



**Bid 640**  
**New HVAC Modernization Project for Adolfo Camarillo High School**

**BID CLARIFICATION ADDENDUM #1**

Dated: November 20, 2020

*All interested parties seeking to submit responses to the Oxnard Union High School District's Bid #640 shall execute the certification at the end of this addendum and shall attach the addendum to the documents submitted to the District.*

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**The Oxnard Union High School District hereby amends Bid 640 New HVAC Modernization Project for Oxnard High School as follows:**

1) **Question:** Where will the temporary power be pulled from?

**Answer:** Temp. power can be pulled from existing panels

2) **Question:** Is a Construction Manager Field Office required to be provided on this project?

**Answer:** Construction Manager Field Office is not required for this project. Please disregard sections 6.5.1.1 through 6.5.1.5. of the General Conditions document on page 00 72 13 – 14 in Division 0.

3) **Allowances:** The Contractor (General Contractor) shall provide and incorporate an "Allowance" of \$500,000.00 into the base bid value submitted. This Allowance is for future and/or unforeseen conditions encountered during the contract duration.

*Note: The Allowance shall be included/added in the Contract Base Bid Value of the General Contractor's proposal.*

This value (\$500,000.00) will be designated as a line item within the contractor's schedule of values ("SOV"). The District shall have sole discretion to authorize all expenditures from the Allowance. The District shall issue directives to be used against the Allowance in the form of a Price Request ("PR"). All pricing in response to ("PR") for additional or unforeseen work shall include the direct cost of labor, materials, equipment, transportation, design fees, applicable markup, overall management and general condition costs, overhead and profit,

taxes and insurance associated with ("Price Request"). Any unused Allowance or unused portion thereof shall be credited back to the District at the conclusion of work.

- 4) Please refer to Attachment A for Pre-Bid RFIs from Viola
- 5) Please refer to Attachment B for Pre-Bid RFIs from Pinner
- 6) Please refer to Attachments C for Pre-Bid RFIs from Telacu
- 7) Please refer to Attachment D for Pre-Bid RFIs from Waisman Construction
- 8) Please refer to Attachment E for Pre-Bid RFIs from Novus Construction
- 9) Please refer to Attachment F for Pre-Bid RFI from Prime Acoustics
- 10) Please refer to Attachment G for Pre-Bid RFI from Sunbelt Controls
- 11) Please refer to Attachment H for Architect's Addendum
- 12) Please refer to Attachment I for Pre-Bid RFI from Novus Construction
- 13) Please refer to Attachment J for Pre-Bid RFIs from Santa Barbara Glass Co.

**BIDDER'S CERTIFICATION**

**I acknowledge receipt of the foregoing Addendum # 1 and accept all conditions contained herein.**

**Dated:** \_\_\_\_\_ **BIDDER:** \_\_\_\_\_  
(company/entity)

**By:** \_\_\_\_\_ **Printed Name:** \_\_\_\_\_  
(authorized representative signature)

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

*Bid Clarification Addendum #1*

Attachment A

Viola RFIs

**RFI BID CLARIFICATION REQUEST**RFI # 001REQUESTED BY: Tim ViolaDATE: 8/12/2020PROJECT NAME: Bid 629 New HVAC Modernization for Adolfo Camarillo HighSpec #: 26 05 00SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Brittany Villasenor & Karl AldridgeEMAIL: bvillasenor@bernards.com, kaldridge@bernards.com

FAX: \_\_\_\_\_

***YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS REQUESTED ASAP***

Re: Rooftop disconnects and new lighting,

- A) Detail 2/E-113 shows receptacle/disconnects mounted independently on rooftops and several disconnects may be required on each of the 20 bldgs. Is it acceptable to mount disconnects directly onto equipment with Unistrut to reduce costs?
- B) Architectural sheets show new lighting installed in all buildings, yet Electrical sheets do not show new lights in bldgs. F, O, P, Q, U, V, W, X, Y, or the Aquatic Ctr. Can you please clarify which buildings get new light fixtures?

Check here if additional pages attached **PROPOSED SOLUTION**

Allow equipment mounted disconnects where possible. Clarify new fixture locations.

Check here if additional pages attached 

*The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work*

A) - PLEASE PROVIDE INDEPENDENTLY MOUNTED DISCONNECTS AND RECEPTACLES PER PLANS. LIQUID TIGHT FLEX METALLIX CONDUIT CAN BE USED FOR THE WIRING BETWEEN ROOF TOP UNIT AND DISCONNECT SWITCH.

B) - PLEASE FOLLOW ELECTRICAL DRAWINGS FOR LIGHTING INSTALLATION. FOR CLARIFICATION NEW LIGHTING WILL BE INSTALLED IN BUILDINGS 'A,B,C,D,G,H,I,J,K,L,M,N'. ALSO THERE IS A MINOR LIGHTING RELOCATION WORK IN BUILDING X AND Y PLEASE CONSIDER THAT. ITS ALREADY PROVIDED ON PLANS EX-201 & EY-201

By: BUDLONG & ASSOCIATESCheck here if additional pages attached Name: MANAN CHRISTIANTitle: ELECTRICAL ENGINEERDate: 2020-08-13

**RFI BID CLARIFICATION REQUEST**RFI # 002REQUESTED BY: Tim ViolaDATE: 8/12/2020PROJECT NAME: Bid 629 New HVAC Modernization for Adolfo Camarillo HighSpec #: 28 31 00SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Brittany Villasenor & Karl AldridgeEMAIL: bvillasenor@bernards.com, kaldridge@bernards.com

FAX: \_\_\_\_\_

***YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS REQUESTED ASAP***

Re: Fire Detection and Alarm,

- A) Existing FA system is an FCI 7200 series and the devices listed on drawings will work with this system, however MCS-COF3-IV detectors on B200 sounder bases will not be capable of providing temporal 4 tone. This is requirement would necessitate the existing FACP to be upgraded to a Gamewell FCI E3. Can you please confirm the course of action?
- B) 265 detection type devices are being added to the existing system, please confirm if there is space available on existing FACP to handle additional devices? Note: FCI 7200 FACP's use ALU cards for landing two separate SLC lines, each line is only capable 99 detectors and 99 modules. If there are not enough ALU cards currently on the panel, it will need to be upgraded as ALU cards are no longer available.
- C) If a new FACP panel is required, will new wiring and conduit be needed?

Check here if additional pages attached **PROPOSED SOLUTION**

None currently.

Check here if additional pages attached 

*The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work*

Due to the existing fire alarm control panel (FCI 7200) being obsolete, a new Gamewell FCI E3 panel will be installed under DSA #03-120049. New conduit & wiring may be required from new FACP to (E) FATC for connection.  
- Jose A. Hurtado, Budlong & Associates, 8/13/2020.

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

Check here if additional pages attached 

Name: \_\_\_\_\_ Title: \_\_\_\_\_ Date: \_\_\_\_\_

**RFI BID CLARIFICATION REQUEST**RFI # 004REQUESTED BY: Tim ViolaDATE: 8/20/2020PROJECT NAME: Bid 629 New HVAC Modernization for Adolfo Camarillo High

Spec #: \_\_\_\_\_

SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Brittany Villasenor & Karl AldridgeEMAIL: bvillasenor@bernards.com, kaldridge@bernards.com

FAX: \_\_\_\_\_

***YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS NEEDED ASAP***

Re: Flooring

Reconstruction Legends in architectural 201 sheets show areas to patch and repair flooring. Finish schedules on 701 sheets list multiple finishes with General Note #1 stating that finishes shown reflect existing conditions and to verify existing finishes prior to work. GN #3 states to provide ceramic tile to match existing floor to ceiling including window jambs sills, and heads.

- A. Spec section 09 65 19 Resilient Flooring appears to reference F1-VCT, is this correct and does it match existing?
- B. There are no specs for ceramic tile or other floor finishes, can these be provided and is it known if new tile matches existing?

Check here if additional pages attached **PROPOSED SOLUTION**Check here if additional pages attached 

*The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work*

Where plans call out to Patch & Repair, the GC shall refer to Finish Schedule for the finish required to be matched & provided.

A. Refer to Spec Section 09 65 19 attached. Color to be V.I.F.

B. Item B is addressed in Project Manual Spec section 09 31 00 Ceramic Tile. Use as basis for cost, color to be V.I.F.

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

Check here if additional pages attached Name: Irvine CarrilloTitle: ArchitectDate: 2020.08.24

## VIOLA BID RFI#004

SECTION 09 65 19  
RESILIENT FLOORING

## PART 1 – GENERAL

## 1.1 SECTION INCLUDES

- A. Resilient tile flooring.
- B. Resilient top set base.

