VENTURE OAKS WAY SUITE 440
SACRAMENTO, CA 95833
916-682-9494 P
916-682-0990 F
PBK.com

MECHANICAL WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0800 P WESTON-ME.COM

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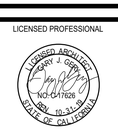
MARENGO RANCH ELEMENTARY SCHOOL
ROOF AND HVAC REPLACEMENT

1000 ELK HILS DRIVE, GALT, CA 95632

ADDEDUM #02

Building a Bright Future for All Learners
Galt Joint Union Elementary School District

LICENSED PROFESSIONAL



CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233
DATE: 08/03/2018
DRAWN BY: CR
CHECKED BY: KJ

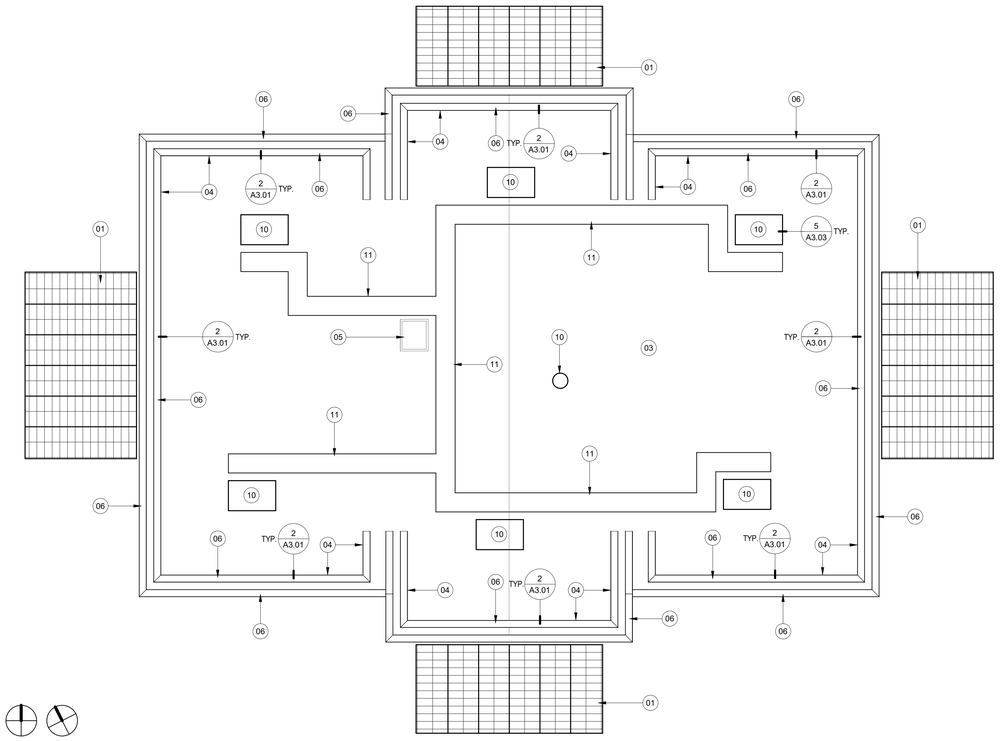
REVISIONS

No.	Description	Date

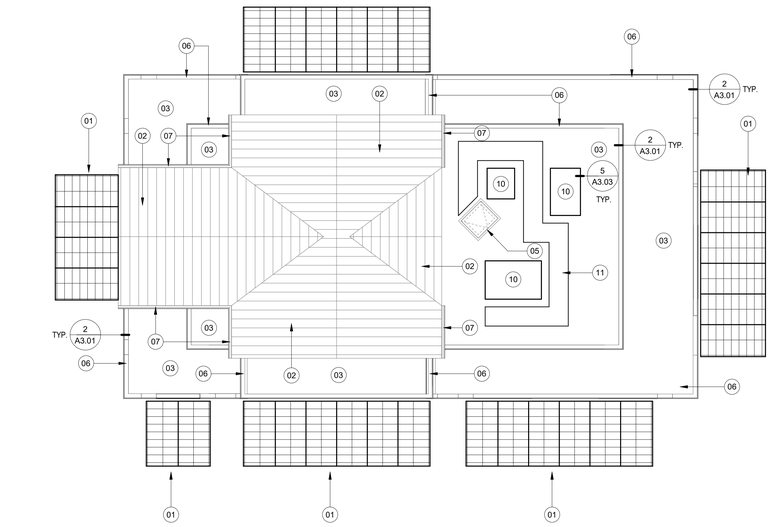
ADDEDUM #02

ROOF PLANS - BLDGS A,B & G

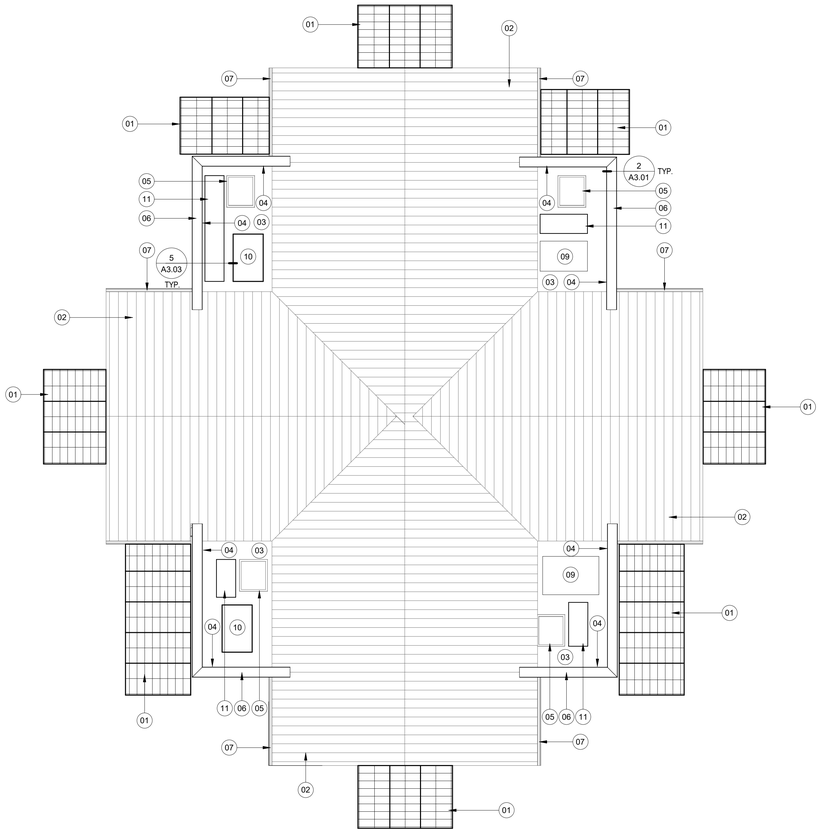
A3.01



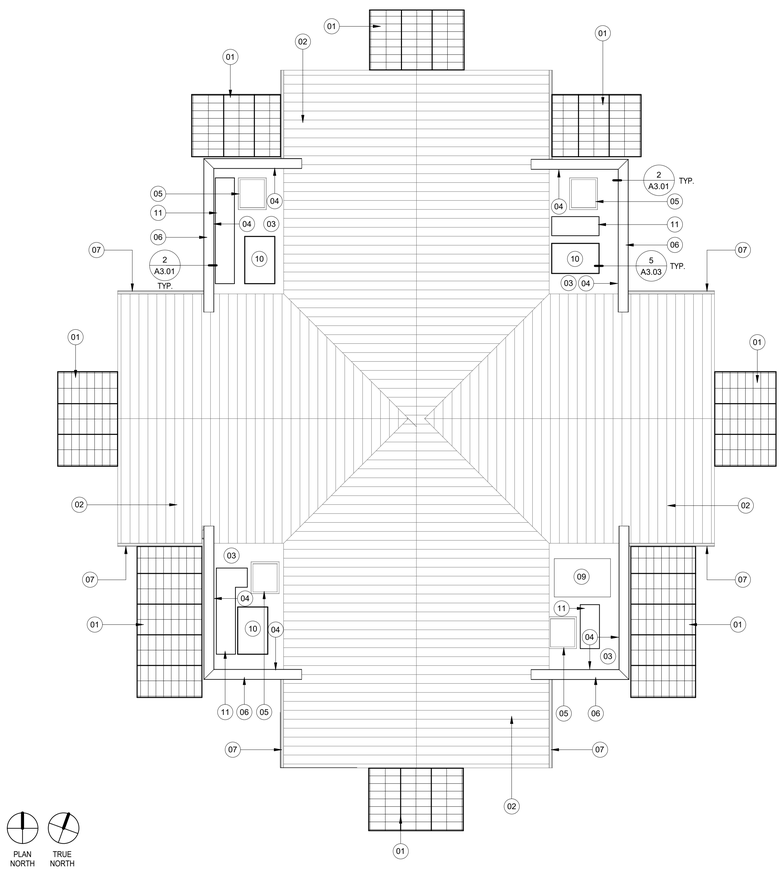
4 ROOF PLAN - BLDG H
1/8" = 1'-0"



3 ROOF PLAN - BLDG L
1/8" = 1'-0"



2 ROOF PLAN - BLDG E
1/8" = 1'-0"



1 ROOF PLANS - BLDGS C,E,H & L
1/8" = 1'-0"

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SACRAMENTO, CA 95833
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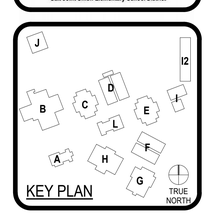
ADDEDUM #02

Building a Bright Future for All Learners
Galt Joint Union Elementary School District



LICENSED PROFESSIONAL

LICENSED ARCHITECT
JEREMY J. CHEN
No. C-17626
REN. 10-31-19
STATE OF CALIFORNIA

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE: 08/03/2018
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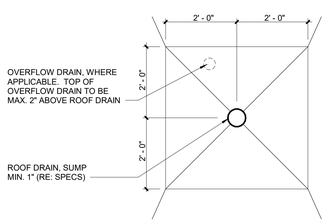
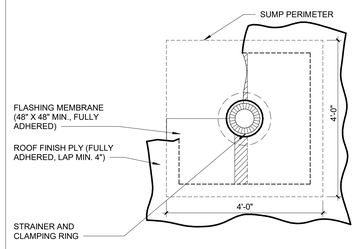
ROOF PLANS - BLDGS C,E,H & L

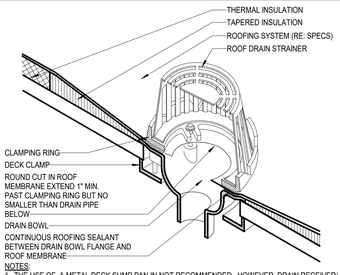
A3.02



10 ROOF DRAIN SUMP PLAN (FOR REF)
NOT TO SCALE

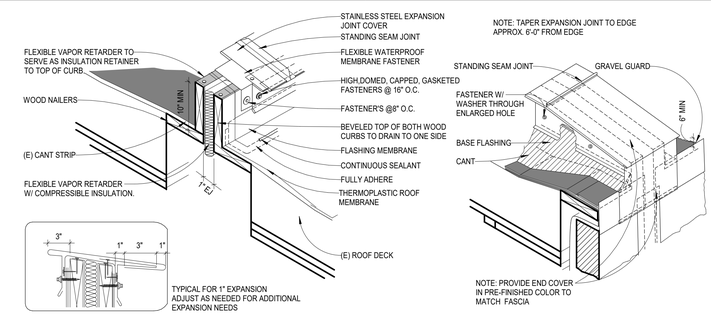


9 ROOF DRAIN PLAN (FOR REFERENCE)
NOT TO SCALE

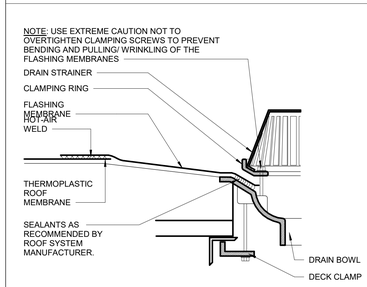


NOTES:
1. THE USE OF A METAL DECK SUMP PAN IN NOT RECOMMENDED. HOWEVER, DRAIN RECEIVER/ BEARING PLATES ARE APPLICABLE WITH SOME PROJECTS.
2. SLIP SHEET MAY BE REQUIRED BELOW MEMBRANE WHEN OVERLAYING SOME INSULATIONS OR SUBSTRATES.

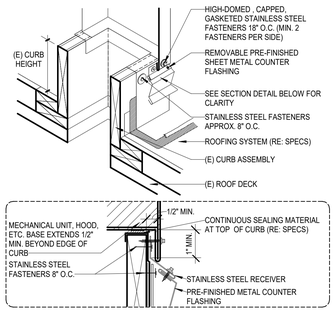
8 ROOF DRAIN (FOR REFERENCE)
NOT TO SCALE



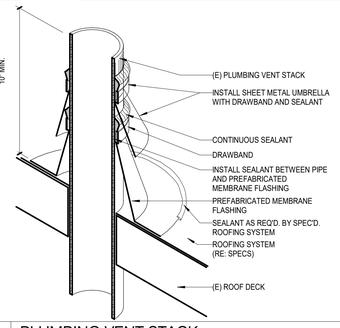
7 RAISED EXPANSION JOINT WITH COVER (FOR REFERENCE)
NOT TO SCALE



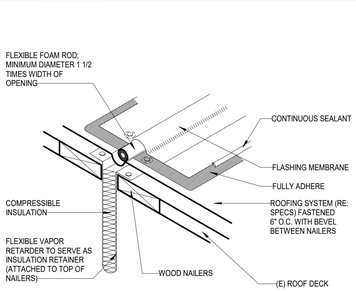
6 ROOF DRAIN SECTION (FOR REFERENCE)
NOT TO SCALE



5 EQUIPMENT CURB
NOT TO SCALE



4 PLUMBING VENT STACK
NOT TO SCALE



3 LOWRISE EJ (FOR REFERENCE)
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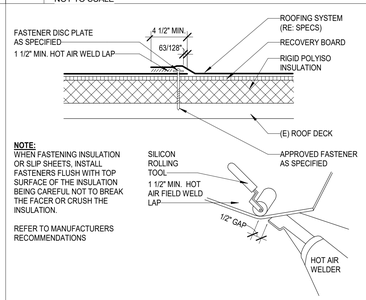
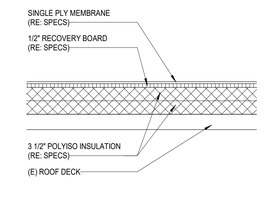


2 MEMBRANE LAP
NOT TO SCALE



1 NOMENCLATURE
NOT TO SCALE

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ARCHITECT
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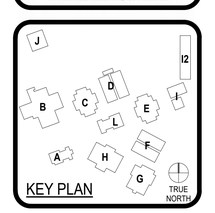
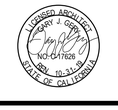


KEY PLAN

LICENSED PROFESSIONAL



CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE: 08/03/2018
DRAWN BY: Author
CHECKED BY: Checker

REVISIONS

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ADDEDUM #02

ROOFING DETAILS

A3.03

ANCHORAGE / BRACING NOTES

ALL MECHANICAL AND PLUMBING COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONTRACT DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2016 CBC, SECTION 1616A.1.18 THROUGH 1616A.1.26 AND ASCE 7-10, CHAPTERS 6 AND 40.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS, OR WATER.
3. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING MECHANICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.

B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD AND THE DSA DISTRICT STRUCTURAL ENGINEER. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.

PIPING AND DUCTWORK SYSTEM BRACING NOTE:

PIPING AND DUCTWORK SHALL BE BRACED TO COMPLY THE FORCE AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 14.4 AS DEFINED IN ASCE 7-10 SECTION 14.6.8, 14.6.7, AND 14.6.5.6, AND 2014 CBC, SECTIONS 1616A.1.24, 1616A.1.24, 1616A.1.25, AND 1615A.1.26.

THE BRACING AND ATTACHMENT TO THE STRUCTURE SHALL BE DETAILED ON THE APPROVED DRAWINGS OR THEY SHALL COMPLY WITH ONE OF THE OSHPD PRE-APPROVALS (OPM #) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 418, APPENDIX D.

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANDING AND BRACING OF THE PIPE AND DUCTWORK SYSTEMS.