## 1.2 REFERENCES

- A. ADASAD – American Disabilities Act (ADA) Standards for Accessible Design.
- B. CBC - California Building Code, (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- C. ASTM D2047 - Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine.
- D. ASTM E648 - Test Method for Critical Radiant Flux of Floor-Covering Systems using a Radiant Energy Source.
- E. ASTM E662 - Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
- F. ASTM F710 - Practice for Preparing Concrete Floors and other Monolithic Floors to Receive Resilient Flooring.
- G. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

**H. Armstrong Flooring Technical Manuals**

**Armstrong Flooring Guaranteed Installation Systems manual, F-5061**

**Armstrong Flooring Maintenance Recommendations and Procedures, manual, F-8663**

## 1.3 REGULATORY REQUIREMENTS

- A. Resilient flooring to comply with the following fire performance characteristics as determined by testing products per ASTM test method indicated below:
  - 1. Critical Radiant Flux: 0.45 watts per sq cm or more per ASTM E648.
  - 2. Smoke Density: Less than 450 per ASTM E662.
- B. Products supplied for tile installation shall comply with local regulations controlling use of volatile organic compounds (VOC).
- C. Resilient flooring products shall have a coefficient of friction when tested according to ASTM D2047 of 0.60 for flat floors and 0.80 for ramped surfaces.

- D. Conform to CBC, California Building Code, (CCR) Title 24, Part 2, and ADAAG for accessibility requirements.

#### 1.4 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Provide seaming plan and pattern plan.
- C. Submit samples under provisions of Section 01 33 00.
- D. Submit two samples 3 x 3 inches in size, illustrating color and pattern for each floor material specified.
- E. Submit two 2 inch long samples of base material for each material specified.
- F. Submit Owner's written acceptance of final floor finish of vinyl composition tile to Architect under provisions of Section 01 77 00.

#### 1.5 OPERATION AND MAINTENANCE DATA

- A. Submit cleaning and maintenance data under provisions of Section 01 77 00.
- B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

#### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Concrete subfloor to be allowed to cure for a minimum of 90 days to achieve acceptable dryness.
- B. Store materials for three days prior to installation in area of installation to achieve temperature stability.
- C. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.
- D. Subfloor Moisture Conditions: Moisture emission rate of no more than 3 lb/1000 sq. ft./24 hours when tested by Quantitative Anhydrous Calcium Chloride Test, ASTM F1869, with subfloor temperature not less than 65 degrees F.
- E. Subfloor Alkalinity Conditions: A pH range of between 5 to 9 when subfloor is wetted with potable water and pHdrion paper is applied.

#### 1.7 EXTRA MATERIALS

- A. Provide 120 sq ft of flooring and 40 lineal feet of base of each material specified under provisions of Section 01 77 00 for each building.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS - RESILIENT TILE FLOORING

A. Armstrong Flooring Inc. –

- B. Substitutions: Under provisions of Section 01 33 00



## 2.2 RESILIENT TILE FLOORING MATERIALS

- A. VCT: Standard Excelon, 12 x 12 inch size, 1/8 inch thick; Colors as selected by Architect from manufacturer's full range of colors.

## 2.3 BASE MATERIALS

- A. Base: Type TPR rubber; coved; 4 inch high; 0.125 inch thick; top set, in maximum practical lengths.
- B. Manufacturer: Burke

## 2.4 ACCESSORIES

- A. Subfloor Filler: White premix Portland Cement latex type as recommended by flooring material manufacturer.
- B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer. Shall meet **Ventura County Air Pollution Control District (VCAPCD) Rules**
- C. Edge Strips: Rubber.
- D. Sealer and Wax: Types recommended by flooring manufacturer. Coordinate selection of floor wax with Owner's maintenance program.

## PART 3 – EXECUTION

### 3.1 EXAMINATION

- A. Verify that concrete slabs comply with ASTM F710 and are as specified herein.
- B. Verify concrete floors exhibit acceptable moisture emission rate; exhibit negative alkalinity, carbonization, or dusting.
- C. Verify that surfaces are smooth and flat and are ready to receive Work.
- D. Beginning of installation means acceptance of existing substrate and site conditions.

### 3.2 PREPARATION

- A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
- B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
- C. Prohibit traffic from area until filler is cured.
- D. Vacuum clean substrate.
- E. Apply primer to concrete slab surfaces if recommended by flooring manufacturer.

### 3.3 INSTALLATION - TILE MATERIAL

- A. Install in accordance with manufacturer's instructions.
- B. Mix tile from container to ensure shade variations are consistent.

- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Set flooring in place, press with heavy roller to attain full adhesion.
- E. Install tile to pattern indicated on drawings.
- F. Pattern grain parallel for all units and parallel to length of room. Allow minimum 1/2 full size tile width at room or area perimeter.
- G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
- H. Install edge strips at unprotected or exposed edges, and where flooring terminates.
- I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.
- J. Install flooring under movable partitions and under cabinetry without interrupting floor pattern.
- K. Install flooring in open cabinet recesses.

### 3.4 INSTALLATION - BASE MATERIAL

- A. Fit joints tight and vertical.
- B. Install material in maximum practical lengths.
- C. Maintain minimum measurement of 18 inches between joints.
- D. Miter internal corners.
- E. Field wrap external corners with longest practical lengths. "V" cut back surface to 2/3 its thickness.
- F. Install base on solid backing. Bond tight to wall and floor surfaces.
- G. Scribe and fit to door frames and other interruptions.

### 3.5 CLEANING

- A. Remove excess adhesive from floor, base and wall surfaces without damage.
- B. Sweep or vacuum floor thoroughly.
- C. Damp mop with a neutral detergent solution.
- D. Carefully remove black marks with a scrubbing pad or brush.

### 3.6 PROTECTION

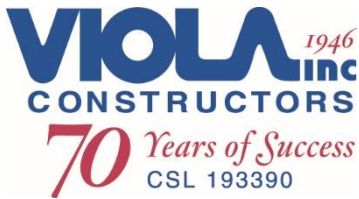
- A. Prohibit traffic on floor finish for 48 hours after installation.
- B. Protect floor finish until final completion with a non-asphaltic building paper.
- C. Maintain protective covering until final completion.

### 3.7 COMPLETION

- A. At final completion, remove floor protection and correct any damage.

- B. Apply 2 coats of sealer to vinyl composition tile.
- C. Apply 4 coats of wax to vinyl composition tile.
- D. Each coat of sealer and wax to be thoroughly dry before installing subsequent coats.
- E. Final coat of wax to be burnished in accordance with manufacturer's recommendations.
- F. Floor finish with 1844 Buckeye ([buckeyeinternational.com](http://buckeyeinternational.com)).
- G. Obtain Owner's written acceptance of final floor finish at completion of sealer and wax application.
- H. Submit copy of Owner's acceptance of floor finish to architect.

END OF SECTION

**RFI BID CLARIFICATION REQUEST**RFI # 005REQUESTED BY: Tim ViolaDATE: 8/20/2020PROJECT NAME: Bid 629 New HVAC Modernization for Adolfo Camarillo High

Spec #: \_\_\_\_\_

SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Brittany Villasenor & Karl AldridgeEMAIL: bvillasenor@bernards.com, kaldridge@bernards.com

FAX: \_\_\_\_\_

***YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS NEEDED ASAP***

Re: Access Panels

Note #3 in Floor Plan Reconstruction Notes on architectural 201 sheets states to provide stainless steel, hinged and keyed, access panels of adequate size where required... Is it acceptable to use primer coated panels in classrooms that will accept paint to match adjacent surfaces and use stainless in restroom applications?

Check here if additional pages attached **PROPOSED SOLUTION**Check here if additional pages attached 

*The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work*

Provide cut sheet of proposed panel for review.

Please refer to spec section 083113 - Access Doors and Frames. The General Contractor who is awarded this project is to provide a cut sheet for AOR review based off the specified manufacturer list in section 2.3B. Primer doors are acceptable at this time.

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

Check here if additional pages attached Name: Irvine Carrillo  
Karl AldridgeTitle: Architect  
Sr. Project managerDate: 2020.08.24  
2020.08.24

**RFI BID CLARIFICATION REQUEST**RFI # 006REQUESTED BY: Tim ViolaDATE: 8/31/2020PROJECT NAME: Bid 629 New HVAC Modernization for Adolfo Camarillo HighSpec #: 22 00 00SUBMITTED TO: Oxnard Union High School DistrictPGS: 1ATTENTION: Brittany Villasenor & Karl AldridgeEMAIL: bvillasenor@bernards.com, kaldridge@bernards.com

FAX: \_\_\_\_\_

***YOUR RESPONSE TO THE FOLLOWING BID CLARIFICATION REQUEST IS NEEDED ASAP***

1. Spec section 22 05 13-4 calls for above ground natural gas pipe to be A53 Type E by manufacturer US Steel or equal, and US Steel is a domestic manufacturer. Are we required to use domestic steel pipe or is globally sourced A53 Type E pipe acceptable?
2. Drawing PE-201D, PE-201, and PE-202 indicates work for building E, yet A-101 shows this building as 'Not Part of Scope' Is building E part of this scope of work or not?
3. Architectural drawings show removing, replacing, or moving fixtures in multiple restrooms, yet his work is not shown on plumbing drawings. Please clarify if this work is required? If so, provide a fixture schedule with new fixtures to be used.
4. Drawing P-101 states to remove and replace all existing natural gas piping. There are areas where the new piping is unable to be installed in the same trench or path of the existing. There is great deal of existing piping under hardscape requiring additional saw cutting beyond the new piping. Does the existing natural gas piping need to be removed or can it be abandoned in place?