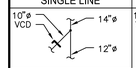
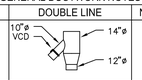
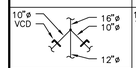
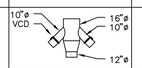
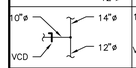
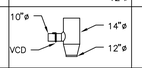
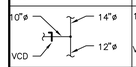
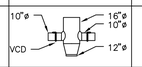
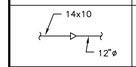
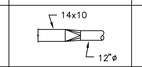
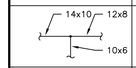
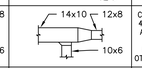
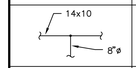
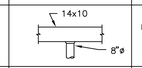
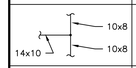
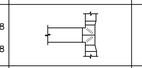
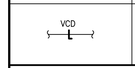
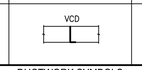
THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL NOTES

1. MECHANICAL AND PLUMBING DETAILS APPLY TO ALL BUILDINGS WHETHER REFERENCED OR NOT.
2. PROVIDE FIRE STOPPING ASSEMBLY PROTECTION FOR DUCT AND PIPE PENETRATIONS OF RATED ASSEMBLIES. FIRE STOP RATING SHALL MATCH RATED ASSEMBLY BEING PENETRATED.
3. CONTRACTOR TO OFFSET DUCTWORK AND PIPING AROUND SKYLIGHTS.
4. CONTRACTOR TO OFFSET DUCTWORK AND PIPING AROUND ROOF ACCESS LADDERS.
5. REFERENCE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF DIFFUSERS/GRILLES.
6. DUCTWORK AND/OR PIPING SHALL NOT PENETRATE INTO, OVER, OR THROUGH IT CLOSETS OR ELECTRICAL ROOMS UNLESS IT SERVES THAT SPECIFIC ROOM.
7. DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO SHOW EVERY OFFSET, FITTING, OR STRUCTURAL DIFFICULTY THAT MAY BE ENCOUNTERED DURING INSTALLATION OF WORK. THE CONTRACTORS SHALL COORDINATE LOCATION OF ALL DUCTWORK AND PIPING WITH ALL OTHER TRADES ON THIS PROJECT. LOCATION OF ALL ITEMS NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. EXACT LOCATIONS NECESSARY TO SECURE BEST CONDITIONS AND RESULTS MUST BE DETERMINED AT THE JOB SITE AND SHALL HAVE THE APPROVAL OF THE ARCHITECT BEFORE BEING INSTALLED.
8. CEILING SUPPLY AIR DIFFUSERS TO HAVE 4-WAY BLOW PATTERN UNLESS SHOWN OTHERWISE.
9. ALL VALVES SHALL BE FULL LINE SIZES UNLESS NOTED OTHERWISE.
10. DUCTWORK AND PIPING SHALL BE SUPPORTED IN ACCORDANCE TO SMACNA "GUIDELINES FOR SEISMIC RESTRAINTS OF MECHANICAL AND PLUMBING PIPING SYSTEMS".
11. ACCESS PANELS SHALL BE PROVIDED AS NECESSARY TO PROPERLY ACCESS THE VALVES, EQUIPMENT, ACTUATORS, AND DAMPERS.
12. REFERENCE ARCHITECTURAL DRAWINGS FOR BUILDING DIMENSIONS, EXACT LOCATIONS OF DIFFUSERS, GRILLES, AND MOUNTING HEIGHTS.
13. CONCEAL ALL PIPING AND DUCTWORK IN WALL FURRINGS, PARTITIONS, ABOVE CEILINGS, EXCEPT IN MECHANICAL ROOMS OR WHERE NOTED OTHERWISE.
14. THERMOSTATS TO BE INSTALLED AT 46" AFF (TOP OF THERMOSTAT). DO NOT INSTALL THERMOSTATS OVER CASEWORK OR SHELVING OVER 24" IN DEPTH AND 44" IN HEIGHT.

DUCTWORK LEGEND

GENERAL DUCTWORK NOTES

SINGLE LINE	DOUBLE LINE	NOTES / DESCRIPTION
		45° BRANCH REDUCING LATERAL LOW LOSS
		45° REDUCING LATERAL, CROSS LOW LOSS
		90° TEE LOW LOSS
		90° TEE CROSS LOW LOSS
		SQUARE TO ROUND
		CONVERGING OR DIVERGING TEE, 45° ENTRY, RECTANGULAR MAIN AND BRANCH. WHEN REDUCING MAIN, SIDE OF TAKEOFF OR ENTRY BRANCH TO BE FLAT, OTHER SIDES MAX. SLOPE OF 1:4
		ROUND DUCT TAKE OFF FROM RECTANGULAR VIA SMOOTH CONVERGING BELL MOUTH
		RECTANGULAR DUCT TEE THROAT SIZED FOR EQUAL PRESSURE DROP
		VOLUME CONTROL DAMPER

DUCTWORK SYMBOLS

	FLEXIBLE DUCTWORK
	DUCT (FIRST FIGURE SIDE SHOWN, SECOND FIGURE SIDE NOT SHOWN)
	LINED DUCT (FIRST FIGURE SIDE SHOWN, SECOND FIGURE SIDE NOT SHOWN)
	EXHAUST AIR DUCT SECTION
	RETURN AIR DUCT SECTION
	SUPPLY AIR DUCT SECTION
	DROP IN DIRECTION OF ARROW
	RISE IN DIRECTION OF ARROW
	TURNING VANES

APPLICABLE CODES

ALL WORK PERFORMED UNDER THIS CONTRACT IS TO CONFIRM TO THE FOLLOWING CODES AND REGULATIONS:

1. CALIFORNIA CODE OF REGULATIONS – TITLE 24
2. CALIFORNIA BUILDING CODE, 2016
3. CALIFORNIA MECHANICAL CODE, 2016
4. CALIFORNIA PLUMBING CODE, 2016
5. CALIFORNIA FIRE CODE, 2016
6. CALIFORNIA ELECTRICAL CODE, 2016
7. CALIFORNIA BUILDING ENERGY EFFICIENCY STANDARDS, 2016

THE ABOVE CODES AND REGULATIONS REFER TO THE LATEST EDITION OR REVISION IF FORCE ON THE DATE OF THE CONTRACT, UNLESS OTHERWISE STATED. NOTHING ON THE DRAWINGS IS TO BE CONSTRUED AS REQUIRING OR PERMITTING WORK THAT IS CONTRARY TO THE LISTED CODES AND REGULATIONS, OR OTHER LOCAL, STATE OR FEDERAL CODES OR REGULATIONS WHICH MAY BE APPLICABLE.

MECHANICAL LEGEND

ABBREVIATIONS

ABC	ABOVE FINISHED CEILING	FLR	FLOOR	OC	ON CENTER
AC	AIR CONDITIONING	FPM	FEET PER MINUTE	PC	PUMPED CONDENSATE
ACU	AIR CONDITIONING UNIT	FS	FLOW SWITCH	PD	PRESSURE DROP
AD	ACCESS DOOR	FSD	FIRE SMOKE DAMPER	PF	PRE FILTER
AFF	ABOVE FINISHED FLOOR	FT	FEET	PH	PHASE
AFC	ABOVE FINISHED CEILING	GA	GAUGE	PLBG	PLUMBING
AHU	AIR HANDLING UNIT	GC	GENERAL CONTRACTOR	POC	POINT OF CONNECTION
AP	ACCESS PANEL	GALV	GALVANIZED	POD	POINT OF DISCONNECTION
APD	AIR PRESSURE DROP	GSM	GALVANIZED SHEET METAL	PRV	PRESSURE REDUCING VALVE
AVV	AUTOMATIC AIR VENT	GPH	GALLONS PER HOUR	PS	PRESSURE SWITCH
ARCH	ARCHITECT	GPM	GALLONS PER MINUTE	PSI	POUNDS PER SQUARE INCH
BAS	BUILDING AUTOMATION SYSTEM	GV	GATE VALVE	PSIG	POUNDS PER SQUARE INCH GAUGE
BDD	BACK DRAFT DAMPER	HC	HEATING COIL	R	RISER
BF	BELOW FLOOR	HP	HORSEPOWER	RA	RETURN AIR
BHP	BRAKE HORSEPOWER	HPR	HIGH PRESSURE CONDENSATE RETURN	RAD	RETURN AIR DAMPER
BOD	BOTTOM OF DUCT	HPS	HIGH PRESSURE STEAM, ABOVE 60 PSIG	RD	REFRIGERANT DISCHARGE
BOP	BOTTOM OF PIPE	HR	HOUR	RF	RELIEF FAN
BTUH	BRITISH THERMAL UNIT PER HOUR	HRP	HEAT RECOVERY PUMP	RH	RELATIVE HUMIDITY
BV	BUTTERFLY VALVE	HRR	HEAT RECOVERY RETURN	RHC	REHEAT COIL
CA	COMPRESSED AIR	HRS	HEAT RECOVERY SUPPLY	RL	REFRIGERANT LIQUID
CAP	CAPACITY	HVAC	HEATING VENTILATING & AIR CONDITIONING	RLA	RUNNING LOAD AMPS
CAV	CONSTANT AIR VOLUME	HWP	HEATING WATER PUMP	RM	ROOM
CC	CENTER TO CENTER	HWR	HEATING WATER RETURN	RPM	REVOLUTIONS PER MINUTE
CD	CONDENSATE DRAIN	HWS	HEATING WATER SUPPLY	RS	REFRIDGERANT SUCTION
CEF	CEILING EXHAUST FAN	HXR	HEAT EXCHANGER	RTS	REFER TO SPECIFICATIONS
CFM	CUBIC FEET PER MINUTE	ID	INSIDE DIAMETER	SA	SUPPLY AIR
CHWP	CHILLED WATER PUMP	IN WC	INCHES OF WATER COLUMN	SCD	SECONDARY CONDENSATE DRAIN
CHWR	CHILLED WATER RETURN	KW	KILOWATTS	SCH	SCHEDULE
CHWS	CHILLED WATER SUPPLY	KWH	KILOWATT HOUR	SCR	STEAM CONDENSATE RETURN
CO2	CARBON DIOXIDE	LAT	LEAVING AIR TEMPERATURE	SF	SUPPLY FAN
CU	CONDENSING UNIT	LBS	POUNDS	SHT	SHEET
CV	CONTROL VALVE	LDB	LEAVING DRY BULB	SHWP	SECONDARY HEATING WATER PUMP
CWP	CONDENSING WATER PUMP	LWB	LEAVING WET BULB	SM	SHEET METAL
CWR	CONDENSING WATER RETURN	LP	LOW PRESSURE	SMS	SHEET METAL SCREW
CWS	CONDENSING WATER SUPPLY	LPR	LOW PRESSURE CONDENSATE RETURN	SP	STATIC PRESSURE
D	DROP	LPS	LOW PRESSURE STEAM, 5-15 PSIG	SPD	STATIC PRESSURE DROP
DB	DRY BULB TEMPERATURE	LWT	LEAVING WATER TEMPERATURES	SQFT	SQUARE FEET
DET	DETAIL	LRA	LOCKED ROTOR AMPS	SQIN	SQUARE INCHES
DIA	DIAMETER	MAV	MANUAL AIR VENT	SS	STAINLESS STEEL
DIS	DEIONIZED (PURE) STEAM	MAX	MAXIMUM	TA	TO ABOVE
DN	DOWN	MBH	1,000 BRITISH THERMAL UNITS PER HOUR	TB	TO BELOW
DSD	DUCT SMOKE DETECTER	MC	MECHANICAL CONTRACTOR	TCV	TEMPERATURE CONTROL VALVE
DTR	DUCT THRU ROOF	MCC	MOTOR CONTROL CENTER	TG	TRANSFER GRILLE
DWG	DRAWING	MD	MANUEL DAMPER	TH	THERMOMETER
(E)	EXISTING	MFR	MANUFACTURER	TSP	TOTAL STATIC PRESSURE
(ER)	EXISTING RELOCATED	MIN	MINIMUM	TSTAT	THERMOSTAT
EA	EXHAUST AIR	MISC	MISCELLANEOUS	TYP	TYPICAL
EAD	EXHAUST AIR DAMPER	MPR	MEDIUM PRESSURE CONDENSATE RETURN	UON	UNLESS OTHERWISE NOTED
EAT	ENTERING AIR TEMPERATURE	(N)	NEW	UG	UNDER GROUND
EF	EXHAUST FAN	NC	NORMALLY CLOSED	UF	UNDER FLOOR
ELEC	ELECTRICAL	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	V	VOLTS
ESP	EXTERNAL STATIC PRESSURE	NIC	NOT IN CONTRACT	VAV	VARIABLE AIR VOLUME
ET	EXPANSION TANK	NO	NORMALLY OPEN	VD	VOLUME DAMPER
EWT	ENTERING WATER TEMPERATURE	NTS	NOT TO SCALE	VFD	VARIABLE FREQUENCY DRIVE
°F	DEGREES FAHRENHEIT	NA	NOT APPLICABLE	VLV	VALVE
FA	FROM ABOVE	OA	OUTSIDE AIR	WB	WET BULB
FB	FROM BELOW	OAD	OUTSIDE AIR DAMPER	WPD	WATER PRESSURE DROP
FC	FLEXIBLE CONNECTION	OBD	OPPOSED BLADE DAMPER	WMS	WIRE MESH SCREEN
FCU	FAN COIL UNIT			W/	WITH
FD	FIRE DAMPER			W/O	WITHOUT
FF	FINAL FILTER			WT	WEIGHT
FFU	FAN/FILTER UNIT			$	ON/OFF SWTCH/STARTER
FLA	FULL LOAD AMPS				

SYMBOLS

RL	REFRIGERANT LIQUID LINE PIPING		BALL VALVE
RS	REFRIGERANT SUCTION LINE PIPING		BALANCE VALVE
	FLOW IN DIRECTION OF ARROW		BUTTERFLY VALVE
	REDUCER		CHECK VALVE
	OUTSIDE AIR INTO LOUVER		LEVER HANDLE GAS COCK
	RETURN OR EXHAUST AIR INTO REGISTER		PRESSURE REDUCING VALVE
	SUPPLY AIR FROM REGISTER		SOLENOID VALVE W/ MOTOR ACTUATOR
			STRAINER
	SUPPLY AIR GRILLE ID SIZE / CFM		PRESSURE GAUGE
	RETURN AIR GRILLE ID SIZE / CFM		THERMOMETER
	EXHAUST AIR GRILLE ID SIZE / CFM		UNION
			VALVE BOX
			CAP (END OF PIPE)
	ITEM TO BE REMOVED / DEMOED		CIRCULATING PUMP
	ITEM TO BE ABANDONED IN PLACE	ø	DIAMETER
ROOM NAME --	ROOM NAME AND NUMBER		ROOM THERMOSTAT
			POINT OF CONNECTION
			POINT OF DISCONNECTION

PBK

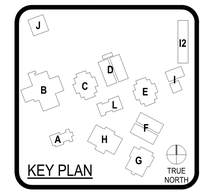
ARCHITECT PBK Architects, Inc.
PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

REGISTERED PROFESSIONAL ENGINEER ADAM C. DAVIS M 34869 MECHANICAL STATE OF CALIFORNIA

MARENGO RANCH ELEMENTARY SCHOOL ROOF AND HVAC REPLACEMENT
1000 ELK HILLS DRIVE,
GALT, CA 95632
CONSTRUCTION DOCUMENTS

Building a Bright Future for All Learners
Galt Joint Union Elementary School District



Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233

DATE 08/09/2018

REVISIONS

No.	Description	Date

-

HVAC LEGENDS & NOTES

M0.01

AIR CONDITIONING UNIT SCHEDULE

(N) EQUIPMENT ID	(E) UNIT ID (FROM RECORD DWGS	PREVIOUS DSA #	"CARRIER" MODEL NUMBER	NOMINAL TONNAGE	SUPPLY AIR BLOWER					MINIMUM COOLING CAPACITY (MBH @ ARI CONDITIONS)		HEATING CAPACITY (MBH)		MINIMUM SEER / (EER)	UNIT ELECTRICAL DATA					MIRCROMETL ADAPTOR CURB MODEL #	MIRCROMETL POWER EXHAUST MODEL #	POWER EXHAUST ELECTRICAL DATA					MINIMUM OUTSIDE AIR (CFM)	(E) INSTALLED UNIT WEIGHT (LBS.)	(N) INSTALLED UNIT WEIGHT (LBS.)	NOTES
					DESIGN CFM	NOMINAL CFM	HP	bHP	ESP	(GROSS) TOTAL	(NET) SENSIBLE	INPUT	OUTPUT		VOLTS	PHASE	HERTZ	MCA	MOCP			VOLTS	PHASE	HERTZ	FLA	HP				
AC B1	AC B1	95-62934	CARRIER WEATHEREXPERT 48HCDD08A2A6-0A0G0	7.5 TON	3,000	3,000	1.25	1.06	0.5	88.21	70.23	90 125	73 103	(12.0)	460	3	60	20	25	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.9	1/2	700	1575	1165	(N) UNIT BASE WEIGHT = 960 LBS, (E) CURB = 130 LBS, (N) ACCESSORIES = 70 LBS. WEIGHT DIFFERENCE = 105 LBS. | 9% HEAVIER
AC B2	AC B2	95-62934	CARRIER WEATHEREXPERT 48TCDD14A3A6-0A0G0	12.5 TON	5,000	5,000	4.0	4.0	0.80	142.97	103.97	120/180	98/148	(10.8)	460	3	60	33	40	NOT REQUIRED	PECD-SRT34CA-D2DH-4M3	460	3	60	4.3	3/4	1500	1800	1654	(N) UNIT BASE WEIGHT = 1202 LBS, (E) CURB = 185 LBS, (N) ACCESSORIES = 267 LBS. WEIGHT DIFFERENCE = -146 LBS. | 8% LIGHTER
AC B4	AC B4	95-62934	CARRIER WEATHEREXPERT 48VGNB240403-TP	2 TON	803	803	0.5	0.5	0.23	20.84	16.84	40	33	15 SEER	208	1	60	19.4	30	CA-CAR-SDCSM-CAR-529	NOT REQUIRED	--	--	--	--	--	50	630	592	(N) UNIT BASE WEIGHT = 344 LBS, (E) CURB = 90 LBS, (N) CURB ADAPTER = 133 LBS, (N) ACCESSORIES = 158 LBS. WEIGHT DIFFERENCE = -38 LBS. | 6% LIGHTER
AC G1	AC C1	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC G2	AC C2	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC C1	AC D1	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC C3	AC D3	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC C4	AC D4	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC E1	AC E1	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A6-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC E3	AC E3	95-62934	48LCL006A2A5-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC L1	AC F1	95-62934	CARRIER WEATHEREXPERT 48LCL006A2A5-0A0A0	5 TON	2,000	2,000	1.25	1.25	0.65	57.5	45.9	60.0	49.0	16.2 SEER	460	3	60	15	20	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.1	1/2	450	1050	769	(N) UNIT BASE WEIGHT = 630 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 49 LBS. WEIGHT DIFFERENCE = 69 LBS. | 10% HEAVIER
AC L2	AC F2	95-62934	CARRIER WEATHEREXPERT 48HCDD09A2A6-0A0G0	8.5 TON	3,400	3,400	1.72	1.72	0.80	97.79	78.62	90/125	73/103	(12.0)	460	3	60	20	25	NOT REQUIRED	PECD-SRT12CA-D2DH-4MH	460	3	60	1.9	1/2	450	1590	1360	(N) UNIT BASE WEIGHT = 960 LBS, (E) CURB = 130 LBS, (N) POWER EXHAUST = 267 LBS, (N) ACCESSORIES = 267 LBS. WEIGHT DIFFERENCE = -230 LBS. | 14% LIGHTER
AC L3	AC F3	95-62934	CARRIER WEATHEREXPERT 48VGNA420606	3.5 TON	803	803	0.5	0.5	0.19	20.84	16.84	40	33	15 SEER	460	3	60	11.5	15	CA-CAR-SDCL-CAR-529	NOT REQUIRED	--	--	--	--	--	100	720	720	(N) UNIT BASE WEIGHT = 447 LBS, (E) CURB = 90 LBS, (N) CURB ADAPTER = 147 LBS, (N) ACCESSORIES = 35 LBS. WEIGHT DIFFERENCE = 0 LBS. | 0% LIGHTER
AC H1	AC G1	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER
AC H2	AC G2	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER
AC H3	AC G3	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER
AC H4	AC G4	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER
AC H5	AC G5	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER
AC H6	AC G6	95-62934	CARRIER WEATHEREXPERT 48LCL005A0A5-0A0A0	4 TON	1,600	1,600	1.0	1.0	0.6	45.79	35.04	60	49	17.5	208	3	60	29	40	NOT REQUIRED	PECD-SRT12CA-D2DH-2MH	208	3	60	2.3	1/2	450	1030	900	(N) UNIT BASE WEIGHT = 620 LBS, (E) CURB = 90 LBS, (N) ACCESSORIES = 189 LBS. WEIGHT DIFFERENCE = -130 LBS. | 12% LIGHTER

NOTES:

1. DATA ON EXISTING UNITS SHOWN FOR INFORMATION ONLY.
2. COOLING CAPACITIES ARE LISTED AT NOMINAL CFM (400 CFM/TON) AT ARI CONDITIONS – 95°F AMBIENT, 80°F DB / 67°F WB. REFERENCE FLOORPLANS FOR ACTUAL DESIGN CFM AND BALANCE ACCORDINGLY.
3. UNLESS NOTED OTHERWISE, PROVIDE ALL UNITS WITH THE FOLLOWING MANUFACTURER'S OPTIONS / ACCESSORIES:
   - COIL GUARDS
   - HINGED ACCESS PANELS
   - 2" FILTERS (MERV 8 PLEATED FILTERS)
   - FOIL FACED INSULATION
   - 0-100% DRY BULB ECONOMIZER
   - BASE ELECTROMECHANICAL CONTROLS
   - ULTRA LOW LEAK ECONOMIZER WITH POWER EXHAUST AND BELIMO ACTUATOR (FOR CONTROL BY BMS) FOR FOUR TON AND HIGHER UNITS.
4. LISTED OPERATING WEIGHT INCLUDES EXISTING CURB WEIGHT, NEW UNIT WEIGHT, NEW ADAPTOR CURB WEIGHT (IF APPLICABLE), AND ALL NEW ACCESSORIES.
5. LISTED UNIT MCA/MOCP IS ONLY FOR THE CARRIER AC UNIT AND DOES NOT INCLUDE POWER EXHAUST AMPERAGE.
6. LISTED (E) INSTALLED UNIT WEIGHT IS LISTED UNIT WEIGHT FROM DSA APPROVED RECORD DRAWINGS.
7. LISTED (N) INSTALLED UNIT WEIGHT IS WEIGHT OF NEW UNIT AND ALL ACCESSORIES INCLUDING: (E) CURB, NEW UNIT, ADAPTOR CURB (AS MAY BE NECESSARY), AND NEW UNIT ACCESSORIES.
8. CARRIER MODEL LC SERIES COOLING LOAD LISTED AT SECOND STAGE COOLING.
9. AUTOMATIC SMOKE SHUT OFF NOTES:
   - AC UNITS AC/C3, AC/C4, AC/E1, E2, F1, AND F2 ARE ALL IN EXCESS OF 2,000 CFM; HOWEVER, THESE UNITS MEET THE CMC 608.1, EXCEPTION (2). THESE UNITS SERVE AREAS WHICH HAVE DIRECT ACCESS TO THE EXTERIOR WITH A TRAVEL DISTANCE LESS THAN 100 FEET.
   - AC UNIT AC/E3 TO BE PROVIDED WITH DUCT SMOKE DETECTOR WITHIN SUPPLY AIR DUCT (IF EXISTING IS NOT ALREADY INSTALLED). WIRE DUCT SMOKE DETECTOR TO SHUT DOWN UNIT UPON DETECTION OF SMOKE.

MAKE UP AIR UNIT

SYMBOL	DESCRIPTION
MAU B1	"REZNOR" MODEL RDH-350 350 MBH GAS INPUT, 283.5 MBS GAS OUTPUT. 3,500 CFM AT 1.0" WC ESP. 1084 RPM, 2 HP FAN, 208V/3PH/60HZ, 9.58 FLA, 11.33 MCA, 15 MOP. EXISTING UNIT CURB IS 51" WIDE x 101" LONG. PROVIDE TRANSITION CURB TO NEW UNIT. PROVIDE UTILITY CONNECTIONS ON THE SAME SIDE OF THE UNIT AS (E) UTILITIES. CONTRACTOR SHALL FIELD VERIFY CURB DIMENSIONS AND UTILITY CONNECTIONS PRIOR TO ORDERING THE EQUIPMENT. (E) UNIT WEIGHT INCLUDING CURB 1,650 LBS NEW UNIT WEIGHT 1,336 LBS + 150 LBS TRANSITION CURB + 160 LBS (E) CURB = 1646 LBS 4 LBS LIGHTER

EXHAUST FAN SCHEDULE

SYMBOL	(E) UNIT ID (FROM RECORD DWGS	OLD DSA APPLICAITON #	MANUFACTURER & MODEL NUMBER	TOTAL CFM	EXTERNAL SP (" W.G.)	ELECTRICAL			MOTOR HP / bHP	MAXIMUM UNIT WEIGHT (LBS)	NOTES
						VOLTS	PHASE	HERTZ			
HEF B1	HEF B1	95-62934	COOK MODEL VCR-HP-150VH6B	1,200	1.50	208	3ø	60	3/4 HP 0.719 bHP	175	NEW FAN – RE-INSTALL ON EXISTING VENTED CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.
HEF B2	HEF B2	95-62934	COOK MODEL VCR-HP-165VH7B	2,000	1.50	208	3ø	60	1 HP 0.938 bHP	200	NEW FAN – RE-INSTALL ON EXISTING VENTED CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.
HEF B3	HEF B3	95-62934	COOK MODEL ACRU-B-100R3B	700	0.50	120	1ø	60	1/4 HP 0.159 bHP	100	NEW FAN – RE-INSTALL ON EXISTING VENTED CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.
REF B1	REF B1	95-62934	COOK MODEL ACE-B-135C3B	1340	0.50	120	1ø	60	1/4 HP 0.229 bHP	115	NEW FAN – RE-INSTALL ON EXISTING CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.
REF G1	REF C1	95-62934	COOK MODEL ACE-B-120C3B	830	0.50	120	1ø	60	1/4 HP 0.128 bHP	115	NEW FAN – RE-INSTALL ON EXISTING CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.
REF H1	REF G1	95-62934	COOK MODEL ACE-B-80C3B	560	0.375	120	1ø	60	1/4 HP 0.188 bHP	100	NEW FAN – RE-INSTALL ON EXISTING CURB. PROVIDE ADAPTOR CURB AS NECESSARY – FIELD VERIFY.

NOTES:

1. DATA ON EXISTING UNITS SHOWN FOR INFORMATION ONLY.
2. PROVIDE WITH ADAPTOR CURB – FIELD VERIFY DIMENSIONS OF EXISTING CURB PRIOR TO ORDERING ADAPTOR CURB.
3. PROVIDE THE FOLLOWING ACCESSORIES ON ALL EXHAUST FANS:
   - NEMA 3R FACTORY MOUNTED/WIRED EXTERNAL DISCONNECT.
   - GALVANIZED BACKDRAFT DAMPERS (REPLACE EXISTING DAMPERS)
   - GALVANIZED BIRDSCREENS

PBK
ARCHITECT PBK Architects, Inc.
PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

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MECHANICAL
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MARENGO RANCH ELEMENTARY SCHOOL ROOF AND HVAC REPLACEMENT
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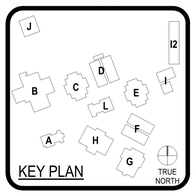

Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233

DATE 08/09/2018

REVISIONS

No.	Description	Date

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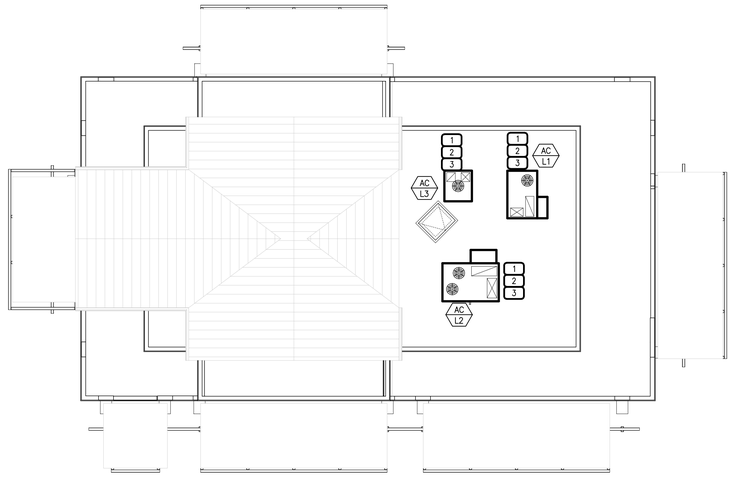
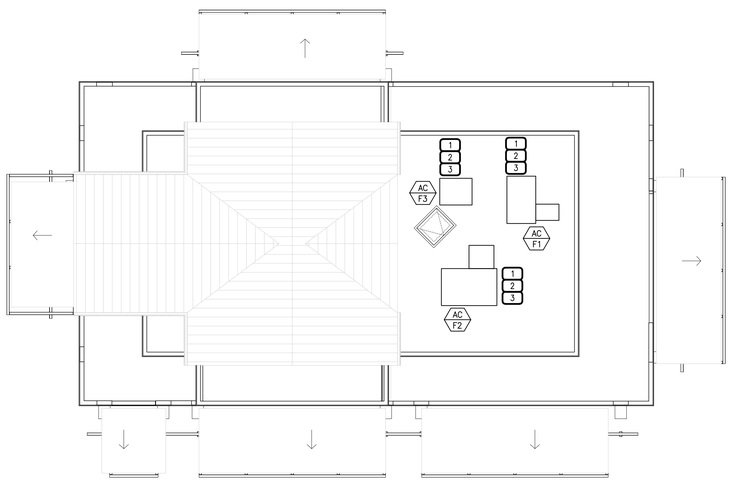
HVAC SCHEDULES

M0.02



24 HVAC ROOF PLAN L
1/8" = 1'-0"



SHEET NOTES

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2	DISCONNECT (E) GAS FROM UNIT. RECONNECT TO NEW UNIT. EXTEND AS REQUIRED. REPLACE (E) SOV WITH NEW. SEE DETAILS FOR ADDITIONAL DETAILS/NOTES.
3	DISCONNECT (E) CD FROM UNIT. PROVIDE NEW TRAP AND RECONNECT TO PIPING WITHIN THE CURB
4	REMOVE/REPLACE (E) RELIEF VENT. FIELD VERIFY SIZE PRIOR TO ORDERING. RE-INSTALL ON EXISTING CURB.
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6 HVAC DEMO ROOF PLAN L
1/8" = 1'-0"

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ARCHITECT PBK Architects, Inc.
PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES
MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

REGISTERED PROFESSIONAL ENGINEER
ADAM C. DAVIS
M 34869
EXPIRE 06/30/19
MECHANICAL
STATE OF CALIFORNIA

MARENGO RANCH ELEMENTARY SCHOOL ROOF AND HVAC REPLACEMENT
1000 ELK HILLS DRIVE,
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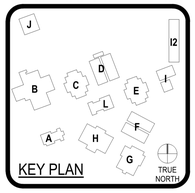

Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233
DATE 08/09/2018

REVISIONS

No.	Description	Date

-

HVAC ROOF PLANS BLDG L

M3.01

SHEET NOTES

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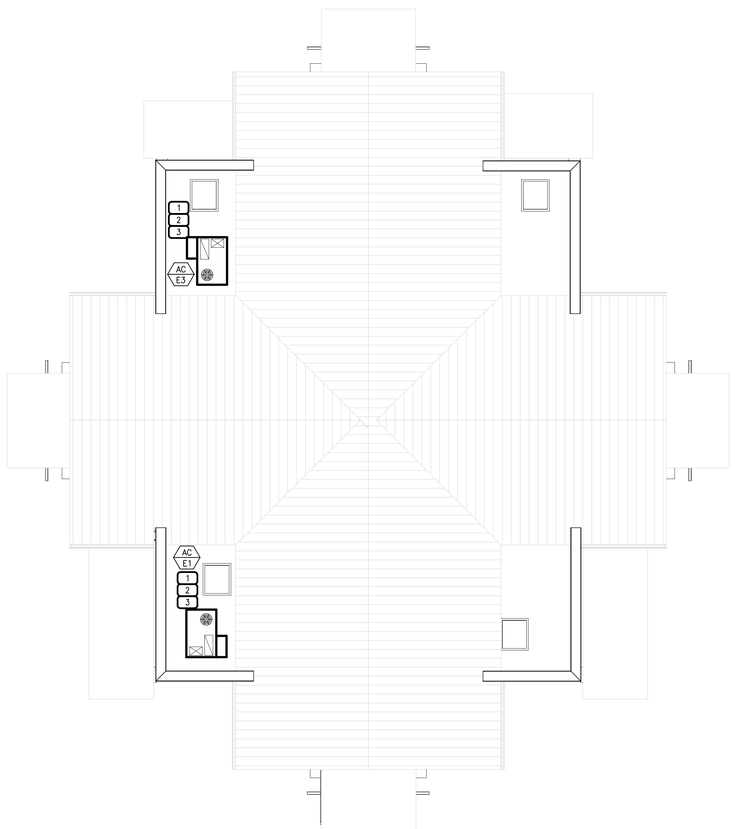
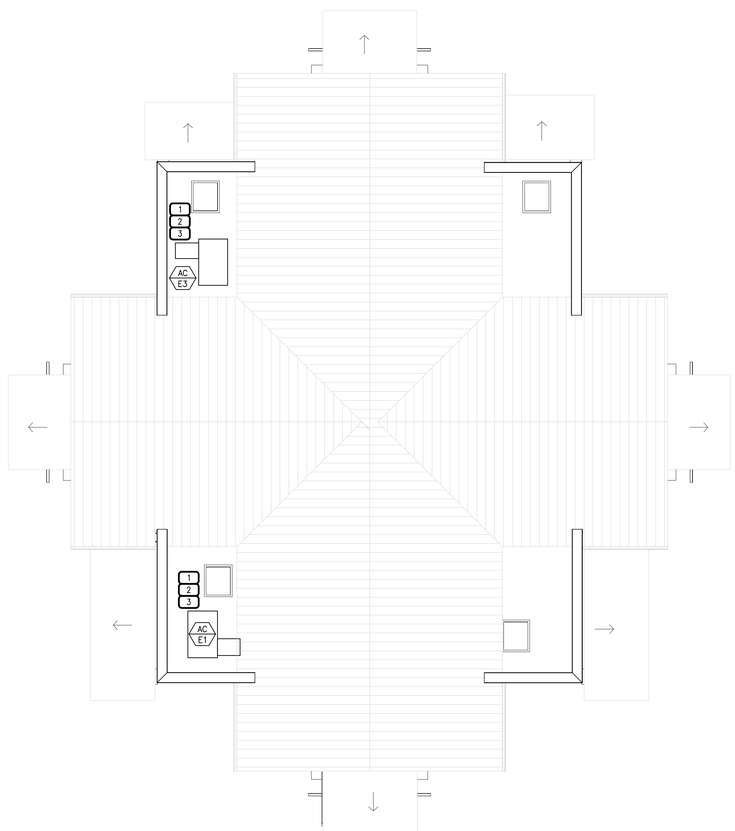


6 HVAC ROOF PLAN BLDG E
1/8" = 1'-0"



3 HVAC DEMO ROOF PLAN BLDG E
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ARCHITECT PBK Architects, Inc.
PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

REGISTERED PROFESSIONAL ENGINEER
ADAM C. DAVIS
M 34862
EXPIRES 06/30/20
MECHANICAL
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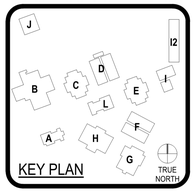