Check here if additional pages attached **PROPOSED SOLUTION**

None currently.

Check here if additional pages attached 

*The following information is provided in response to your bid clarification request above. This is not a change order or an approval for extra work*

1. Install per specifications. US Steel or equal means having the standards mentioned in 22 05 13-4 to be A53 Type E. Globally sourced A53 Type E might not meet these standards.
2. A1.01 shows buildings receiving HVAC, Windows, and/or lighting. Contractor shall refer to all discipline site plans for additional scope required to reconnect utilities. For example, Building E does not get lights, windows, or lighting, but as a result of the site gas replacement there will be work needed.
3. Refer to Attachment H Drawings Item "1"
4. The existing natural gas piping needs to be removed so that if there are future upgrades, these existing gas pipes can't be in the way of future new work. If there is a hardship where the Plumbing contractor cannot physically be able to be accomplish this, or after the Plumbing contractor verifies through Dig Alert that there is no other alternative: then abandoning in place would be acceptable, but only after the Plumbing Engineer has seen the proposed suggested routing differing from the DSA approved set of plans in a redline. The Plumbing Engineer would then work with the contractor after the findings are made during construction (RFI's) and then coordinate with AS-BUILT redlines for a turn over at the end of the project.

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

Check here if additional pages attached Name: IRVINE CARRILLO

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

Date: 09.09.2020

*Bid Clarification Addendum #1*

**Attachment B**  
**Pinner RFIs**



## REQUEST FOR INFORMATION

DSA Appl. No. (if applicable): 03-120038

RFI Title: Roof Details RFI Number: PRE-BID 002

Project Name: Camarillo High School Alteration Project Date: 8/13/2020

School Name: Camarillo High School Project No.: 2840.0100

Issued To: Flewelling & Moody Contract No.: \_\_\_\_\_  
(Architect)

A9.05 \_\_\_\_\_  
Drawing Number Detail Specification Section Page

### Request:

Sheet A9.05 Roof Details is listed on the TOC T0.02. Sheet A9.05 is not included with the drawing set. Please clarify.

Request Issued by: Mike Soucek Mike Soucek August 13, 2020  
*Contractor's Signature* *Name (Printed)* *Date*

### Response:

REFER TO DSA DRAWINGS SHEET A9.05 DATED 09.08.20 ON DISTRICT'S WEBSITE

The undersigned recommends the following document requirements:

|   | <u>Required</u>                                 | <u>Not Required</u>                 |
|---|---|-------------------------------------|
| FLS, SSS, ACS, Review   | <input checked="" type="checkbox"/>             | <input type="checkbox"/>            |
| Sketch  | <input type="checkbox"/>                        | <input checked="" type="checkbox"/> |
| FGD   | <input type="checkbox"/>                        | <input checked="" type="checkbox"/> |
| Response Review by: _____<br><i>Architect's Signature</i>           | <u>IRVINE CARRILLO</u><br><i>Name (Printed)</i> | <u>2020.11.09</u><br><i>Date</i>    |
| Response Issued by: _____<br><i>Owner Authorized Representative</i> | _____<br><i>Name (Printed)</i>                  | _____<br><i>Date</i>                |

**This Form Cannot Modify Contract Amount or Milestones and/or Contract Time.**



## REQUEST FOR INFORMATION

DSA Appl. No. (if applicable): 03-120038

RFI Title: Roof Penetration Detail      RFI Number: PRE-BID 003

Project Name: Camarillo High School Alteration Project      Date: 8/13/2020

School Name: Camarillo High School      Project No.: 2840.0100

Issued To: Flewelling & Moody      Contract No.: \_\_\_\_\_  
(Architect)

\_\_\_\_\_ Drawing Number Detail      \_\_\_\_\_ Specification Section      \_\_\_\_\_ Page

### Request:

New gas, condensate, & water are shown to the new HVAC units & Hose Bibbs located on the roof in the Plumbing Drawings. There is no roof penetration detail. Please provide a roof penetration detail for piping.

Request Issued by: Mike Soucek      Mike Soucek      August 13, 2020  
*Contractor's Signature*      *Name (Printed)*      *Date*

### Response:

REFER TO DSA DRAWINGS SHEET A9.05 DATED 09.08.20 ON DISTRICT'S WEBSITE.  
DETAILS TO BE AS PER MANUFACTURER'S BEST PRACTICE. SEE ALSO DETAILS ON MEP DRAWINGS.

*The undersigned recommends the following document requirements:*

|                       | <u>Required</u>          | <u>Not Required</u>                 |
|-----------------------|--------------------------|-------------------------------------|
| FLS, SSS, ACS, Review | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sketch                | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| FGD                   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Response Review by: \_\_\_\_\_ IRVINE CARRILLO      2020.11.09  
*Architect's Signature*      *Name (Printed)*      *Date*

Response Issued by: \_\_\_\_\_  
*Owner Authorized Representative*      *Name (Printed)*      *Date*

**This Form Cannot Modify Contract Amount or Milestones and/or Contract Time.**

## REQUEST FOR INFORMATION

DSA Appl. No. (if applicable): 03-120038

RFI Title: Panic Hardware on Existing      RFI Number: PRE-BID 004

Project Name: Camarillo High School Alteration Project      Date: 8/13/2020

School Name: Camarillo High School      Project No.: 2840.0100

Issued To: Flewelling & Moody      Contract No.: \_\_\_\_\_  
(Architect)

Door Schedules \_\_\_\_\_  
Drawing Number Detail      Specification Section      Page

### Request:

Door Schedules indicate that doors, frames, and hardware are existing to remain. The notes on the Door Schedule Sheets indicate that panic hardware shall be amounted at 34" to 44" above finish floor surface. Please confirm that panic hardware is existing, and no adjustments are needed to any doors, hardware, or frames.

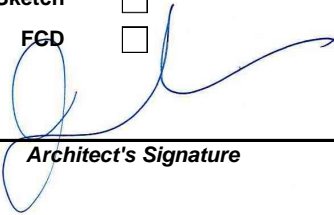
Request Issued by: Mike Soucek      Mike Soucek      August 13, 2020  
*Contractor's Signature*      *Name (Printed)*      *Date*

### Response:

REFER TO GENERAL NOTE #2 ON DOOR SCHEDULE SHEETS. NO SCOPE AT DOORS, HARDWARE, OR FRAMES

The undersigned recommends the following document requirements:

|                       | <u>Required</u>          | <u>Not Required</u>                 |
|-----------------------|--------------------------|-------------------------------------|
| FLS, SSS, ACS, Review | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sketch                | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| FGD                   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Response Review by:       IRVINE CARRILLO      2020.08.14  
*Architect's Signature*      *Name (Printed)*      *Date*

Response Issued by: \_\_\_\_\_      \_\_\_\_\_      \_\_\_\_\_  
*Owner Authorized Representative*      *Name (Printed)*      *Date*

**This Form Cannot Modify Contract Amount or Milestones and/or Contract Time.**

## REQUEST FOR INFORMATION

DSA Appl. No. (if applicable): 03-120038

RFI Title: Kick Plate RFI Number: PRE-BID 005

Project Name: Camarillo High School Alteration Project Date: 8/13/2020

School Name: Camarillo High School Project No.: 2840.0100

Issued To: Flewelling & Moody Contract No.: \_\_\_\_\_  
(Architect)

Door Schedules \_\_\_\_\_  
Drawing Number Detail \_\_\_\_\_ Specification Section \_\_\_\_\_ Page \_\_\_\_\_

### Request:

Door Schedules indicate to provide a kick plate at all doors. A door hardware specification was not included in the documents. Please indicate type of kick plate to provide and install on existing doors.

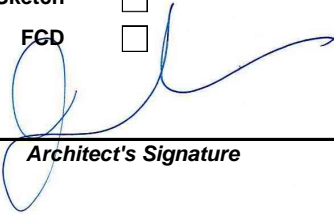
Request Issued by: Mike Soucek Mike Soucek August 13, 2020  
*Contractor's Signature* *Name (Printed)* *Date*

### Response:

KICKPLATES ARE EXISTING. DELETE NOTE TO PROVIDE KICKPLATES FROM DOOR SCHEDULES, TYPICAL.

The undersigned recommends the following document requirements:

|                       | <u>Required</u>          | <u>Not Required</u>                 |
|-----------------------|--------------------------|-------------------------------------|
| FLS, SSS, ACS, Review | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| Sketch                | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| FGD                   | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Response Review by:  IRVINE CARRILLO 2020.08.14  
*Architect's Signature* *Name (Printed)* *Date*

Response Issued by: \_\_\_\_\_  
*Owner Authorized Representative* *Name (Printed)* *Date*

**This Form Cannot Modify Contract Amount or Milestones and/or Contract Time.**





*Bid Clarification Addendum #1*

Attachment C

Telacu RFIs



TELACU Construction Management  
 604 N. Eckhoff Street  
 Orange, CA 92868  
 Ph: 714.541.2390  
 Fax: 714.541.9411

NEW HVAC FOR ADOLFO CAMARILLO HIGH SCHOOL

BID: 629

Pre-Bid RFI # 01

From: Kelly Coultrup, Chief Estimator  
 Office (714) 541-2390  
 Fax (714) 541-9411  
 Cell (714) 623-8983  
[kcoultrup@TELACU.com](mailto:kcoultrup@TELACU.com)

Date: 8/11/2020

Submitted: Via e-mail to [bvillasenor@Bernards.com](mailto:bvillasenor@Bernards.com)

1. Electrical Roof-Top Disconnect Switches and GFI Receptacles

Detail 2 Sheet E113 shows how all roof top disconnects, and GFI's are to be independently supported.

Key Note #1 on Electrical Roof Plans states disconnects to be independently supported.

Key Note #4 does not mention independent support.

Key Note #3 does not mention independent support.

Please confirm if this detail 2/E113 is to be used, in lieu of mounting directly to the mechanical equipment.

**Mount the Disconnects and receptacles independently. Use 2/E113 for mounting, currently the plans are being reviewed by DSA and there might be a minor change to the detail depending on any structural comments from DSA. Contractor may use the liquid tight flex metallic conduit for the wiring between disconnect and roof top unit.**

2. Electrical Clarify New Lighting

The architectural drawings show new lighting installed in every building. But the electrical drawing don't show new lights in buildings F, O, Q, P, U, V, W, X, Y, and the Aquatic center. Please clarify which buildings need new light fixtures.

**Install lighting per Electrical drawings. For clarification new lighting will be installed in building 'A,B,C,D,G,H,I,J,K,L,M,N'. Also there is a minor lighting relocation work in building X and Y please consider that. Its already provided on plans EX-201 and EY-201**

**Responded by : Budlong & Associates , Manan Christian EE, 2020-08-12**

End of Pre-Bid RFI # 01



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NEW HVAC FOR ADOLFO CAMARILLO HIGH SCHOOL  
BID: 629

Pre-Bid RFI # 02

From: Kelly Coultrup, Chief Estimator  
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Cell (714) 623-8983  
[kcoultrup@TELACU.com](mailto:kcoultrup@TELACU.com)

Date: 8/17/2020

Submitted: Via e-mail to [bvillasenor@Bernards.com](mailto:bvillasenor@Bernards.com)

1. Window system clarifications and scope

Please see attached:

Pre-Bid RFI from Santa Barbara Glass Company  
Product Data Sheet

End of Pre-Bid RFI # 02



## Pre-Bid (RFI)

ISSUED BY SANTA BARBARA GLASS COMPANY

|                               |  |                     |              |
|-------------------------------|--|---------------------|--------------|
| <b>DATE:</b>                  | 8-17-20                                | <b>RFI No.:</b>     | 1            |
| <b>PROJECT:</b>               | Camarillo HS HVAC Replacement          | <b>PROJECT NO.:</b> |              |
| <b>CONTRACTOR:</b>            | Santa Barbara Glass Company            |                     |              |
| <b>CONTACT PERSON:</b>        | Ed Dickson                             | <b>PHONE:</b>       | 805-962-7648 |
| <b>E-MAIL ADDRESS:</b>        | ed@sbglassmen.com                      | <b>FAX:</b>         | 805-966-6673 |
| <b>RFI ISSUED TO:</b>         |  |                     |              |
| <b>RFI SUBJECT:</b>           | Window system clarifications and scope |                     |              |
| <b>SPEC SECTION REF:</b>      |  |                     |              |
| <b>RFI REFERENCES:</b>        |  |                     |              |
| <b>INFORMATION REQUESTED:</b> |  |                     |              |

1. The specifications include Section 085113 Aluminum Windows no others exist. These windows are sliders.

The majority of the project consists of fixed windows resembling storefront type system.

They are continuous and run for many feet. The window schedule sheet A9.03 shows individual windows but that is not what the exterior elevations indicate.

Should a storefront system be added to the project for most of the fenestration shown? Such as Kawneer TriFab 451T thermally broken system? See attached.

Should the Sliding Windows section 085113 be inserted into the storefront openings where shown on the exterior elevations?

2. Building K does not indicate new Type D windows on the south elevation. Is this correct?

**WRITTEN BY:** \_\_\_\_\_ **RESPONSE REQUIRED BY:** \_\_\_\_\_

**INITIATED BY:** \_\_\_\_\_

**RESPONSE:** 1a. Windows are individual  $\pm$  3'-9" wide sections mounted in between existing wood post supports. Refer to mullion details.

1b. Windows are not storefronts. Provide ULT 500 as per spec, per Arcadia Rep James at 714.244.9024, window can be configured to meet fixed & sliding configurations.

2. Provide Type D windows on Building K south elevation, full building width.

|                      |                 |                         |            |
|----------------------|-----------------|-------------------------|------------|
| <b>RESPONDED BY:</b> | Irvine Carrillo | <b>DATE RESPONDED:</b>  | 08.18.2020 |
| <b>COST IMPACT?</b>  | _____           | <b>SCHEDULE IMPACT?</b> | <u>No</u>  |
| <b>ATTACHMENTS?</b>  | <b>YES</b>      |                         |            |


**TRIFAB™ VG (VERSAGLAZE™)**

 TRIFAB™ VG 450, 451 & 451T (THERMAL) FRAMING SYSTEMS &  
 TRIFAB™ 451UT (ULTRA THERMAL) FRAMING SYSTEM

# Design + Performance

## Versatility with Unmatched Fabrication Flexibility



Preston Pointe  
 Louisville, Kentucky  
 ARCHITECT  
 Potter & Associates Architects PLLC, Louisville, Kentucky  
 GLAZING CONTRACTOR  
 Kentucky Mirror & Plate Glass Company, Louisville, Kentucky  
 PHOTOGRAPHER  
 © Moberly Photography Inc.

Trifab™ VersaGlaze™ is built on the proven and successful Trifab™ platform – with all the versatility its name implies. There are enough framing system choices, fabrication methods, design options and performance levels to please the most discerning building owner, architect and installer. The Trifab™ VersaGlaze™ family's newest addition, the Trifab™ 451UT (Ultra Thermal) Framing System, is designed for the most demanding thermal performance and employs a dual Isolock™ thermal break.

**AESTHETICS**

Trifab™ VersaGlaze™ Framing Systems offer designers a choice of front-, center-, back- or multi-plane glass applications. Structural silicone

glazing (SSG) and weatherseal glazing options further expand designers' choices, allowing for a greater range of design possibilities for specific project requirements and architectural styles. All systems have a 4-1/2" frame depth; Trifab™ VersaGlaze™ 450 has 1-3/4" sightlines, while Trifab™ VersaGlaze™ 451/451T and Trifab™ 451UT have 2" sightlines.

With seamless incorporation of Kawneer entrances or windows, including GLASSvent™ visually frameless ventilators, Trifab™ VersaGlaze™ can be used on almost any project. These framing systems can also be packaged with Kawneer curtain walls and overhead glazing, thereby providing a full range of proven, and tested, quality products for the owner, architect and installer from a single-source supplier.

**ECONOMY**

Trifab™ VersaGlaze™ 450/451/451T Framing Systems offer four fabrication choices to suit your project (Trifab™ 451UT is available as screw spline fabrication only):

- **Screw Spline** – for economical continuous runs utilizing two-piece vertical members that provide the option to pre-assemble units with controlled shop labor costs and smaller field crews for handling and installation.
- **Shear Block** – for punched openings or continuous runs using tubular moldings with shear block clips that provide tight joints for transporting large pre-assembled multi-lite units.
- **Stick** – for fast, easy field fabrication. Field measurements and material cuts can be done when metal is on the jobsite.
- **Type B** – Same fabrication benefits as shear block except the head and sill run through.



**Brighton Landing**  
**Cambridge, Massachusetts**  
 ARCHITECT  
**ADD Inc., Cambridge, Massachusetts**  
 GLAZING CONTRACTOR  
**Ipswich Bay Glass Company, Inc., Rowley, Massachusetts**  
 PHOTOGRAPHER  
 © Gordon Schenck, Jr.