KEY PLAN

Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE 08/09/2018

REVISIONS

No.	Description	Date

-

HVAC
ROOF PLANS
BLDG E

M3.02

SHEET NOTES

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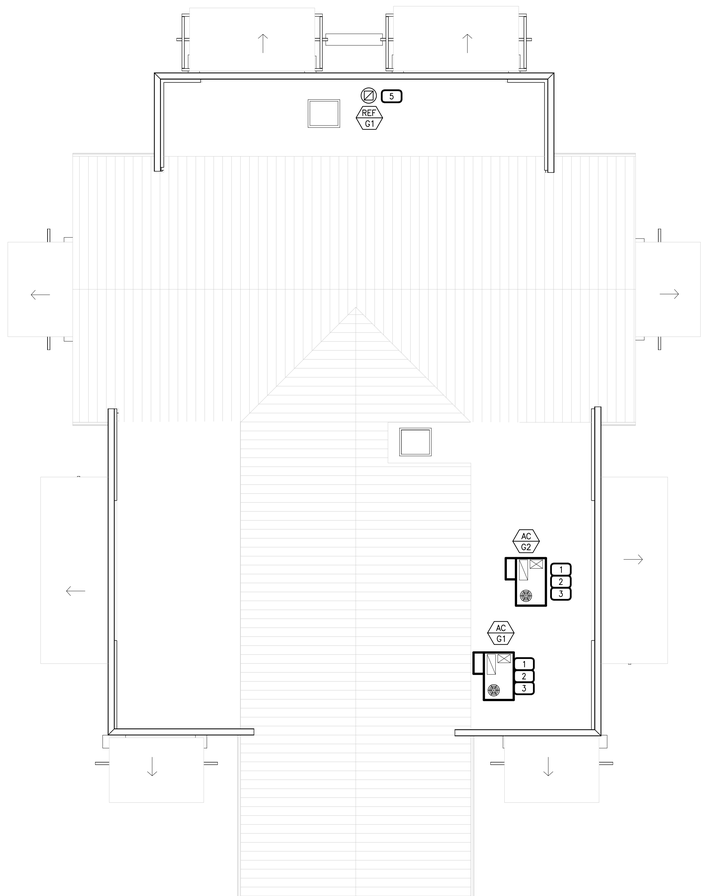
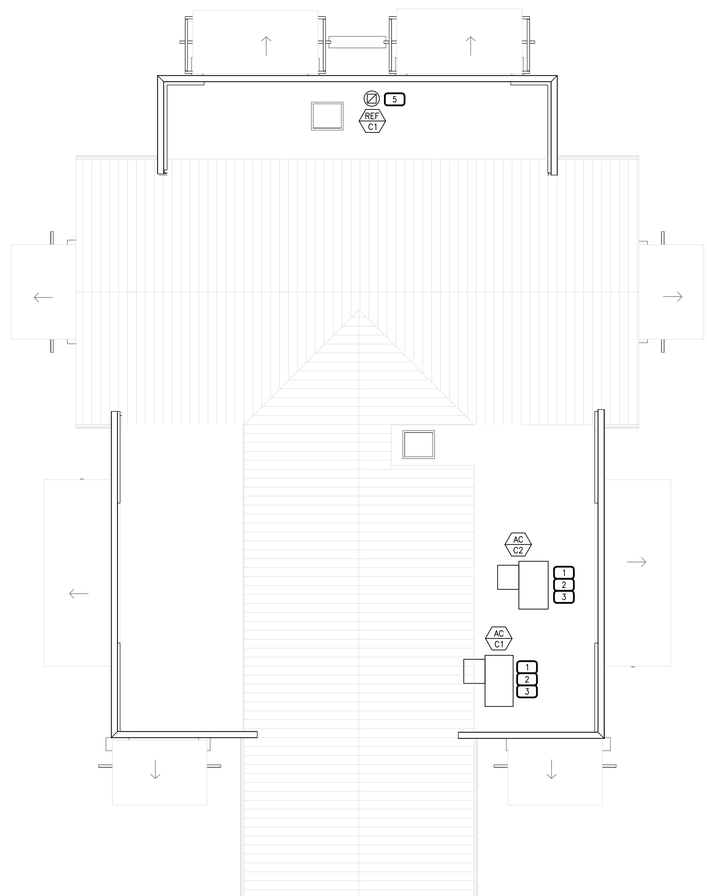


6 HVAC ROOF PLAN BLDG G
1/8" = 1'-0"



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ARCHITECT PBK Architects, Inc.
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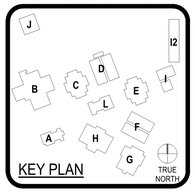

Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233

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HVAC
ROOF PLANS
BLDG G

M3.03

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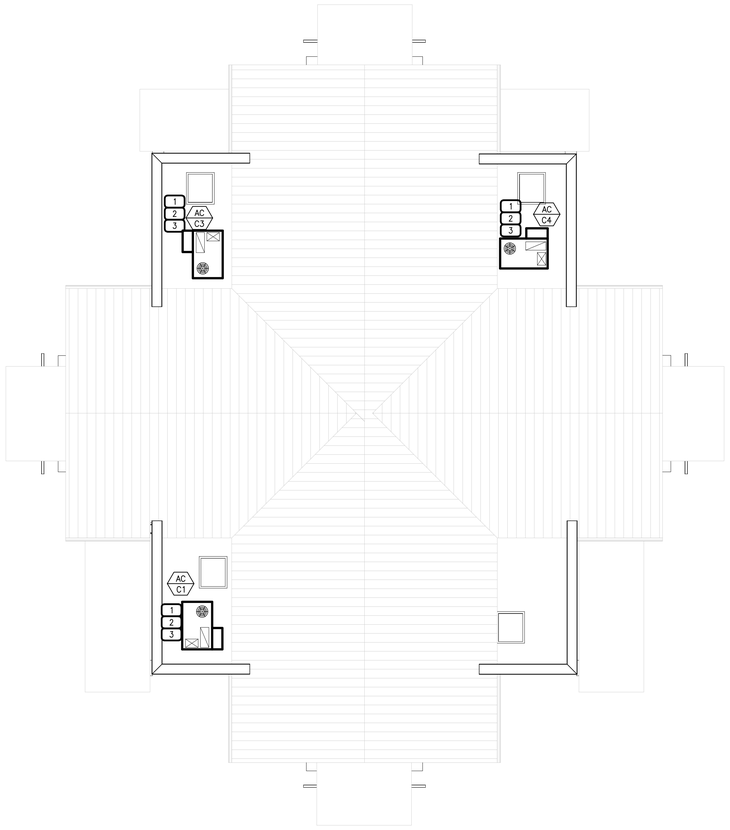
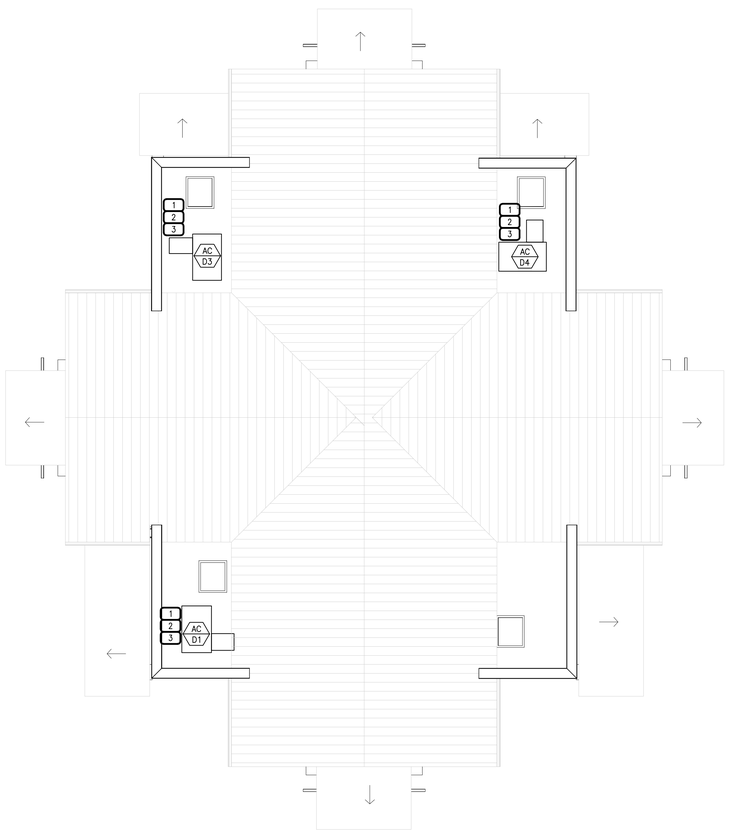


6 HVAC ROOF PLAN BLDG C
1/8" = 1'-0"



3 HVAC DEMO ROOF PLAN BLDG C
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ARCHITECT PBK Architects, Inc.
PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

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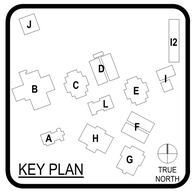

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CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER 17233

DATE 08/09/2018

REVISIONS

No.	Description	Date

-

HVAC ROOF PLANS BLDG C

M3.04

SHEET NOTES

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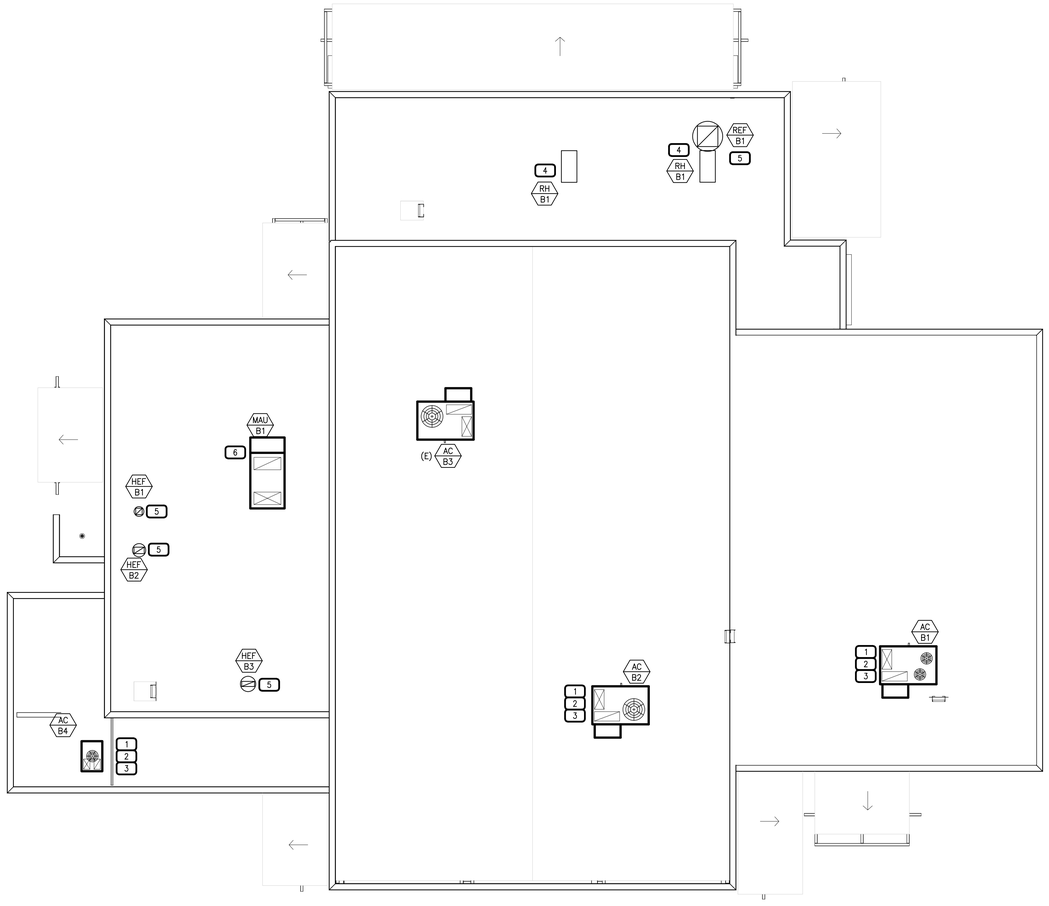

6 HVAC ROOF PLAN BLDG B
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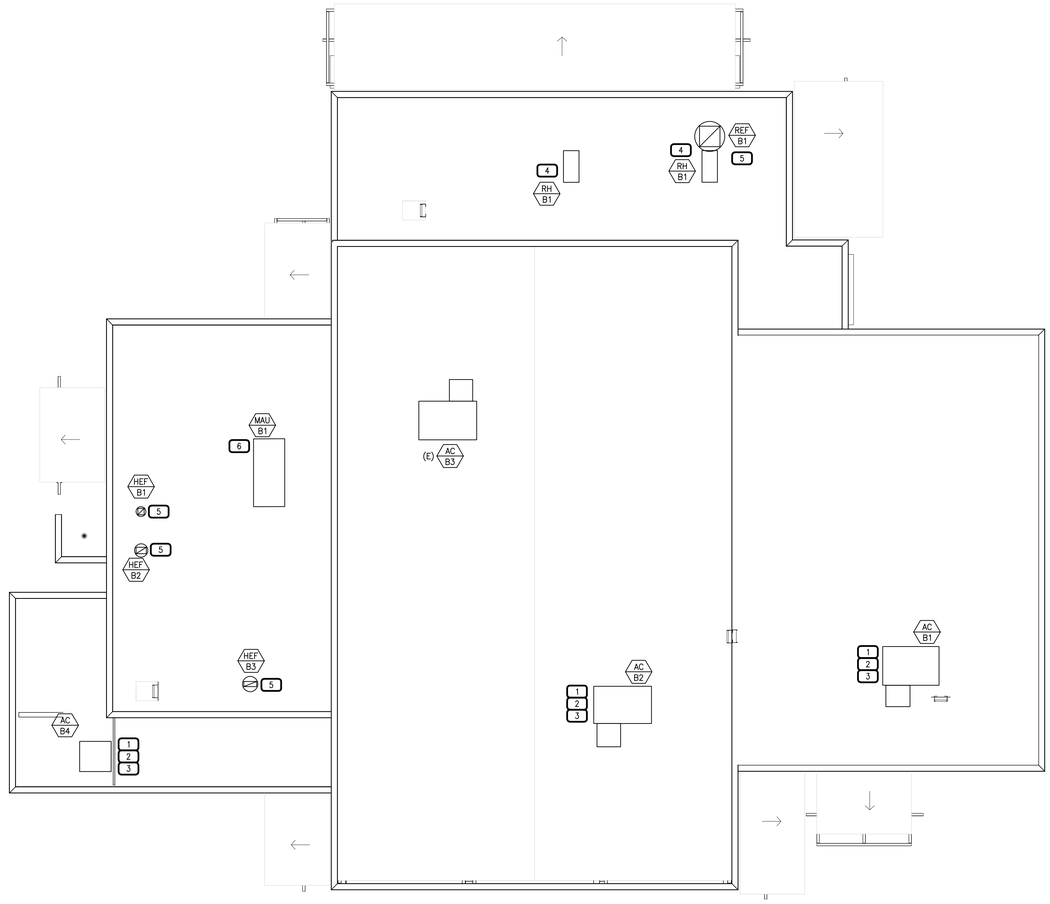

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ARCHITECT PBK Architects, Inc.
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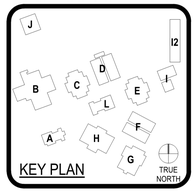

Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

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HVAC
ROOF PLANS
BLDG B

M3.05

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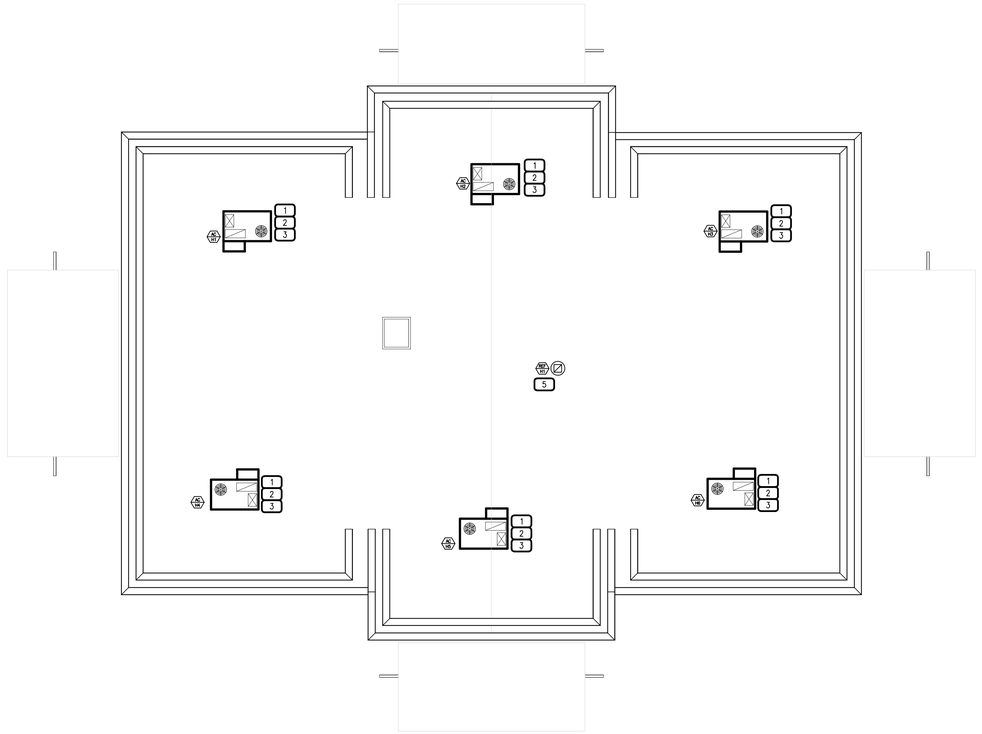

6 HVAC ROOF PLAN BLDG H
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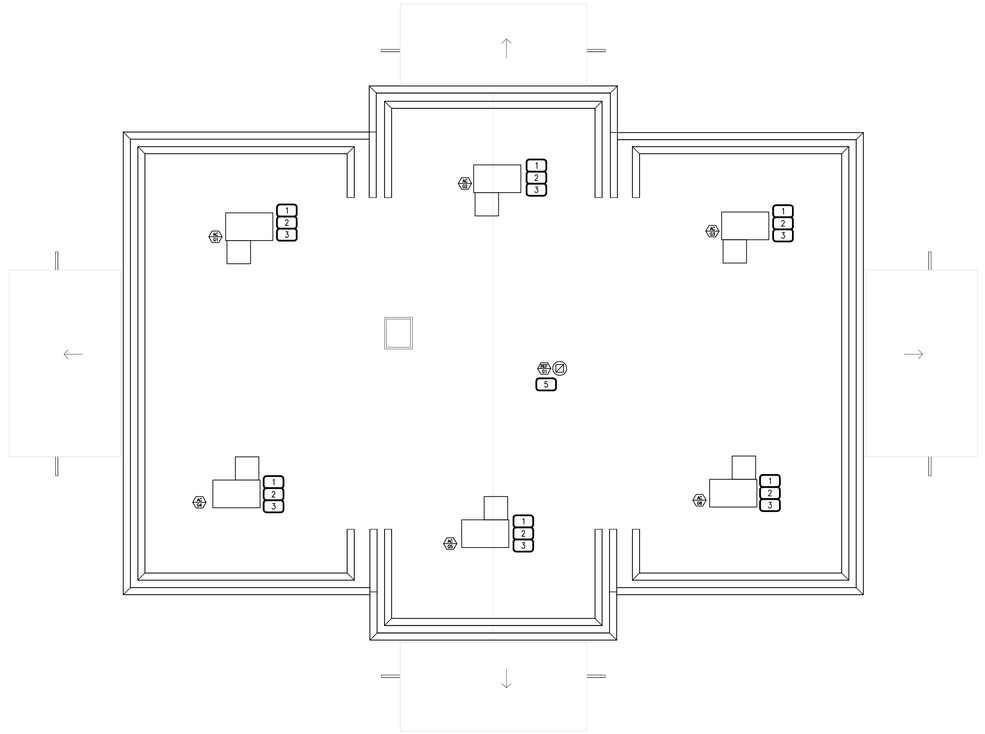

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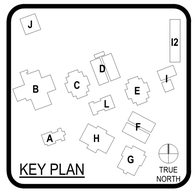

Other

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GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

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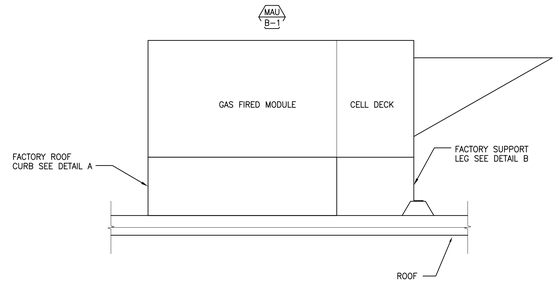
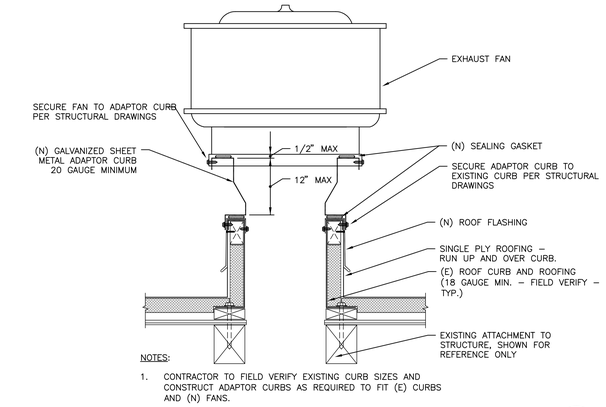
HVAC
ROOF PLANS
BLDG H

M3.06





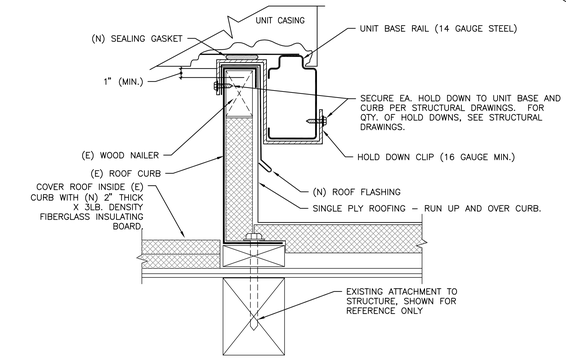
NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING CURB SIZES AND CONSTRUCT ADAPTOR CURBS AS REQUIRED TO FIT (E) CURBS AND (N) FANS.

EXHAUST FAN MOUNTING DETAIL

NTS

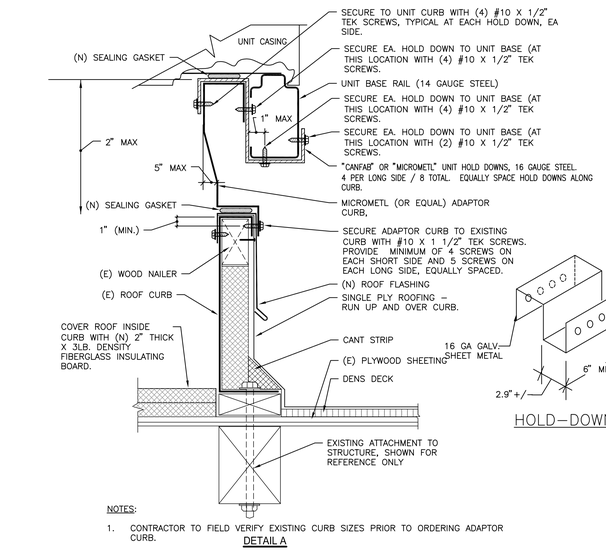
3 M5.01



AC UNIT ON EXISTING CURB MOUNTING DETAIL

NTS

2 M5.01

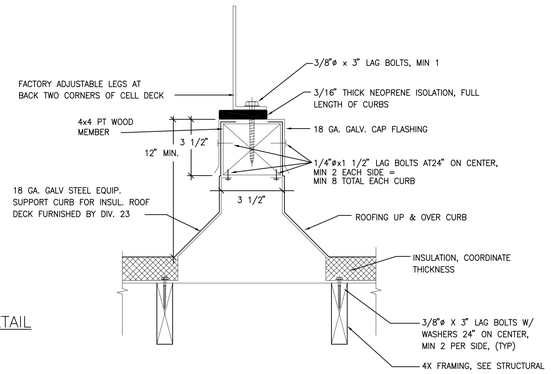


NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING CURB SIZES PRIOR TO ORDERING ADAPTOR CURB.

DETAIL A

HOLD–DOWN DETAIL

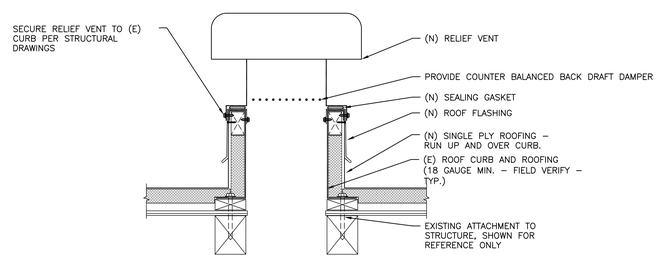


DETAIL B

MAKE UP AIR UNIT MOUNTING DETAIL

NTS

6 M5.01



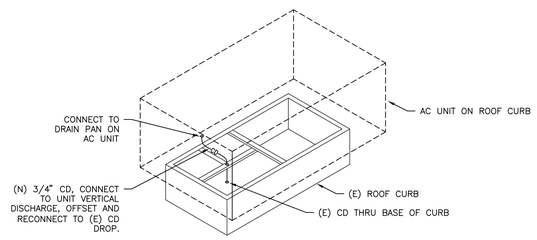
NOTES:

1. PRIOR TO SUBMITTALS, CONTRACTOR TO FIELD VERIFY CURB SIZE OF ALL EXISTING RELIEF VENTS AND ADJUST SPECIFIED SIZES AS NECESSARY TO MATCH EXISTING CURBS.

RELIEF VENT MOUNTING DETAIL

NTS

6 M5.01



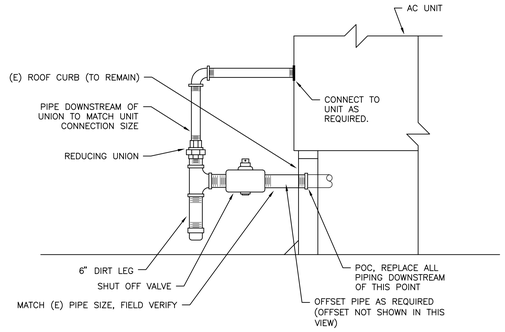
NOTES:

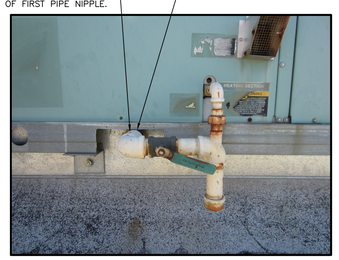
1. EXISTING CONDENSATE DRAINS ARE VERTICAL DISCHARGE AND DRAIN THRU CURB.
2. CONTRACTOR TO CLEAR/CLEAN EXISTING CONDENSATE DRAINS (WITH COMPRESSED AIR) AFTER UNIT IS REMOVED/PRIOR TO INSTALLING NEW UNIT.
3. CONTRACTOR TO CONNECT NEW UNIT CD TO EXISTING.
4. NEW CONDENSATE DRAIN TO BE 3/4" TYPE L COPPER WITH SOLDERED JOINTS

CONDENSATE TRAP DETAIL

NTS

4 M5.01





TYPICAL IMAGE OF EXISTING CONNECTION

NOTES:

1. CLEAN/PAINT ALL NEW AND EXISTING GAS PIPING.
2. PROVIDE NEW SHUT OFF VALVE.
3. ALL PIPING DOWNSTREAM OF SHUT–OFF VALVE TO BE NEW
4. MODIFY (CUT) NEW ROOF CURB AS MAY BE NECESSARY TO FIT AROUND (E) GAS PIPE.

GAS CONNECTION TO EXISTING AC UNIT DETAIL

NTS

1 M5.01

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ARCHITECT PBK Architects, Inc.
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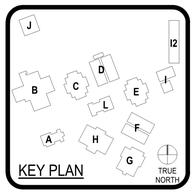

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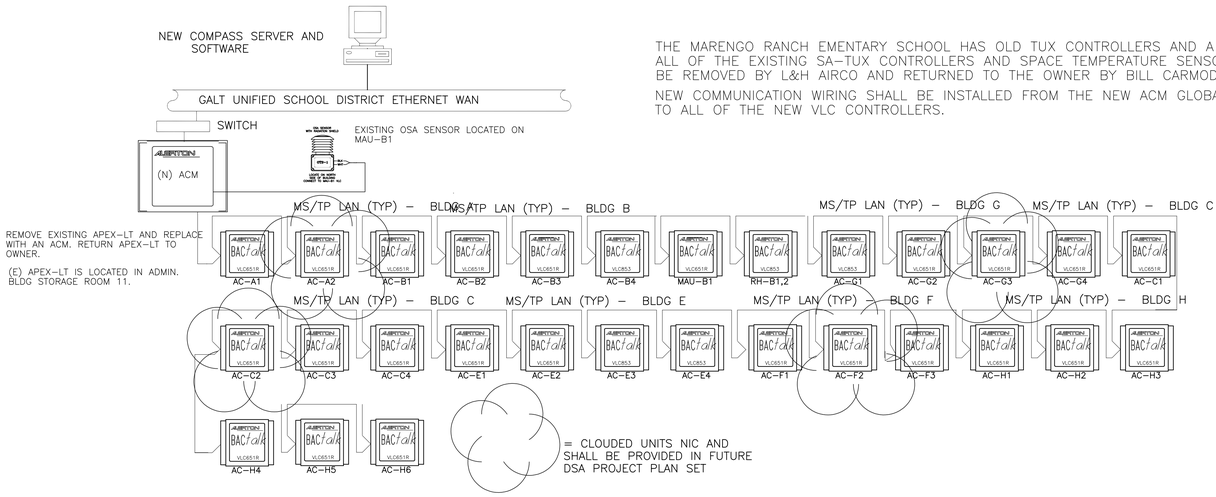
HVAC DETAILS

M5.01



ALERTON SYSTEM ARCHITECTURE

1. PROVIDE ALERTON COMPASS SYSTEM

THE MARENGO RANCH EMENTARY SCHOOL HAS OLD TUX CONTROLLERS AND A N APEX LITE GLOBAL. ALL OF THE EXISTING SA-TUX CONTROLLERS AND SPACE TEMPERATURE SENSORS SHALL BE REMOVED BY L&H AIRCO AND RETURNED TO THE OWNER BY BILL CARMODY OF L&H AIRCO.

NEW COMMUNICATION WIRING SHALL BE INSTALLED FROM THE NEW ACM GLOBAL CONTROLLER TO ALL OF THE NEW VLC CONTROLLERS.

MATERIAL LEGEND

ALL PART NUMBERS ARE ALERTON BACTALK UNLESS OTHERWISE NOTED

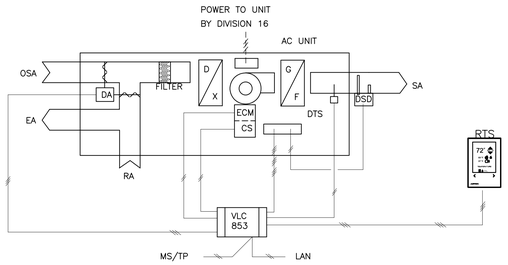
SYMBOL	DESCRIPTION
ACM	ALERTON GLOBAL CONTROL MODULE
VLC	VISUAL LOGIC NATIVE BACNET CONTROLLER (SIZE AS REQUIRED)
RTS	MICROSET4 ROOM TEMPERATURE AND HUMIDIY SENSOR WITH BACKLIT DIGITAL DISPLAY DISPLAYING SETPOINT, ROOM TEMP., AND OUTSIDE AIR TEMP. COMPLETE WITH ADJUSTABLE SETPOINT AND OVERRIDE FUNCTIONS.
SS	BLANK STAINLESS STEEL ROOM SENSOR
DTS	6" DUCT TEMPERATURE SENSOR
CS	VERIS H-60O CURRENT SWITCH
DA	FACTORY PROVIDED BELIMO DAMPER ACTUATOR (SIZE AS REQD)
MS	MOTOR STARTER WITH 120V CONTROL CIRCUIT BY OTHERS
ENCL-1	NEMA-1 CONTROL PANEL FOR INDOOR MOUNTING
ENCL-3R	NEMA-3R CONTROL PANEL FOR OUTDOOR MOUNTING
CO2	VERIS 0-2000 PPM ROOM CO2 SENSOR
DPX	VERIS DIFFERENTIAL PRESSURE TRANSDUCER
VFD	FACTORY PROVIDED POWER EXHAUST VFD INTERLOCK TO OSA DAMPER
RIB	FUNCTIONAL DEVICES RELAY IN A BOX
SD	FIRE MARSHALL APPROVED DUCT SMOKE DETECTOR (PROVIDED BY DIV 16)
PWR	POWER TO EQUIPMENT BY DIVISION 16
PWR/FA	120V PWR AND FIRE ALARM WIRING BY DIV. 16
TX	120V TO 24V TRANSFORMER
MS/TP	BACNET NETWORK FOR COMMUNICATIONS
DSD	CSFM APPROVED DUCT SMOKE DETECTOR - WIRE TO STOP SUPPLY FAN ON DETECTION OF PRODUCTS OF COMBUSTION

EA	EXHAUST AIR	AI	ANALOG INPUT
SA	SUPPLY AIR	BI	BINARY INPUT
RA	RETURN AIR	AO	ANALOG OUTPUT
OSA	OUTSIDE AIR	BO	BINARY OUTPUT

WIRING BY TEMPERATURE CONTROL CONTRACTOR (TCC)

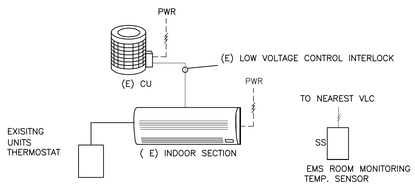
WIRING BY DIVISION 16 ELECTRICAL CONTRACTOR (EC)

THESE CONTROL DIAGRAMS ARE DIAGRAMMATIC AND DO NOT DEPICT ALL CONTROL WIRES, RELAYS OR COMPONENTS OF A COMPLETE SYSTEM. IT IS THE RESPONSIBILITY OF THE TEMPERATURE CONTROLS CONTRACTOR TO PROVIDE A COMPLETE AND FUNCTIONAL CONTROL SYSTEM AT NO ADDITIONAL COST TO THE OWNER.



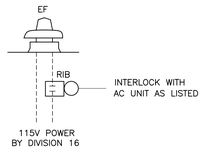
AC UNIT CONTROL DIAGRAM

1. SEE PLANS AND SCHEDULES FOR QUANITIES. TYPICAL OF 27 UNITS
2. ECONOMIZER DAMPERS AND BELIMO ACTUATORS PROVIDED BY FACTORY.
3. MOUNT VLC CONTROLLER IN AC UNIT OR IN NEMA 3R SC ENCLOSURE.
4. SEE PLANS AND SCHEDULES FOR UNITS THAT REQUIRE DUCT SMOKE DETECTORS



ACI/ACO UNITS CONTROL DIAGRAM

1. TYPICAL FOR EXISTING FC'S A1, G1, C1, E1, H1.
2. ADD STAINLESS STEEL PLATE SENSORS TO ROOM SERVED BY FAN COIL UNITS FOR ALARM PURPOSES/
3. MOUNT SS EMS SENSORS ADJACENT TO THERMOSTAT AND WIRE TO NEAREST CONTROLLER



EF INTERLOCK CONTROL DIAGRAM

1. SEE EXISITNG INTERLOCK SCHEDULE BELOW. RE-ESTABLISH EF-INTERLOCKS.

INTERLOCK SCHEDULE

EF	AC
EF-C1	AC-C3
EF-C2	AC-C4
EF-C3	AC-C1
EF-E1	AC-E3
EF-E3	AC-E1
EF-2E	AC-E4
EF-B1	RH VLC

SEQUENCE OF OPERATIONS

SYSTEM GENERAL
PROVIDE AN ALERTON BACTALK SYSTEM AS SHOWN ON THE DRAWINGS. ALL SYSTEM TEMPERATURES AND STATUS SHALL BE DISPLAYED AND BE ADJUSTABLE FROM THE ELK GROVE UNIFIED SCHOOL DISTRICT ALERTON ENVISION FOR BACTALK WORKSTATION AND THE ALERTON WEBTALK IPORT.

TEMPERATURE CONTROL CONTRACTOR (TCC) SHALL WORK WITH THE ENGINEER AND OWNER TO ADJUST THE BUILDING CONTROL SETTINGS AS NEEDED. TCC SHALL INSTALL ALL MS/TP VLC CONTROLLER WIRING IN EMT CONDUIT BETWEEN BCM AND ALL VLC CONTROLLERS. TCC TO PROVIDE BACKLIT LCD STYLE MICROSET 4 ROOM TEMPERATURE SENSOR/CONTROLLER FOR EACH AC UNIT.