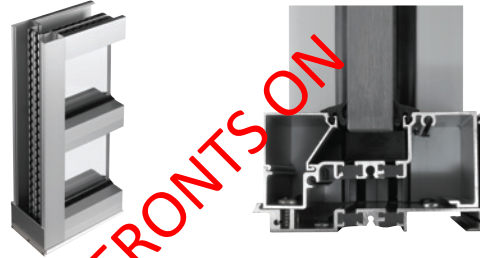
All systems can be flush glazed from either the inside or outside. The weatherseal option provides an alternative to SSG vertical mullions for Trifab™ VersaGlaze™ 450/451/451T. This ABS/ASA rigid polymer extrusion allows complete inside glazing and creates a flush glass appearance on the building exterior without the added labor of scaffolding or swing stages. Additionally, high-performance flashing options are engineered to eliminate perimeter sill fasteners and associated blind seals.

**FOR THE FINISHING TOUCH**

Architectural Class I anodized aluminum and painted finishes in fluoropolymer (AAMA 2605) and solvent-free powder coatings (AAMA 2604) offer a variety of color choices.

**PERFORMANCE**

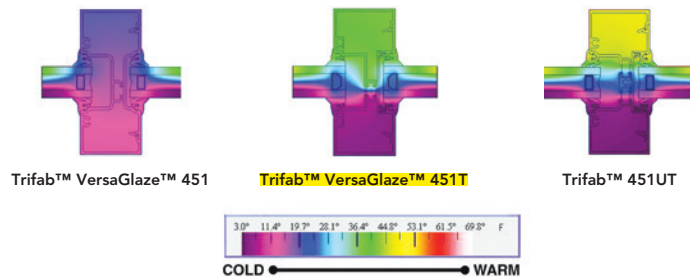
Kawneer's Isolock™ thermal break technology creates a composite section, prevents dry shrinkage and is available on Trifab™ VersaGlaze™ 451T. For even greater thermal performance, a dual Isolock™ thermal break is used on Trifab™ 451UT.



Trifab™ 451UT uses a dual Isolock™ thermal break (right) and features a new high-performance sill design, which incorporates a screw-applied end dam (left), ensuring positive engagement and tight joints between the sill flashing and end dam.

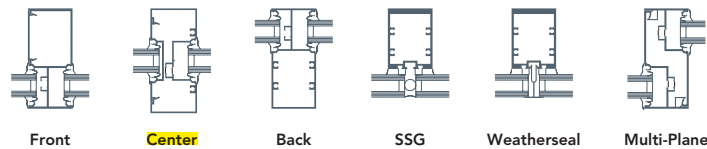
U-factor, CRF values and STC ratings for Trifab™ VersaGlaze™ vary depending upon the glass plane application. Project-specific U-factors can be determined for each individual project. (See the Kawneer Architectural Manual or Kawneer.com for additional information.)

Thermal simulations showing temperature variations from exterior/cold side to interior/warm side.



**PERFORMANCE TEST STANDARDS**

|                  |                       |
|------------------|-----------------------|
| Air Infiltration | ASTM E283             |
| Water            | AAMA 501, ASTM E331   |
| Structural       | ASTM E330             |
| Thermal          | AAMA 1503             |
| Thermal Break    | AAMA 505, AAMA TIR-A8 |
| Acoustical       | AAMA 1801, ASTM E1425 |



*Bid Clarification Addendum #1*

Attachment D

Waisman Construction

RFIs



## RFIs for Bid 629 New HVAC Modernization for Adolfo Camarillo HS

**Question 1:** Please confirm work shown on details 1 and 3 page A1.02 are NIC

Answer: Details 1, 2, & 3 on Sheet A1.02 are for reference only, NIC.

**Question 2:** Please confirm ADA site ramps detail 3 page A1.03 are NIC

Answer: Details 1, 2, 3, & 4 on Sheet A1.03 are for reference only, NIC.

**Question 3:** Please confirm what fabric on pg. 3 of DIV 12 49 20-3 (attached) will be used?

Answer: District standard Spec is attached below. Provide Mariak Manual Roller Window Shade Econoscreen 3%.

**Question 4:** Four (4) Buildings on plans did not show window treatments: Building F, Cafeteria, Faculty and Admin. Please confirm that there is no window treatments for these four (4) buildings.

Answer: Only buildings where windows are replaced shall receive Manual Roller Window Shades.

**Question 5:** Page E-101 "wiring methods CES ART.300" chart seems to be in conflict with the project specs and details for acceptable raceways in various conditions. Reference chart shows MC cable approved for branch circuit conductors within

buildings and PVC as approved raceway for and above roof, canopy roof, exposed vertical risers. Please advise.

*Answer: Please follow specs. Wiring methods CEC Art 300. Will be revised to match specs.*

**Question 6:** Sheet E-109 and E-109A note 8 on the legend says to field verify (E) conduit to be min of 3" (EMT)/31/2" PVC sch-80 and replace if required. Is the owner expecting us to determine this prior to bid? If so we will need additional pre bid job walk to open the vaults and determine existing conditions. Or will this be determined during construction and addressed as a COP if conditions defer?

*Answer: Please consider it as a new conduit, we are currently revising the plans to create an addendum revisions will be included in that.*

SECTION 12 24 13  
MANUAL ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chain operated clutch roller shades.

B. Related Sections:

1. Section 06 10 00 - Rough Carpentry: Blocking and backing for attachment of shades to wood substrate.
2. Section 09 51 13: Aluminum Windows
3. Section 09 29 00 – Gypsum Board

1.2 REFERENCES:

ASTM International (ASTM):

G 21 Determining Resistance of Synthetic Polymeric Materials to Fungi

American Type Culture Collection (ATCC):

9642, 9644, 9645 Fungi, Yeast and Yeast Genetic Stock

Glass Association of North America:

Glazing Manual.

National Fire Protection Association (NFPA):

NFPA 701-1999 Fire Tests for Flame Propagation of Textiles and Film

State of California Code of Regulations:

Title 19 Public Safety, State Fire Marshal.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product data for each shade type provided under this Section. Include construction details, dimensions of each shade, and description of each component.
- B. Shop Drawings: If required, provide shop drawings, prepared after field measurements are taken, showing location and extent of chain operated clutch roller shades.
  1. Provide elevations, sections, and details. Show tube and bracket sizes for each condition.

2. Show size and location of blocking and backing required for installation of shades. Show mounting details and method of attachment of shades to backing.
- C. Schedule: Provide schedule of chain operated clutch roller shades. Use the same designations as indicated on drawings.
- D. Samples:
  1. Shade Material: Not less than 3 inches square, with specified treatments applied. Illustrate complete range of colors and textures available for selection.
  2. Samples of accessories, brackets, chain, clutch, etc.
- E. Installation Instructions: Submit complete manufacturer's installation instructions.
- F. Qualification Data: If required, submit a letter indicating that installer is authorized by the manufacturer to install specified product.
- G. Installer's Experience Record: Submit a list of at least five 5 installations that have been installed for a minimum of 3 years of window shades similar in size, type and scope as described in this document. Include contact names and phone numbers.
- H. Maintenance Data: Submit manufacturer's recommended cleaning and maintenance data. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning. Include precautions about cleaning materials that could damage or discolor the shade fabric.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm specializing in manufacturing chain operated clutch roller shades with at least 7 years experience.
- B. Installers shall be specially trained in the installation of chain operated clutch roller shades. Installers shall have completed at least 5 commercial installations of chain operated clutch roller shades similar to those specified in this Section.

#### 1.5 Not Used

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials in manufacturer's unopened packages, labeled to show manufacturer's name and product name.
- B. Storage:
  1. Store materials in a clean area, free of corrosive fumes, dust, and away from construction activities.
  2. Stack chain operated clutch roller shades horizontally using plastic or wood shims such that drainage and ventilation are provided for, and such that water cannot accumulate in, about or upon containers.
  3. Cover stacks with tarpaulins or plastic such that ventilation is provided for, and such that contaminants are prevented from contacting surfaces.



## 1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete. Air conditioning system shall be operating, and ambient temperature shall be between 60 degrees F. and 85 degrees F. Relative humidity shall be between 45 percent and 65 percent.
- B. Field Measurements: Verify dimensions of adjoining construction by field measurements before fabrication. Allow clearances for operable glazed units' operation hardware.
- C. Before Installation Begins of Chain Operated Clutch Roller Shades
  - 1. Roof shall tight, windows and frames installed and glazed, and interior doors hung.
  - 2. Wet work including concrete, masonry, plaster, stucco, and terrazzo, shall be complete and dry.
  - 3. Application of gypsum wallboard, joint treatment, taping and sanding shall be complete and dry.
  - 4. Ceilings, window pockets, electrical, and mechanical work above the product shall be complete.
  - 5. Flooring materials such as carpet, tile, etc. must be completed.
- D. Electrical power (110 volt AC) shall be available for installer's tools within 500 feet of product installation areas.