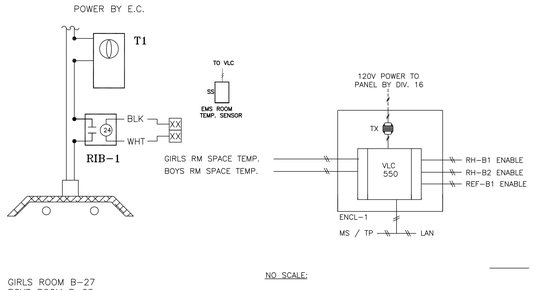
AC UNIT OPERATION:
DURING PERIODS OF OCCUPANCY THE AC UNIT VLC CONTROLLER WILL ENABLE THE FAN, ECONOMIZER AND STAGES OF HEATING AND COOLING TO MAINTAIN ROOM SETPOINT. TCC SHALL PROVIDE ALL ECONOMIZER CONTROLS FROM VLC CONTROLLER. ECONOMIZER ALGORITHMS SHALL BE BASED UPON GLOBAL OUTSIDE AIR DRY BULB TEMPERATURE SENSOR AND UNIT SUPPLY AIR SENSOR. MINIMUM OUTSIDE AIR DAMPER POSITION SHALL BE DISPLAYED AND ADJUSTABLE FROM EACH DETAILED INDIVIDUAL UNIT CONTROL PANEL GRAPHIC.
ON A CALL FOR COOLING THE VLC CONTROLLER WILL MODULATE THE ECONOMIZER DAMPERS TO OPERATE AS THE FIRST STAGE OF COOLING AS LONG AS THE OUTSIDE AIR TEMPERATURE IS BELOW THE OUTSIDE AIR LOCKOUT TEMPERATURE SET AT 65 DEGREES (ADJUSTABLE). IF DURING ECONOMIZER OPERATION, THE VLC CANNOT MAINTAIN ROOM COOLING SETPOINT THEN THE VLC WILL ENABLE STAGES OF DX COOLING IN CONJUNCTION WITH THE ECONOMIZER TO MAINTAIN ROOM COOLING SETPOINT. IF THE TEMPERATURE RISES ABOVE THE OUTSIDE AIR LOCKOUT TEMPERATURE THE VLC WILL CLOSE THE ECONOMIZER DAMPER TO MINIMUM POSITION AND ENABLE STAGES OF DX COOLING TO MAINTAIN ROOM COOLING SET POINT. ON A CALL FOR HEATING THE VLC WILL POSITION THE ECONOMIZER DAMPERS TO MINIMUM POSITION AND ENABLE STAGES OF HEATING TO MAINTAIN ROOM HEATING SETPOINT. A SUPPLY AIR SENSOR IS REQUIRED TO PERFORM THE UNITS ECONOMIZER FUNCTIONS AS WELL AS PROVIDE INFORMATION FOR TROUBLESHOOTING PURPOSES. THE OUTSIDE AIR DAMPER WILL BE MODULATED CLOSED UPON UNIT SHUTDOWN. TCC SHALL INSTALL THE FACTORY PROVIDED PRESSURE TUBE INTO THE ROOM SERVED BY THE AC UNIT. THE POWER EXHAUST FAN WILL BE ENABLED INTERNALLY BY THE UNIT WHENEVER THE OUTSIDE AIR DAMPER IS OPEN MORE THAN 70 PERCENT (SET AT THE UNIT FACTORY). THE FACTORY DIFFERENTIAL PRESSURE TRANSDUCER WILL THEN MODULATE THE POWER EXHAUST FAN VFD TO MAINTAIN A POSITIVE .02 INCHES W.C. (SET AT THE UNIT FACTORY).

CO2 CONTROL:
ALL INDICATED AC UNITS (SEE EQUIPMENT SCHEDULES) SHALL MONITOR THE CARBON DIOXIDE LEVEL IN THE CONTROLLED SPACE (ANALOG INPUT) AND OVERRIDE THE CONTROL OF THE ECONOMIZER DAMPERS TO ADMIT INCREASING AMOUNTS OF OUTSIDE AIR AS NECESSARY TO MAINTAIN THE CARBON DIOXIDE LEVEL BELOW THE CO2 PPM SETPOINT. (ADJUSTABLE) THE CONTROLLED PRESET LIMIT SHALL BE DETERMINED AT THE TIME OF THE SYSTEM START-UP AND SHALL BE ADJUSTABLE FROM A GRAPHIC SCREEN GENERATED BY THE CONTROL CONTRACTOR. SEE AC UNIT SCHEDULES FOR MINIMUM AIR QUANTITIES DURING NORMAL AC UNIT OPERATION (MIN. DAMPER POSITION) AND CO2 PURGE OPERATION (MAXIMUM DAMPER POSITION).

SPLIT SYSTEM SAC UNITS:
TCC TO INTERLOCK THE LOW VOLTAGE CONTROL CIRCUIT BETWEEN THE ACI UNIT AND THE ACO UNIT. TCC TO ALSO INSTALL THE FACTORY PROVIDED ACI ROOM THERMOSTAT AND MOUNT A BLANK STAINLESS STEEL EMS ROOM SENSOR ADJACENT TO THE THERMOSTAT FOR EMS MONITORING.

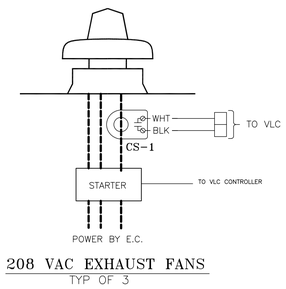
EXHAUST FAN CONTROL:
EXHAUST FANS SHALL BE INTERLOCKED TO RUN WHEN EITHER THE UNIT(S) SERVING THE EF'S RESPECTIVE AREA IS IN OPERATION BY THE TCC OR THE EXHAUST FAN SHALL BE INTERLOCK TO OPERATE WITH THE LIGHTS BY DIVISION 16. SEE EXHAUST FAN INTERLOCK SCHEDULE.

POWER WIRING:
POWER WIRING TO ALL EQUIPMENT AND 120V POWER WIRING TO CONTROL PANELS SHALL BE BY ELECTRICAL CONTRACTOR. COORDINATE WITH CONTROLS CONTRACTOR.

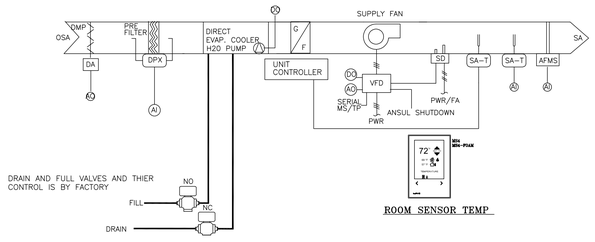


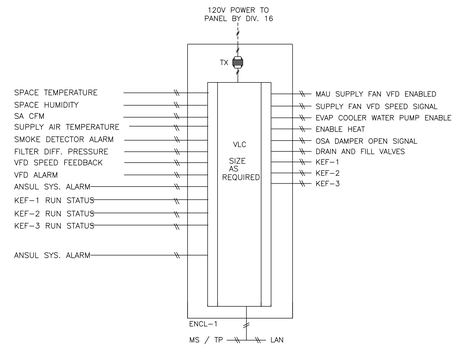
GIRLS ROOM B-27
BOYS ROOM B-28

NO SCALE:



208 VAC EXHAUST FANS
TYP OF 3





NO SCALE:

SEQUENCE OF OPERATION

CURRENTLY THE MAU UNIT IS ENERGIZED BY A LOCAL CONTROL PANEL. WHEN THE MAU IS ENERGIZED THE EMS SYSTEM WILL ENERGIZE THE THREE KETICHEN HOOD EXHAUST FANS AND MONITOR THEIR RUN OPERATION.

THE CONTROL SYSTEM SHALL ENABLE THE HEATING WHEN HEAT IS REQUIRED THE SPACE AND THE MAU ON BOARD CONTROLLER WILL MODUALTE THE GAS VALVE TO MAINTAIN A 75 DEGREE DISCHARGE AIR TEMPERATURE. WHEN COOLING IS REQUIRED IN THE SPACE THE CONTROL SYSTEM SHALL ENERGIZE THE EVAPORATIVE COOLING WATER PUMP.

PBK

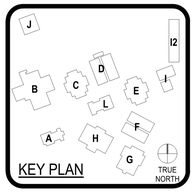
ARCHITECT PBK Architects, Inc. PBK.com
SACRAMENTO
2860 Gateway Oaks Drive, Suite 370
Sacramento, CA 95833
916-682-9494 P
916-682-0990 F

WESTON & ASSOCIATES MECHANICAL ENGINEERS
555 UNIVERSITY AVE, SUITE 210 | SACRAMENTO, CA 95825
WESTON & ASSOCIATES #17-101

REGISTERED PROFESSIONAL ENGINEER ADAM C. DAVIS M 34869 MECHANICAL STATE OF CALIFORNIA

MARENGO RANCH ELEMENTARY SCHOOL ROOF AND HVAC REPLACEMENT
1000 ELK HILLS DRIVE,
GALT, CA 95632
CONSTRUCTION DOCUMENTS

Building a Bright Future for All Learners
Galt Joint Union Elementary School District



Other

Architect

CLIENT
GALT JOINT UNION ELEMENTARY SCHOOL DISTRICT

PROJECT NUMBER
17233

DATE 08/09/2018

REVISIONS

No.	Description	Date

HVAC DETAILS

M6.01

SYMBOLS LIST

SOME OF THESE SYMBOLS SHOWN MAY NOT BE USED ON THIS PROJECT

POWER DISTRIBUTION

- SWITCHBOARD, DISTRIBUTION BOARD, SUBSTATION OR MOTOR CONTROL CENTER, FLOOR MOUNTED.
- PANELBOARD, 277/480V, SURFACE MOUNTED ON WALL.
- PANELBOARD, 277/480V, FLUSH MOUNTED IN WALL.
- PANELBOARD, 120/208V, SURFACE MOUNTED ON WALL.
- PANELBOARD, 120/208V, FLUSH MOUNTED IN WALL.
- DRY-TYPE STEP-DOWN TRANSFORMER, FLOOR MOUNTED 3Ø,480-120/208V, UON.
- ELECTRIC MOTOR, NIEC. MAKE POWER CONNECTIONS ONLY AS NOTED ON PLANS.
- (F) INDOOR EXHAUST FAN MOTOR, SINGLE PHASE. MAKE POWER CONNECTIONS TO INCLUDE JUNCTION BOX MOUNTED MANUAL MOTOR STARTER AND DISCONNECT ADJACENT TO FAN WITH 2 #12 CONDUCTORS PLUS GROUND IN 1/2" FLEXIBLE CONDUIT BETWEEN STARTER AND MOTOR.
- (V) INDOOR FAN POWERED VAV BOX MOTOR, SINGLE PHASE, MOUNTED FROM STRUCTURE ABOVE, NIEC. MAKE POWER CONNECTIONS TO INCLUDE JUNCTION BOX MOUNTED MANUAL MOTOR STARTER AND DISCONNECT ADJACENT TO VAV BOX WITH 2 #12 CONDUCTORS PLUS GROUND IN 1/2" FLEXIBLE CONDUIT BETWEEN STARTER AND MOTOR.
- P PULLBOX OR HANDHOLE, SIZE AND TYPE AS NOTED ON PLANS.
- A, H SAFETY DISCONNECT SWITCH, 3 POLE, UON. ADJACENT NUMBER INDICATES FUSE SIZE WHEN APPLICABLE. LABELING CONVENTION AS FOLLOWS:

A:	30A, NON-FUSED	AF:	30A, FUSED
B:	60A, NON-FUSED	BF:	60A, FUSED
C:	100A, NON-FUSED	CF:	100A, FUSED
D:	200A, NON-FUSED	DF:	200A, FUSED
E:	400A, NON-FUSED	EF:	400A, FUSED
F:	600A, NON-FUSED	FF:	600A, FUSED
G:	800A, NON-FUSED	GF:	800A, FUSED

- 1 MAGNETIC MOTOR STARTER. ADJACENT NUMBER INDICATES NEMA SIZE OF STARTER.
- 1 COMBINATION MAGNETIC MOTOR STARTER/SAFETY DISCONNECT SWITCH. ADJACENT NUMBER INDICATES NEMA SIZE OF STARTER.
- PACKAGE MOTOR CONTROLLER OR STARTER FURNISHED AND INSTALLED UNDER ANOTHER DIVISION WITH EQUIPMENT CONTROLLED. PROVIDE SINGLE-POINT POWER SERVICE CONNECTION UNDER THIS DIVISION AS NOTED ON PLANS.
- VFD VARIABLE FREQUENCY DRIVE FURNISHED AND INSTALLED UNDER ANOTHER DIVISION. PROVIDE POWER SERVICE CONNECTION UNDER THIS DIVISION AS NOTED ON PLANS.
- VFD VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONNECT FURNISHED AND INSTALLED UNDER ANOTHER DIVISION. PROVIDE POWER SERVICE CONNECTION UNDER THIS DIVISION AS NOTED ON PLANS.
- DRIVEN GROUND ROD.
- DRIVEN GROUND ROD IN GROUND WELL WITH COVER.
- ELECTRICAL VEHICLE CHARGING STATION, WALL MOUNTED.
- ELECTRICAL VEHICLE CHARGING STATION, PEDESTAL MOUNTED.
- 2,4,6 BRANCH CIRCUIT POWER DISTRIBUTION BOX OF MANUFACTURED WIRING SYSTEM WITH MODULAR CONNECTORS FOR INTERFACE TO BRANCH CIRCUIT MODULAR CABLE SETS AND CABLE OR CONDUIT HOMERUN. BOX MOUNTED FROM STRUCTURE ABOVE IN ACCESSIBLE CEILING SPACE. ADJACENT NUMBERS INDICATE CIRCUITS AVAILABLE AT BOX.
- 2,4,6 DEVICE BRANCH CIRCUIT POWER DISTRIBUTION BOX FOR INTERFACE BETWEEN MULTI-CIRCUIT HOMERUN AND MC CABLE BRANCH CIRCUITING. MINIMUM BOX SIZE IS 10"X10"X4" DEEP. BOX MOUNTED FROM STRUCTURE ABOVE IN ACCESSIBLE CEILING SPACE. ADJACENT NUMBERS INDICATE CIRCUITS AVAILABLE AT BOX.
- INDICATES CABLE TERMINATION LUGS AT EQUIPMENT BUS.
- BOLTED PRESSURE OR HIGH PRESSURE CONTACT SWITCH.
- FUSED SWITCH.
- MEDIUM-VOLTAGE LOAD INTERRUPTER SWITCH.
- GROUP MOUNTED MOLDED CASE CIRCUIT BREAKER.
- INDIVIDUALLY FIXED MOUNTED INSULATED-CASE OR POWER CIRCUIT BREAKER.
- INDIVIDUALLY DRAW-OUT MOUNTED INSULATED-CASE OR POWER CIRCUIT BREAKER.
- VM MEDIUM-VOLTAGE, INDIVIDUALLY DRAW-OUT MOUNTED VACUUM CIRCUIT BREAKER.
- G INDICATES INTEGRAL GROUND FAULT RELAY WHEN ASSOCIATED WITH CIRCUIT BREAKER.
- C INDICATES COMMUNICATION NETWORK WIRING WHEN ASSOCIATED WITH CIRCUIT BREAKER.
- E0 INDICATES ELECTRICALLY OPERATED WHEN ASSOCIATED WITH CIRCUIT BREAKER.
- ST INDICATES SHUNT TRIP WHEN ASSOCIATED WITH OVERCURRENT PROTECTION DEVICES.
- K 1 INDICATES KIRK-KEY INTERLOCK WHEN ASSOCIATES WITH OVERCURRENT PROTECTION DEVICES. ADJACENT NUMBER CORRESPONDS WITH DEVICE INTERLOCK.
- GFR GROUND FAULT RELAY WITH SHUNT TRIP.
- GFA GROUND FAULT ALARM, NO SHUNT TRIP.
- M UTILITY METER.
- TRANSFORMER.
- CONNECTION TO GROUND.
- CURRENT TRANSFORMERS.
- POTENTIAL TRANSFORMERS.
- V AUTOMATIC OR MANUAL TRANSFER SWITCH.
- NORM. EM. AUTOMATIC TRANSFER/BY-PASS ISOLATION SWITCH.
- G EMERGENCY GENERATOR.
- BATTERIES.
- NEUTRAL SERVICE DISCONNECT LINK.
- SPD SURGE PROTECTION DEVICE, 'SPD'.
- C CONTROL CONTACTOR.
- NORMALLY OPEN CONTACT.
- NORMALLY CLOSED CONTACT.
- DMU DIGITAL METERING UNIT.
- WHM WATT HOUR METER.
- GND GROUND BUS.
- NEU NEUTRAL BUS.

CONVENTIONS

- 1 NUMBERED NOTE, APPLIES TO ALL DRAWINGS.
- 1 NUMBERED SHEET NOTE, APPLIES TO DRAWING CONTAINING NOTES ONLY.
- 1 OVERCURRENT PROTECTIVE DEVICE SPACE IDENTIFICATION TAG. REFERS TO LOCATION OF PROTECTIVE OR CONTROL DEVICE WITHIN SWITCHBOARDS, DISTRIBUTION BOARDS, MOTOR CONTROL CENTERS, ETC.
- NAME EQUIPMENT IDENTIFICATION TAG: ITEM FURNISHED AND INSTALLED UNDER ANOTHER SECTION AND WIRED UNDER THIS SECTION.
- P2 CABLE AND/OR RACEWAY TAG, FUNCTION AS NOTED BELOW:

  P = POWER T = TELEPHONE C = COMMUNICATION
- 2004 FEEDER SIZE. REFER TO FEEDER SCHEDULE.
- DETAIL REFERENCE: A / EXX.XX — SHEET NUMBER, DETAIL DESIGNATION
- 2-F3 FIXTURE IDENTIFICATION TAG: FIXTURE TYPE, QUANTITY
- EXISTING BUILDING OR PORTION OF A BUILDING

WIRING DEVICES

- J JUNCTION BOX, WALL MOUNTED, +18" UON.
- JB JUNCTION BOX, MOUNTED IN FLUSH FLOOR BOX.
- J JUNCTION BOX, MOUNTED FLUSH IN CEILING.
- J JUNCTION BOX, SURFACE OR PENDANT MOUNTED TO STRUCTURE IN ACCESSIBLE CEILING SPACE.
- J JUNCTION BOX, MOUNTED ON CONDUIT STANCHION FLOOR PENETRATION, +12" UON.
- SINGLE-PLEX CONVENIENCE RECEPTACLE DEVICE, WALL MOUNTED, +18" AFF UON.
- USB 'USB' DENOTES DUPLEX CONVENIENCE RECEPTACLE DWBICE WITH INTERGRAL USB POWER OUTLETS, WALL MOUNTED, +18" AFF UON.
- IG 'IG' DENOTES ISOLATED GROUND. DUPLEX CONVENIENCE RECEPTACLE DEVICE, WALL MOUNTED, +18" AFF UON.
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE DEVICE, WALL MOUNTED, +18" AFF UON.
- DENOTES WALL MOUNTED OVER COUNTER, 6" ABOVE BACK SPLASH UON.
- G 'G' DENOTES GROUND FAULT CURRENT INTERRUPTER (GFCI), 'A' DENOTES ARC FAULT CURRENT INTERRUPTER (AFCI).
- WP DUPLEX RECEPTACLE, WEATHER RESISTANT WITH GROUND FAULT CURRENT INTERRUPTER 'GFCI', WITH WEATHERPROOF COVER, WALL MOUNTED, +18" AFF UON.
- SHADING DENOTES SPLIT WIRED DEVICE.
- SHADING DENOTES DEVICE CONNECTED TO EMERGENCY POWER CIRCUIT.
- SHADING DENOTES CONTROLLED RECEPTACLE.
- SHADING DENOTES SPECIALTY DEVICE, TYPE AS NOTED ON PLANS.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED IN FLUSH FLOOR BOX.
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED IN FLUSH FLOOR BOX.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED IN FIRE-RATED POKE-THRU FLOOR FITTING.
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED IN FIRE-RATED POKE-THRU FLOOR FITTING.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED FLUSH IN CEILING.
- DOUBLE DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED FLUSH IN CEILING.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED ON CONDUIT STANCHION FLOOR PENETRATION, +12" AFF UON.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, MOUNTED IN FLOOR MONUMENT.
- COMBINATION POWER/TELECOMMUNICATION DEVICE, MOUNTED IN FLUSH FLOOR BOX. TYPE AS NOTED ON PLANS OR IN SPECIFICATIONS.
- DUPLEX CONVENIENCE RECEPTACLE DEVICE, CORD OR REEL HUNG FROM STRUCTURE ABOVE. TYPE AS NOTED ON PLANS.
- ELECTRIFIED FURNITURE PARTITION POWER FEED, WALL MOUNTED, +18" AFF UON. CONSISTS OF 4 11/16" SQ. X 2 1/8" DEEP. JUNCTION BOX, SINGLE GANG RING, AND STAINLESS STEEL COVER PLATE WITH KO TO ACCEPT FURNITURE WHIP.
- ELECTRIFIED FURNITURE PARTITION COMBINATION POWER/TELECOMMUNICATION FEEDS, MOUNTED IN FLUSH FLOOR BOX WITH KO'S IN COVER TO ACCEPT FURNITURE WHIPS
- ELECTRIFIED FURNITURE PARTITION POWER FEED, MOUNTED IN FIRE-RATED POKE-THRU FLOOR FITTING WITH KO IN COVER TO ACCEPT FURNITURE WHIP.
- POWER/TELECOMMUNICATION POLE, MOUNTED TO EXTEND FROM FLOOR TO CEILING. TYPE AS NOTED ON PLANS.
- S SINGLE-POLE, SINGLE-THROW SWITCH, WALL MOUNTED, +42" AFF UON.
- S^3 THREE-WAY SWITCH, WALL MOUNTED, +42" AFF UON.
- S^4 FOUR-WAY SWITCH, WALL MOUNTED, +42" AFF UON.
- S^K KEY-OPERATED, SINGLE-POLE, SINGLE-THROW SWITCH, WALL MOUNTED, +42" AFF UON.
- S^P PILOT LIGHT, SINGLE-POLE, SINGLE-THROW SWITCH, WALL MOUNTED, +42" AFF UON.
- S^T MANUAL MOTOR STARTER SWITCH WITH THERMAL OVERLOAD ELEMENT, MOUNTED ADJACENT TO MOTOR.
- S^M MANUAL MOTOR STARTER/DISCONNECT SWITCH, MOUNTED ADJACENT TO MOTOR.
- S^F SWITCH FURNISHED UNDER ANOTHER DIVISION, BUT INSTALLED AND WIRED UNDER THIS DIVISION, WALL MOUNTED, +42" AFF UON.
- S^D WALL BOX DIMMER SWITCH, +42" AFF UON. SIZED PER CONNECTED LOAD ON PLANS AND FURNISHED FOR LAMP SOURCE SERVED. PROVIDED FOR DE-RATING WHEN INSTALLED GANGED LOCATIONS.
- S^C SINGLE-POLE, TIMER CONTROLLED SWITCH, WALL MOUNTED, +42" AFF UON.
- S^{EP} SINGLE-POLE, SINGLE-THROW, EXPLOSION PROOF SWITCH, WALL MOUNTED, +42" AFF UON.
- SH LINE-VOLTAGE MULTIPLE GANG SWITCHING STATION, WALL MOUNTED, 42" AFF UON. REFER TO PLANS FOR DEVICE QUANTITIES AND TYPES.
- L LOW-VOLTAGE LIGHTING CONTROL SWITCHING STATION, WALL MOUNTED, +42" AFF UON. REFER TO PLANS AND SCHEDULES FOR DEVICE QUANTITIES AND RELAYS CONTROLLED
- MH LIGHTING CONTROL OCCUPANCY SENSOR WITH DUAL LEVEL SWITCHING, WALL MOUNTED, +42" AFF UON.
- MH LIGHTING CONTROL OCCUPANCY SENSOR WITH SINGLE LEVEL SWITCHING, WALL MOUNTED, +42" AFF UON.
- M LIGHTING CONTROL OCCUPANCY SENSOR, CEILING MOUNTED FOR AREA COVERAGE.
- DH PRESET SCENE CONTROL LIGHTING STATION WITH DIMMING CAPABILITIES, WALL MOUNTED, +42" AFF UON. REFER TO PLANS AND SCHEDULES FOR CONTROL.
- DH COMBINATION LIGHTING CONTROL DIMMER/MOTION SENSOR, WALL MOUNTED, +42", AFF UON.
- ETD EGRESS LIGHTING TRANSFER DEVICE
- CONTROL STATION, WALL MOUNTED, +42" AFF UON.
- PC PHOTOELECTRIC CELL
- DS DAYLIGHT SENSOR

RACEWAYS

- CONDUIT RUN EXPOSED ON WALL OR CEILING.
- CONDUIT RUN CONCEALED IN SLAB, UNDER SLAB OR UNDERGROUND.
- CONDUIT RUN CONCEALED IN WALL OR ABOVE CEILING.
- CONDUIT HOMERUN, CONTINUOUS RUN TO PANEL OR EQUIPMENT CABINET.
- FLEXIBLE METALLIC CONDUIT.
- CONDUIT TURNED UP
- CONDUIT TURNED DOWN.
- CONDUIT CAPPED OR STUBBED WITH INSULATED BUSHINGS.
- CONDUIT SLEEVE, WITH INSULATING BUSHINGS.
- CROSSMARKS ON BRANCH CIRCUIT CONDUIT RUNS INDICATE THE QUANTITY OF CONDUCTORS AS FOLLOWS (GROUND CONDUCTORS ARE NOT NOTED, BUT SHOULD BE INCLUDED IN EVERY CONDUIT WITH POWER CONDUCTORS):
  1. NO CROSSMARKS INDICATES TWO #12 AWG CONDUCTORS, UON.
  2. THREE TO SIX CROSSMARKS INDICATES THE QUANTITY OF #12 AWG CONDUCTORS, UON.
  3. SEVEN OR MORE CROSSMARKS INDICATES THE QUANTITY OF #10 AWG CONDUCTORS, UON.
- MULTI-OUTLET TWO PIECE SURFACE RACEWAY; TYPE, DEVICE SPACING AND MOUNTING AS NOTED ON PLANS.
- TWO PIECE SURFACE METAL RACEWAY, MOUNTED AS NOTED IN PLANS.
- CABLE TRAY, CABLE RUNWAY OR LADDER RACK SUSPENDED FROM STRUCTURE ABOVE. REFER TO PLANS FOR SIZE AND MOUNTING.

PROJECT NOTES

1. UNLESS OTHERWISE NOTED, ALL CIRCUITRY SHOWN ON THESE DOCUMENTS IS DONE PER THE "ROUNDHOUSE" METHOD. FOR EVERY GROUP OF THREE (3) CONSECUTIVE CIRCUITS IN PHASE ORDER, THERE IS A DEDICATED NEUTRAL. FOR EXAMPLE, A HOMERUN COMPRISED OF CIRCUITS 1, 3 AND 5 CONTAINS FOUR (4) CONDUCTORS; THREE (3) HOTS AND ONE (1) NEUTRAL. A HOMERUN COMPRISED OF NON- CONSECUTIVE NUMBERS OUT OF PHASE ORDER .I.E. 1, 9 AND 11 OR 3, 5, 7 CONTAINS FIVE (5) CONDUCTORS; THREE (3) HOTS AND TWO (2) NEUTRALS. GROUND CONDUCTORS TYPICALLY ARE NOT SHOWN AS PART OF THE WIRE COUNT.
2. INSTALL AND CONNECT A CODE SIZED INSULATED OR BARE COPPER GROUNDING CONDUCTOR IN ALL BRANCH CIRCUITS AND FEEDERS.
3. MOUNTING HEIGHTS SHOWN ARE FROM FINISHED FLOOR TO THE CENTERLINE OF THE DEVICE. ALL MOUNTING HEIGHTS SHALL BE AS SHOWN ON THE SYMBOLS LIST UNLESS OTHERWISE NOTED ON THE PLANS OR IN THE SPECIFICATIONS.
4. REFER TO POWER PLANS FOR THE LOCATION OF ALL PANELBOARDS.
5. FURNISH AND INSTALL ALL PANELBOARDS WITH CIRCUIT BREAKERS AS SHOWN ON PANEL SCHEDULES.
6. REFER TO ELECTRICAL PLANS FOR THE FIXTURE SCHEDULE.
7. SUBSCRIPTS ON SWITCH SYMBOLS (Sa) DENOTE THE FIXTURE CONTROLLED.
8. DO NOT INSTALL POWER OUTLETS BACK TO BACK IN STUD WALLS.
9. REFER TO ELECTRICAL ONE LINE DIAGRAM AND FEEDER SCHEDULE FOR THE SIZE OF CONDUITS AND CONDUCTORS BETWEEN MAJOR POWER COMPONENTS OF THE ELECTRICAL SYSTEM.
10. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONAL LOCATION OF OUTLETS AND FIXTURES AND LOCATION IN ELEVATION VIEW.
11. ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE LISTED BY UNDER-WRITERS LABORATORIES AND BEAR THEIR LABEL.
12. CONTRACTOR SHALL REMOVE ALL LEFT OVER CONDUIT, WIRE, SCRAPS, ETC. AND LEAVE PREMISES CLEAN AND FREE OF TRASH OR DEBRIS RESULTING FROM HIS WORK.
13. PROVIDE INDIVIDUAL GFCI RECEPTACLES AT EACH LOCATION SHOWN, DO NOT USE FEED-THRU GFCI TYPE RECEPTACLES. LOCATE RECEPTACLE AT END OF A BRANCH CIRCUIT WIRE.
14. VERIFY THE EXACT LOCATION OF ALL MECHANICAL AND PLUMBING EQUIPMENT, SPRINKLER VALVE MONITORS AND FLOW SWITCHES, DUCT SMOKE DETECTORS, CONTROL DEVICES, ETC. PRIOR TO DETERMINING CONDUIT TERMINATION POINTS.
15. CONDUIT ROUTING (WHERE SHOWN) IS ESSENTIALLY DIAGRAMMATIC. CONTRACTOR SHALL LAYOUT RUNS TO SUIT FILED CONDITIONS AND THE COORDINATION REQUIREMENTS OF OTHER TRADES.
16. ALL CONDUIT AND RACEWAY PENETRATIONS THROUGH FIRE RATED WALLS AND FLOORS SHALL BE SEALED TO MAINTAIN THE FIRE SEPARATION RATING. REFER TO ARCHITECTURAL PLANS TO IDENTIFY ALL RATED CONSTRUCTION.
17. INSTALL A POLYETHYLENE PULLING ROPE IN ALL EMPTY CONDUITS.
18. FIXTURES INDICATED AS EMERGENCY, WITH BATTERY BACK-UP, SHALL BE WIRED FOR NORMAL OPERATION (SWITCHED) U.O.N. DO NOT WIRE AS NIGHT LIGHT (24 HOUR OPERATION) U.O.N. EXIT LIGHTS ARE EXCEPTION.
19. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS TO VERIFY LOCATION OF CEILING MOUNTED LIGHT FIXTURES. REPORT ANY DISCREPANCIES PRIOR TO ROUGH-IN.
20. ALL EXPOSED CONDUIT, BOXES, SUPPORTS, ETC. SHALL BE PAINTED TO MATCH SURROUNDING SURFACES.
21. ALL EXPOSED CONDUITS, CABLE TRAY, OPEN CABLING SHALL BE ROUTED AT RIGHT ANGLES TO THE BUILDING STRUCTURE.
22. DEVICE/OUTLET BOXES MOUNTED ON OPPOSITE SIDES OF RATED WALLS IN CORRIDORS, AND IN ANY AIRTIGHT SPACES, SHALL BE SEPARATED BY A MINIMUM OF 24".

DSA ANCHORAGE NOTES

ELECTRICAL COMPONENT ANCHORAGE NOTE

ALL ELECTRICAL COMPONENTS SHALL BE INSTALLED AND ANCHORED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IN INDICATED, THE FOLLOWING COMPONENTS WILL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2016 CBC, SECTIONS 1616A.1.18 THROUGH 1616A.1.26 AND ASCE 7-10 CHAPTERS 13, 26, AND 30.

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. ALL TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER.
3. MOVABLE EQUIPMENT WHICH IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS ARE REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE ATTACHMENT OF THE FOLLOWING ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE. BUT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR HUNG FROM A WELL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD AND THE DSA DISTRICT STRUCTURAL ENGINEER. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.

PIPING, DUCTWORK AND ELECTRICAL DISTRIBUTION BRACING NOTE

PIPING, DUCTWORK AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-10 SECTION 13.3 AS DEFINED IN ASCE 7-10 SECTION 13.6.8, 13.6.7, 13.6.5.6 AND 2016 CBC, SECTIONS 1616A.1.23, 1616A.1.24, 1616A.1.25, AND 1616A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (e.g. SMACNA OR OSHPD OPM), COPIES OF THE BRACKING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIUBTION SYSTEMS. THE STRUCTURAL ENGINEERING OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

ELECTRICAL DISTRIBUTION SYSTEMS, OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM #) 0052-013.

ABBREVIATIONS

A	AMPERES
AFC	ABOVE FINISHED CEILING
AFI	ARC FAULT CIRCUIT INTERRUPTER
AF	AMPERE OVERCURRENT FRAME SIZE (WHEN APPLIED TO CIRCUIT BREAKERS) OR AMPERE FUSE SIZE (WHEN APPLIED TO FUSES)
AFF	ABOVE FINISHED FLOOR
AIC	ASYMMETRIC INTERRUPTING CURRENT
AL	ALUMINUM
AT	AMPERE OVERCURRENT TRIP (WHEN APPLIED TO CIRCUIT BREAKERS)
ATS	AUTOMATIC TRANSFER SWITCH
BAS	BUILDING AUTOMATION SYSTEM
BFC	BELOW FINISHED CEILING
BOC	BACK OF CURB
BPS	BOLTED PRESSURE CONTACT SWITCH
C	CONDUIT
CCTV	CLOSED CIRCUIT TELEVISION
CL	CURRENT LIMITING CIRCUIT BREAKER OR FUSE
CP	CIRCULATION PUMP
CKT	CIRCUIT
CT	CURRENT TRANSFORMER
CU	COPPER
DF	DRINKING FOUNTAIN
DW	DISH WASHER
(E)	EXISTING TO REMAIN
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EP	EXPLOSION PROOF
EPO	EMERGENCY POWER OFF
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ETD	EMERGENCY TRANSFER DEVICE
EVSE	ELECTRIC VEHICLE SUPPLY EQUIPMENT
EVCS	ELECTRIC VEHICLE CHARGING STATION
EWH	ELECTRIC WATER HEATER
F	FUSED
(F)	FUTURE
FACP	FIRE ALARM CONTROL PANEL
FAJB	FIRE ALARM JUNCTION BOX
FFCP	FIREMAN'S FAN CONTROL PANEL
FLA	FULL LOAD AMPERES
FMC	FLEXIBLE METAL CONDUIT
FSD	FIRE/SMOKE DAMPER
FSEC	FOOD SERVICE EQUIPMENT CONTRACTOR
FRAP	FIREMAN'S REMOTE ANNUNCIATOR PANEL
G	GROUND
GB	GROUND BUS
GD	GARBAGE DISPOSAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
GRAP	GENERATOR REMOTE ANNUNCIATOR PANEL
GWH	GAS WATER HEATER
HPC	HIGH PRESSURE CONTACT SWITCH
HVAC	HEATING,VENTING AND AIR CONDITIONING
IMC	INTERMEDIATE METAL CONDUIT
IWH	INSTANTANEOUS OR POINT OF USE WATER HEATER
JB	JUNCTION BOX
LSCP	LIFE SAFETY CONTROL PANEL
LCP	LIGHTING CONTROL PANEL
MBGB	MAIN BUILDING GROUND BUS
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MLO	MAIN LUGS ONLY
MT	EMPTY
MTC	EMPTY CONDUIT
MTGB	MAIN TELECOM GROUND BUS
MTS	MANUAL TRANSFER SWITCH
MW	MICROWAVE
(N)	NEW
NC	NORMALLY CLOSED
NF	NON-FUSED
NIEC	NOT IN ELECTRICAL CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
PDU	POWER DISTRIBUTION UNIT
PIV	POST INDICATING VALVE
PNL	PANEL
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RF	REFRIGERATOR
(R)	EXISTING TO BE REMOVED
(RL)	RELOCATED
(RR)	REMOVE AND RELOCATE
RSC	RIGID STEEL CONDUIT
SAD	SEE ARCHITECTURAL DRAWINGS
SPD	SURGE PROTECTION DEVICE
TC	TIME CLOCK
TGB	TELECOMMUNICATIONS GROUND BUS
TP	TWISTED-PAIR
TX	TRANSFORMER
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
URAP	UPS REMOTE ANNUNCIATOR PANEL
UR	UNDERCOUNTER REFRIGERATOR
V	VOLTS
VA	VOLTS-AMPS
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VM	VENDING MACHINE
W	WATTS
WAP	WIRELESS ACCESS POINT
WH	WATER HEATER
WP	WEATHERPROOF
2SP	TWO SPEED
1Ø	1 PHASE
3Ø	3 PHASE
1P	1 POLE
2P	2 POLE
3P	3 POLE
3W	3 WIRE
4W	4 WIRE