## 1.8 WARRANTY

- A. Manufacturer's Limited Warranty: Provide Manufacturer's 25 year limited warranty against product defects.

## PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURER:

- a. Mariak Contract  
575 West Manville Street  
Rancho Dominguez, CA 90220.  
(800) 562-7425  
FAX (800) 459-6999  
[www.mariak.com](http://www.mariak.com)

- b. Or approved equal, substitution must be approved by District prior to close of bid.

### 2.2 SYSTEM DESCRIPTION:

- A. Chain operated clutch roller shade system shall consist of a roller, brackets to support the roller, a flexible fabric carried by the roller, a means of attaching the material to the roller, a bottom bar, and a chain operator to lift and lower the shade.

### 2.3 MATERIALS

- A. Fabric: PVC-coated polyester

1. Material: Econoscreen 3%
  2. Composition: 25% Polyester / 75% Vinyl
  3. Colors: As selected from manufacturer's full range
  4. Material Solar-Optical Properties:
    - a. Material Openness Factor: 3% percent.
    - b. Material UV Blockage: 97% percent.
  5. Fire-Test-Response Characteristics: Material shall pass the following:

Small scale vertical burn: NFPA 701-1999, Test Method No. 1, and California Title 19

Large scale vertical burn: NFPA 701-1999, Test Method No. 2.

Fire rating: NFPA Class A
  6. Anti-Microbial Characteristics: Shade cloth shall conform to requirements for 'No Growth' in accordance with ASTM G 21 results for fungi, using fungus samples ATCC 9642, 9644, and 9645.
- B. Clutch Mechanism: Corrosion resistant PA-6 plastic with glass fiber and internal mechanism of Nylon 6 construction. Provide a heavy-duty single spring that creates a positive mechanical relationship between the roller shade tube unit and the universal installation brackets to ensure stationary positioning in the static state. When activated the wrap spring shall release and permit the clutch to turn while reducing friction on the clutch. Clutch mechanisms with multiple springs are not acceptable.
1. Clutch End Locking System: The clutch shall have a locking system, which prevents the shade from coming out of its brackets if the shade is operated incorrectly.
- C. Spring Loaded Idle End Cap: The idle end of clutch shall be spring loaded to provide secure anchorage into end bracket.
- D. Tube Mechanism: Extruded T6 aluminum with a wall thickness not less than 0.062 inch. Each tube shall have at least one Secure Grip Spline fabric-fixing slot to increase the rigidity of the tube and eliminate sagging when the shade is operated. T5 aluminum is not acceptable.
1. Tube sizes shall be as proposed by manufacturer for each condition, and as indicated on approved submittals.
  2. Spline Mounting System: Secure Grip Spline Method, consisting of flexible PVC extrusion RF (radio frequency) or impulse welded to the shade fabric. The spline shall be inserted into a slot on the extruded aluminum tube. The spline shall provide a positive mechanical attachment of the shade band to the tube. The spline shall be designed to allow fabric to be easily removed and re-installed on the roller shade tube without having to remove the roller tube from the brackets. Splines that slide in the tube mechanism from the edge are not acceptable. Double-sided tape or glue methods of fabric attachment are not acceptable.
- E. Hembars:
1. Wrapped Hembar: Aluminum extruded piece to which the bottom of the shade fabric is attached with a mylar spline system. End caps will be set to the open ends of the wrapped hembar securing the fabric in place.

- F. Tube Mounting Brackets: Universal type, capable of attachment at top, face, and with left hand or right hand controls. Brackets shall accept end cap locking system. If selected without Valance/Fascia, bracket color shall be white or black, painted finish as selected. Zinc plated or mill finish brackets are not acceptable. Size shall be as required for each condition, and as indicated on approved submittals.
- G. Chain: Qualified No. 10 stainless steel ball chain.
- H. Side & Sill Channels: For room darkening shades or blackout shades, provide 2-piece extruded aluminum side and sill channels to eliminate left, right, and bottom edge light gaps. One-piece side channels will not be acceptable.

## 2.4 FABRICATION

- A. Shades shall be fabricated square, and free of sharp edges, burrs or other defects.
- B. Shade Units Installed Between [Inside] Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
- C. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

## PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Inspect substrates and conditions affecting work of this Section. Do not proceed until unsatisfactory conditions have been corrected.
- B. Verify that room temperature is a minimum of 65 degrees F. and that painting and other dust-producing operations are complete.

### 3.2 INSTALLATION

- A. Install shades in accordance with manufacturer's recommended installation procedures except as otherwise specified herein.
- B. Install shades with adequate clearance to permit smooth operation of shades and any sash operators. Hold roller shades 1/4" clear from each side of window opening on inside mount unless other clearance is indicated.
  - 1. Install located so shade band is not closer than 2 inches to interior face of glass. Allow proper clearances for window operation hardware.

### 3.3 CLEANING

- A. Clean soiled shades surfaces with a mild soap solution. Do not use steam, hot water, bleach or any abrasive or solvent-based cleaners. Do not machine wash. To ensure proper drying, provide adequate ventilation for shades.

### 3.4 PROTECTION

- A. Protect chain operated clutch roller shades as required to assure that they will be without damage at substantial completion.
- B. Replace damaged and defective chain operated clutch roller shades in accordance with to satisfaction of Architect.

END OF SECTION

*Bid Clarification Addendum #1*

**Attachment E**

**Novus Construction RFIs**



Phone (818) 700-2649  
FAX (818) 700-0702

**PRE-BID RFI #: 1**

**DATE:** August 31, 2020

**PROJECT NAME:** Adolfo Camarillo High School New HVAC Modernization – OUHSD

**PROJECT ADDRESS:** 4660 Mission Oaks Blvd., Camarillo, CA 93012

**ATTN.:** Brittany Villasenor-Project Engineer / Karl Aldridge–Senior Project Manager

**EMAIL:** [bvillasenor@Bernards.com](mailto:bvillasenor@Bernards.com) / [kaldridge@bernards.com](mailto:kaldridge@bernards.com)

**FROM:** NOVUS Construction

**E-MAIL:** [bid@novusconstruction.com](mailto:bid@novusconstruction.com)

**ADDRESS:** 9205 Alabama Ave., Suite F, Chatsworth, CA 91311

**TELEPHONE & FAX NUMBER:** 818.700.2649 / 818.700.0702

**DOCUMENT/DIVISION NUMBER:** Section 28 31 00 - Fire Alarm

**DRAWING NUMBER:** N/A

**REQUESTED CLARIFICATION:**

- 1) Please advise how to integrate new Fire Alarm System with existing as rooms/buildings are put in use?

New E3 FACP to be installed to replace existing 7200 panel. Existing buildings are connected to existing FACP and will be reconnected to new E3 FACP. Existing devices will remain in working order. New devices will be provided via new conduit from new FACP in Building "Q" to each building requiring CO/Smoke detection. From the existing FATC, new conduit routed within the building to the new devices. Each building with new devices will get one (1) "C" cable and one (1) "D" cable.

- Jose A. Hurtado, Budlong & Associates

9205 Alabama Avenue, Suite F, Chatsworth, California 91311



Phone (818) 700-2649  
FAX (818) 700-0702

**PRE-BID RFI #: 3**

**DATE:** August 31, 2020

**PROJECT NAME:** Adolfo Camarillo High School New HVAC Modernization – OUHSD

**PROJECT ADDRESS:** 4660 Mission Oaks Blvd., Camarillo, CA 93012

**ATTN.:** Brittany Villasenor-Project Engineer / Karl Aldridge–Senior Project Manager

**EMAIL:** [bvillasenor@Bernards.com](mailto:bvillasenor@Bernards.com) / [kaldridge@bernards.com](mailto:kaldridge@bernards.com)

**FROM:** NOVUS Construction

**E-MAIL:** [bid@novusconstruction.com](mailto:bid@novusconstruction.com)

**ADDRESS:** 9205 Alabama Ave., Suite F, Chatsworth, CA 91311

**TELEPHONE & FAX NUMBER:** 818.700.2649 / 818.700.0702

**DOCUMENT/DIVISION NUMBER:** Unit Price

**DRAWING NUMBER:** N/A

**REQUESTED CLARIFICATION:**

- 1) [Attachment H / Drawing / 2 / Sheet A1.01 / Add Note a. "G.C. shall patch and repair existing built up roof membranes & existing roof shingles affected by project scope. Refer to Roof Type Table for roof type at each building. Provide a separate Square Foot Unit Cost for Cover Board, Insulation Board, and Sheathing Replacement. Provide Unit Cost"](#)
- 2) [Attachment H / Architect's Attachment 1A / Section 07 51 13.13 Cold Applied Bituminous Roofing & Shingle Roofing / 1.2 C / Unit Prices.](#)

Referencing to the above Items 1-2, please confirm if Unit Prices are required on this project. Will it be included on the Bid Form?