DRAWING INDEX

PBK

ARCHITECTURE
PBK ARCHITECTS
2520 VENTURE OAKS DRIVE, SUITE 440
SACRAMENTO, CA 95833
916-682-9494
PBK.COM

MECHANICAL
WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0920
WESTONAE.COM

ELECTRICAL
THE ENGINEERING ENTERPRISE
1125 HIGH STREET
AUBURN, CA 95603
530-886-8556
ENGENT.COM

STRUCTURAL
KPFF CONSULTING ENGINEERS
2250 DOUGLAS BLVD, SUITE 200
ROSEVILLE, CA 95661
916-772-7688
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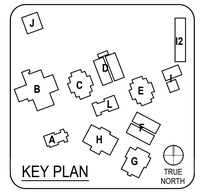
KEY PLAN



ARCHITECT
REGISTERED PROFESSIONAL ENGINEER
SCOTT WHEELER
No. E015491
Exp. 06/30/19
STATE OF CALIFORNIA

CLIENT

PROJECT NUMBER

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CHECKED BY:

REVISIONS

No.	Description	Date

SYMBOLS LIST & DRAWING INDEX

E0.01

GENERAL SHEET NOTES

A. SCOPE OF WORK: EXISTING HVAC UNITS TO BE REPLACED WITH NEW, AS INDICATED. PROVIDE NEW SERVICE DISCONNECT. RECONNECT TO EXISTING BRANCH CIRCUIT HOME RUN WIRING; EXISTING WIRE SIZE GIVEN IS PER RECORD DRAWINGS, CONFIRM IN FIELD AND REPORT ANY DISCREPANCIES. WHERE INDICATED, REPLACE EXISTING BREAKER AT EXISTING PANEL, MANUFACTURER AND AIC RATING TO MATCH EXISTING; EXISTING CIRCUIT NUMBER GIVEN IS PER RECORD DRAWINGS, VERIFY IN FIELD.

B. REFER TO MECHANICAL SCHEDULES FOR LISTED OVERCURRENT PROTECTION REQUIREMENTS FOR ALL NEW MECHANICAL EQUIPMENT. COORDINATE WITH APPROVED SUBMITTALS PRIOR TO ORDERING NEW DISCONNECTS, FUSES, OR BREAKERS.

[#] NUMBERED SHEET NOTES

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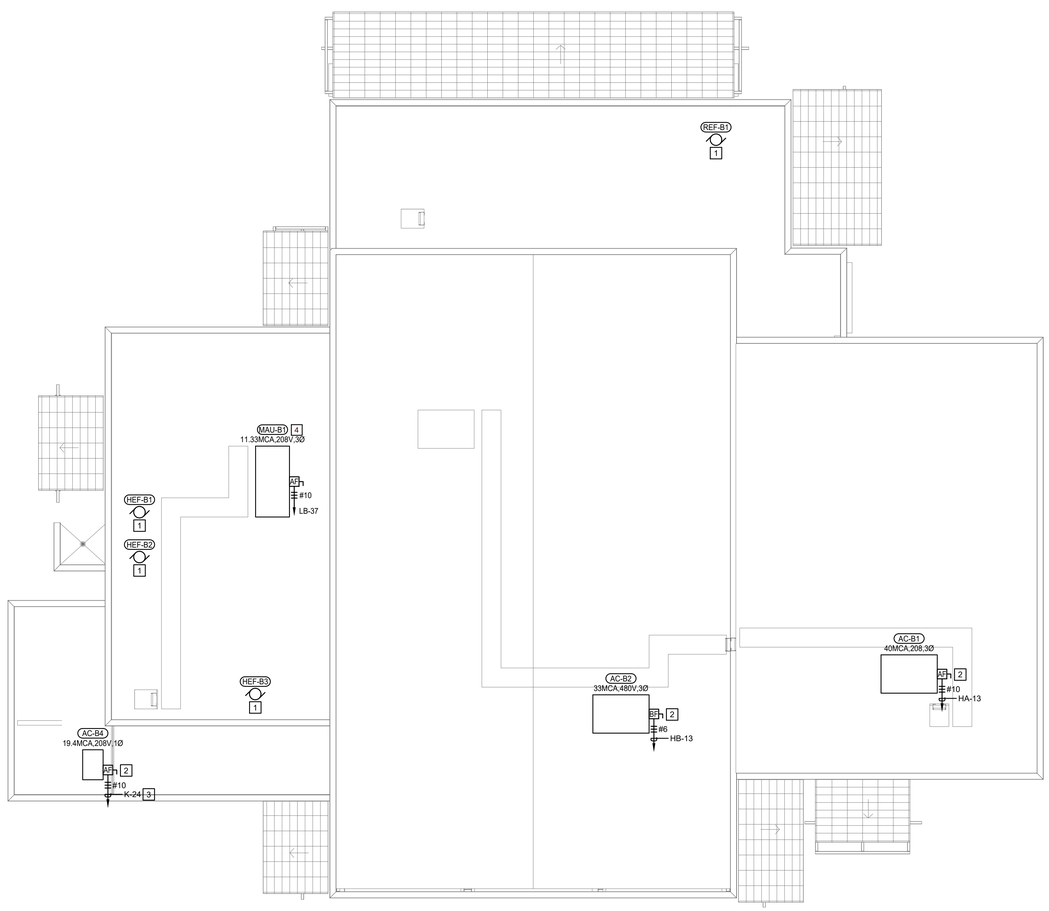
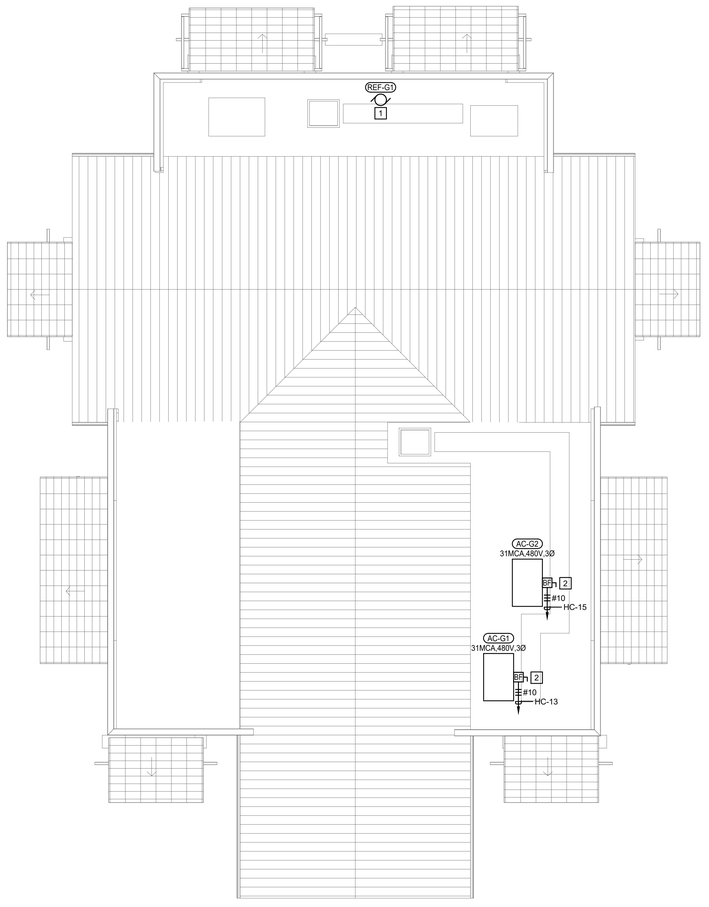
3. REPLACE EXISTING CIRCUIT BREAKER WITH NEW TO MATCH MOCP OF NEW AC UNIT.
4. IDENTIFY EXISTING 120V CIRCUIT AT MAU-B1, AND RECONNECT AS REQUIRED.



B E3.01 ROOF PLAN - BLDG B

SCALE:1/8" = 1'-0"



C E3.01 ROOF PLAN - BLDG G

SCALE:1/8" = 1'-0"

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ARCHITECTURE

PBK ARCHITECTS
2520 VENTURE OAKS DRIVE, SUITE 440
SACRAMENTO, CA 95833
916-682-9494
PBK.COM

MECHANICAL

WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0820
WESTON-ME.COM

ELECTRICAL

THE ENGINEERING ENTERPRISE
1125 HIGH STREET
AUBURN, CA 95603
530-886-8556
ENGENT.COM

STRUCTURAL

KPFF CONSULTING ENGINEERS
2250 DOUGLAS BLVD, SUITE 200
ROSEVILLE, CA 95661
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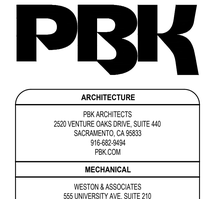

KEY PLAN

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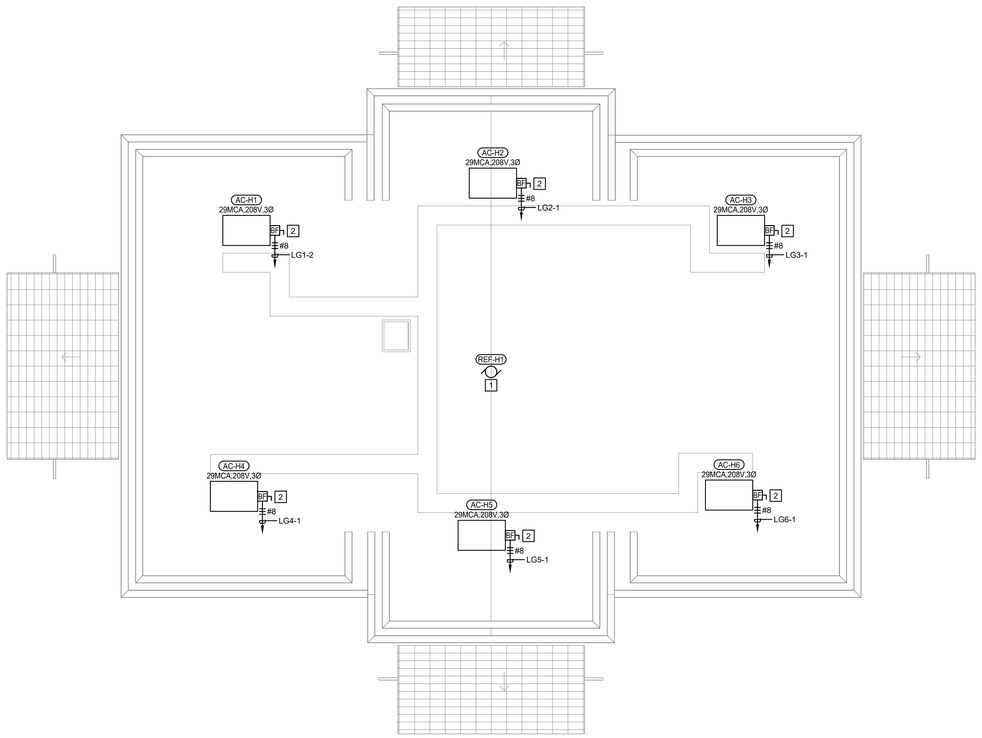
POWER ROOF PLANS

E3.01



A E3.02 ROOF PLAN - BLDG G

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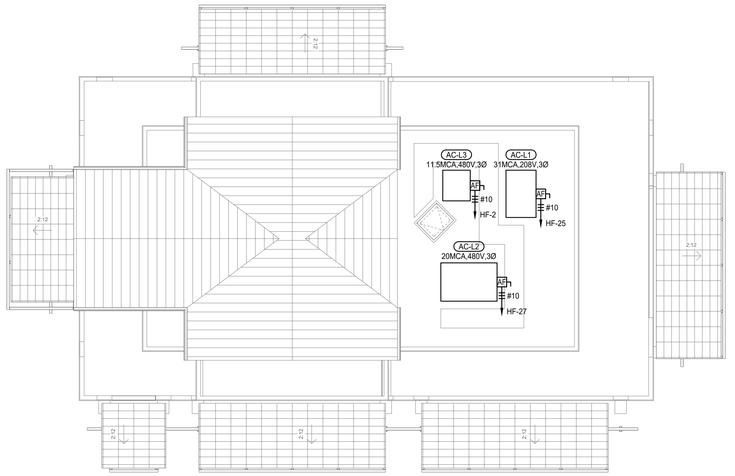
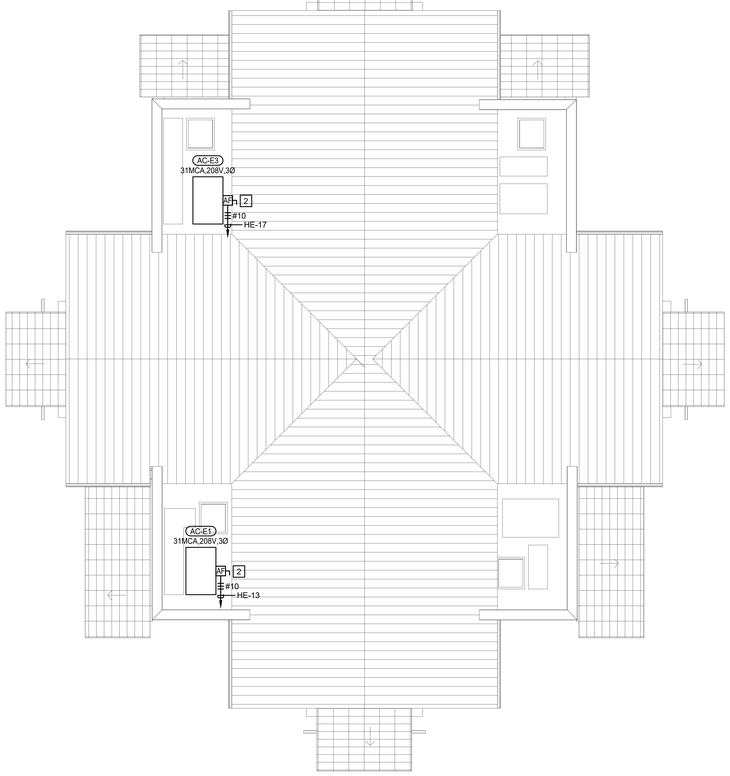


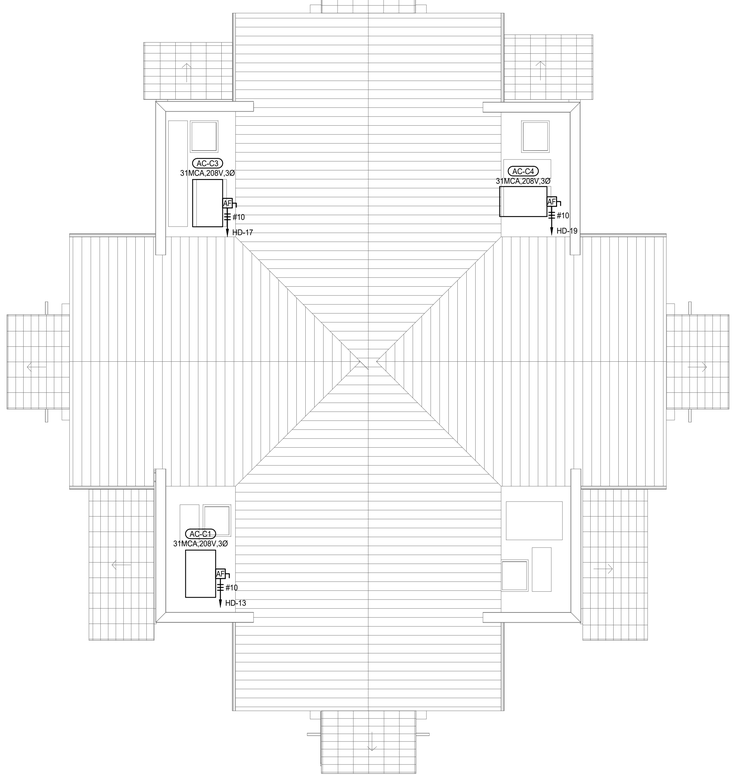
B E3.02 ROOF PLAN - BLDG F

SCALE:1/8" = 1'-0"



C E3.02 ROOF PLAN - BLDG E

SCALE:1/8" = 1'-0"



D E3.02 ROOF PLAN - BLDG D

SCALE:1/8" = 1'-0"

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PBK

ARCHITECTURE
PBK ARCHITECTS
2520 VENTURE OAKS DRIVE, SUITE 440
SACRAMENTO, CA 95833
916-682-9494
PBK.COM

MECHANICAL
WESTON & ASSOCIATES
555 UNIVERSITY AVE, SUITE 210
SACRAMENTO, CA 95825
916-482-0920
WESTONAIE.COM

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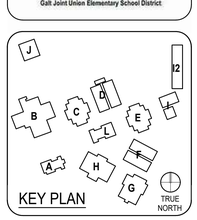

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