Since the note to provide a square foot cost is within Addendum #1 the bidder will be accounting for that cost within their base bid - Bernards / 11.09.20

9205 Alabama Avenue, Suite F, Chatsworth, California 91311



Phone (818) 700-2649  
FAX (818) 700-0702

**PRE-BID RFI #: 4**

**DATE:** August 31, 2020

**PROJECT NAME:** Adolfo Camarillo High School New HVAC Modernization – OUHSD

**PROJECT ADDRESS:** 4660 Mission Oaks Blvd., Camarillo, CA 93012

**ATTN.:** Brittany Villasenor-Project Engineer / Karl Aldridge–Senior Project Manager

**EMAIL:** [bvillasenor@Bernards.com](mailto:bvillasenor@Bernards.com) / [kaldridge@bernards.com](mailto:kaldridge@bernards.com)

**FROM:** NOVUS Construction

**E-MAIL:** [bid@novusconstruction.com](mailto:bid@novusconstruction.com)

**ADDRESS:** 9205 Alabama Ave., Suite F, Chatsworth, CA 91311

**TELEPHONE & FAX NUMBER:** 818.700.2649 / 818.700.0702

**DOCUMENT/DIVISION NUMBER:** QSP / QSD

**DRAWING NUMBER:** N/A

**REQUESTED CLARIFICATION:**

- 1) Will a Construction General Permit Qualified SWPPP Practitioner (QSP) and a Qualified SWPPP Developer (QSD) be required on this project?

**NO, THE DISTRICT'S REPRESENTATIVE WILL MONITOR FOR COMPLIANCE**

9205 Alabama Avenue, Suite F, Chatsworth, California 91311



*Bid Clarification Addendum #1*

**Attachment F**

**Prime Acoustics RFI**



31129 Via Colinas #702  
Westlake Village, CA 91362

Tel (818) 707-3508  
Fax (818) 707-3509  
dzest@msn.com

# RFI

Date: **09/05/2020**

Company: **Bernard Bros**

Company: **Prime Acoustics**

Attn: **Jamie Pace**

Phone: **(818) 707-3508**

Fax:

Fax: **(818) 707-3509**

Project: **New HVAC Camarillo High School**

Specification: **09500 Acoustical**

1. Detail 18 on Sheet A9.01 call for a rod connected to the upper wood structural.  
In a row of 6 connected 4' long light (total 24') who many rods are required?
2. In bldg. A, C & D drawings call for removing of the existing ceiling grid (15/16" grid) and tile (Cortega -Lay-in square edge). Specification 09513 2.2 call for **USG Finline** grid (9/16") and 2x4 **Armstrong** Cortega tile  
Please Clarify if the intent is to use Finline grid with Cortega Tegular tile (that not available any more in 2x4 size) to fit the profile of the new Finline grid or to use 15/16" grid with Lay-in Cortega tile (match the existing)

If you have any questions, please call at (818) 707-3508

Thank You,  
Doron Zahavi  
Prime Acoustics

1. DETAIL DEPICTS DEMO / PATCH & REPAIR AND BLOCKING REQUIRED FOR MOUNTING FIXTURE. SEE 4/E-113 FOR TYP. BRACING AND MOUNTING.

2. CEILING GRID SHALL BE 15/16" GRID BY ARMSTRONG ; CEILING TILE SHALL BE 2X4 CORTEGA 769A - SEE DSA DRAWINGS SHEET 1/A9.06 DATED 09.08.20 ON DISTRICT'S WEBSITE.

*Bid Clarification Addendum #1*

**Attachment G**

**Sunbelt Controls RFI**



## REQUEST FOR INFORMATION

August 10, 2020

Project: Oxnard Union High School District  
Bid #629 – New HVAC Modernization for Adolfo Camarillo High School

Subject: RFI #01 – DDC System for HVAC Mfr Confirmation

**Information Requested:**

**Potential Cost Impact:** \$ 0 .00

Project Specification section 23 09 23 lists the following acceptable controls product manufactures:  
Alerton, Automated Logic, Schneider Electric, Trane, Carrier or equal.

Other school projects, specifically Bids #622 & #627, state that Carrier Open BACnet Controls as the only acceptable manufacturer. No substitutions will be accepted.

**Proposed Solution:**

Please confirm that the listed product manufacturers are in fact approved for use at this District.

**Response:**

[Please refer to Architect's Addendum on Attachment H.](#)

[Bernards / 11.09.2020](#)

***PROPOSED SOLUTION ACCEPTED***-The above proposed solution(s) is/are satisfactory and are hereby accepted. Any potential cost impacts are also hereby accepted. All work is to be performed under the same terms and conditions as specified in the original agreement unless otherwise specified herein.

**Submitted By:**

**Customer:**

**Sunbelt Controls**

**Accepted and Approved**

Authorized Signature

Authorized Signature / Print Name

Jess Lamas

Company:

August 10, 2020

Date

Date

*Bid Clarification Addendum #1*

**Attachment H**

**Architect's Addendum**



November 9, 2020

The following changes and/or clarifications shall be made to the drawings and specifications and all other conditions shall remain the same. All changes and/or clarifications provided shall be included in the scope of contracted work. Pursuant to PR13-01 all work that requires approval by the DSA shall not begin until said approvals are obtained.

### **SPECIFICATIONS**

1. **ADD** Specification Section 07 51 13.13 Shingle Roofing (Patch and Repair) and Section 07 51 13.13 Cold Applied Bituminous Roofing (Patch and Repair). See attachment 1A.
2. Specification Section 07 26 00 Underslab Vapor Barrier:
  - a. **Remove** item 2.01C "Sand" in its entirety.
  - b. **Remove** item 3.02B "Sand Cushion" in its entirety.
3. Specification Section 09 51 13 Acoustical Tile Ceilings:
  - a. **Revise** item 2.3A to read "Basis of design product: As indicated on the drawings."
4. Specification Section 23 09 23 Environmental Controls Energy Management Systems. See attachment 1B.
  - a. **Revise** item 2.1A to read "Environmental controls and energy management systems shall be approved products of Carrier Open BACnet Controls only. No Substitutions."
5. **ADD** Specification Section 23 80 01 Heat Pump Variable Refrigerant Flow Equipment, Section 23 80 02 High Wall Indoor Variable Refrigerant Flow Fan Coil Equipment, Section 23 80 03 Heat Recovery Variable Refrigerant Flow Equipment. See attachment 1C.

**DRAWINGS****1. Sheet T0.01**

- a. **Add** note: "The G.C. shall be responsible for providing all necessary demolition and new construction at restrooms & drinking fountains, including utility layout, sizing, and verification. Refer to corresponding architectural building sheets "A(Bldg Letter)-501" for required parameters and areas of scope. Include in bid amount both the cost of preparing shop drawings complying with all applicable codes for improvements shown and the cost of performing the work for each building. All new toilet partitions shall be HDPE, see specification."
- b. **Add** note: "In addition to the extents of demolition & replacement shown on the architectural plans. G.C. shall remove all existing finishes required for installation of all duct hangers, blocking, and new structural members. All removed finishes shall be replaced, patched, repaired, and painted to match the existing adjacent finishes. Refer to structural drawings for member locations and Finish Schedules for finishes to match. Typical of all buildings"
- c. **Add** note: "Basis of design for all areas receiving 12x12 glued on tile shall be 'Armstrong 12x12 Straight Drilled Tile, Adhered' as manufactured by Classic Acoustical Tel No. 760-775-7745 Contact: Jacob."

**2. Sheet A1.01**

- a. **Add** note: "G.C. shall Patch & Repair existing built up roof membranes & existing roof shingles affected by project scope. Refer to Roof Type Table for roof type at each building. Provide a separate square foot unit cost for cover board, insulation board, and sheathing replacement." See attachment 2A.
- b. **Add** note: "Where site utility distribution requires trenching at existing pavers, monuments, plaques, and similarly unique conditions, G.C. shall photo document existing condition, salvage and reinstall in place to like new condition."

**3. Sheet A9.02**

- a. **Revise** detail 9/- Typ. Platform Section to read " 8" min" instead of " 6" min."

4. **Revise** Mechanical Sheets per Narrative dated 9/17/20. See attachment 2B.

5. **Revise** Electrical Sheets per Narrative dated 9/17/20. See attachment 2C.

6. **Revise** Plumbing Sheets per Narrative dated 9/17/20. See attachment 2D.

Flewelling & Moody,

\_\_\_\_\_  
Irvine Carrillo

# ATTACHMENT 1A

## SECTION 07 51 13.13 COLD APPLIED BITUMINOUS ROOFING (PATCH AND REPAIR)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Patch-repair, patch-back or tie-in work on existing cold applied built-up roof membrane.
  - 2. Roofing insulation.
  - 3. Aggregate ballast.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood blocking, curbs, cants, and nailers; and wood-based, structural-use roof deck panels.
  - 2. Division 7 Section "Joint Sealants."
- C. Unit Prices: Refer to Division 1 Section "Unit Prices" for description of Work in this Section that is affected by unit prices.

#### 1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.
- B. Cold Applied Built Up Roofing – An asbestos free formulation of asphalt, solvent, thixotrope, mineral stabilizer and reinforcing fibers used as an interply adhesive and surface coat.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Install a watertight, built-up roofing and base flashing roofing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. FM Listing: Although the School is not FM Insured, they choose to follow FM criteria where applicable. To that end, provide built-up roofing, base flashings, and component materials that comply with requirements of FM 4450 and FM 4470 and FM 1-49 Loss Prevention Data Sheet as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.
  - 1. Roofing system shall comply with the following:
    - a. Fire/Windstorm Classification: FM Class 1A-90.
    - b. FM 1-49 Loss Prevention Data Sheet - Perimeter Flashing
    - c. FM 1-28 Loss Prevention Data Sheet - Wind Loads to Roof Systems and Decks



# ATTACHMENT 1A

- d. FM 1-29 Loss Prevention Data Sheet - Above Deck Components
- e. ASCE 7 – Section 6: Wind Forces on Buildings and other Structures

## 1.5 SUBMITTALS

- A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work, for the following:
  - 1. Base flashings, cants, and membrane terminations.
  - 2. Tapered insulation, including slopes.
  - 3. Crickets, saddles, and tapered edge strips, including slopes.
- C. Samples for Verification: Of the following products, if requested by Owner:
  - 1. 12-by-12-inch square of roofing insulation.
  - 2. 3 lb of aggregate surfacing material.
  - 3. 6 insulation fasteners of each type, length, and finish.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to conduct the repairs or modifications in accordance with and to preserve the roofing manufacturer's warranty currently in place.
- E. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing similar to that required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product; and who is eligible to receive the standard roofing manufacturer's warranty.
- B. Manufacturers Technical Services: Contractor shall provide the Roofing System Manufacturers Technical Services Inspections. The job site inspections are to be performed by the Manufacturers full time employees. Inspections shall be documented in writing. Provide a minimum of three (3) job site inspection per school site.
- C. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  - 1. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108/UL 790, for application and slopes indicated.
- D. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Meet with the same participants and review the same items listed for the pre-installation conference. In addition, review status of submittals and coordination of work related to roof construction. Notify participants at least 5 working days before conference.

# ATTACHMENT 1A

- E. Pre-installation Conference: Before installing roofing system, conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Notify participants at least 5 working days before conference.
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. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
  4. Review loading limitations of deck during and after roofing.
  5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
  6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
  7. Review temporary protection requirements for roofing system during and after installation.
  8. Review roof observation and repair procedures after roofing installation.
  9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, warm, well-ventilated, weathertight location according to roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.
- B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F.
- C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- D. Protect roofing 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.

## 1.8 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

## 1.9 WARRANTY

# ATTACHMENT 1A

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
  - 1. Warranty Period: Continuance of Existing Tremco Warranty.
  - 2. Letter sign by Manufacture that work repair work or patch work was completed per Manufactures long-term warranty guidelines.
- B. Contractors Warranty
  - 1. Contractors Warranty shall cover all labor and materials required to install the specified assemblies. Warranty period shall be 2 years from Substantial Completion

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Materials are to be compatible with the existing materials and capable of inclusion into the long-term warranty. Subject to compliance with requirements, provide products by the following: The Existing Roofing systems are Tremco.
  - 1. Built-up Asphalt Roofing Products and systems:
    - a. **BURmastic 100 system by Tremco, Inc.**
  - 2. Polyisocyanurate Board Insulation & Taper Panels (*Where required*):
    - a. **Tremco or Approved Generic by Manufacture.**
  - 3. Wood-Fiber-Board Insulation:
    - a. **Tremco Structo-Deck, ½" thick by largest panel size available.**

### 2.2 BASE-SHEET MATERIALS

- A. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft.
- B. Base Sheet: Unperforated, asphalt-impregnated and -coated, glass-fiber reinforced sheet, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.
  - 1. **BURmastic Composite Ply HT.**

### 2.3 ROOF MEMBRANE PLIES

- A. Ply Felt: Asphalt-coated, glass-fiber reinforced felt, complying with ASTM D 4601, Type II. 33 Pounds per square
  - 1. **BURmastic Glass Ply.**

### 2.4 FLASHING MATERIALS

# ATTACHMENT 1A

- A. Backer Sheet: Asphalt- coated glass-fiber and polyester bilaminate reinforced felt, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.
  - 1. **BURmastic Composite Ply HT**
- B. Flashing Sheet: White thermoplastic single ply membrane, comprised of an elastomeric Tri-Polymer alloy based blended with CPE and PVC, white on one side and gray on the opposite side, complying with ASTM D 4434.
  - 1. **TPA 60mil; base flashings**
  - 2. **TPA 55mil un-reinforced; misc. pipe and flashing details**
- C. Glass-Fiber Fabric: Woven glass reinforcement treated with organic resin complying with ASTM D 1668, Type III.
  - 1. **BURmesh**
- D. Base Flashing Strip in adhesive used at 3 and 5 coursing with glass-fiber fabric:
  - 1. **Rock-it Adhesive**

## 2.5 ASPHALT MATERIALS

- A. Asphalt Primer Water-based asphalt primer: **TremPrime WB**
- B. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, 1-part asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing membranes and flashings. Each container labeled with UL and FM logos indicating material was manufactured under the specified UL and FM quality assurance programs.
  - 1. **BURmastic Adhesive** . For use in large roof replacement areas as indicated
  - 2. **BURmastic SF Adhesive**. For use at patch and repair roof areas limited to immediate area around individual mechanical equipment or penetrations outside of large roof replacement areas.

## 2.6 AUXILIARY MEMBRANE MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.
  - 1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.
- B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application
  - 1. **ELS Mastic**
- C. Elastomeric Flashing Adhesive Butyl rubber based, trowel grade
  - 1. **Sheeting Bond.**
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470; designed for fastening base sheets and base flashings and for backnailing ply felts to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
  - 1. Type and kind as required for the deck area in the area of work.
- E. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section "Rough Carpentry."

# ATTACHMENT 1A

- F. Cants: Cellulosic-fiber board, complying with ASTM C 208, Type 2.
- G. Walkway Pads: Mineral-surfaced asphaltic composition panels, factory formed, nonporous, with a slip-resisting surface texture, manufactured specifically for adhering to built-up roofing as a protection course for foot traffic, of the following thickness:
  - 1. **TremTred**
  - 2. **Thickness: 1/2 inch**
- H. Aggregate Surfacing: Clean, dry, double washed, water-worn gravel, complying with ASTM D 1863. Color and size to match existing.
- I. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

## 2.7 INSULATION MATERIALS

- A. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents complying with ASTM C 1289, classified by facer type as follows:
  - 1. Facer Type: Type IV, cellulosic-fiber insulating board, complying with ASTM C 208, Type II, Grade 2
- B. Cellulosic-Fiber-Board Insulation: Fibrous-felted, rigid insulation boards of wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration, complying with ASTM C 208, Type II, Grade 2. **Structo-Dek**

## 2.8 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Insulation Adhesive: Solvent free, bituminous urethane adhesive
  - 1. **Low Rise Insulation Adhesive by Tremco.**
- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- D. Tapered Edge Strips: Rigid, cellulosic-fiber insulation board, complying with ASTM C 208, Type 2.
- E. Tapered Edge Strips: Rigid, glass-fiber insulation board, complying with ASTM C 726.
- F. Substrate Joint Tape: 6 or 8 inches wide, coated, glass-fiber joint tape.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.

# ATTACHMENT 1A

- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.
  - 1. Verify that wood nailer strips are located perpendicular to roof slope and spaced according to requirements of roofing system manufacturer.
- D. Do not proceed with installation until after the minimum concrete curing period recommended by roofing system manufacturer.
- E. Verify that flatness and fastening of metal roof decks comply with installation tolerances specified in Division 5 Section "Steel Deck."
- F. Do not proceed with installation until unsatisfactory conditions have been corrected.

## 3.2 PREPARATION

- A. Clean around area where new penetration has occurred. Remove aggregate surfacing and all materials that will prevent proper adhesion of new materials.
- B. Roofing Contractor shall cut existing membrane in manner to provide clean even edges. Take necessary precautions to prevent tearing and lifting of membrane to remain in place. General Contractor shall be responsible for maintaining openings in a weather tight condition.
- C. The existing Manufacturers Warranty shall be placed in suspension until all roofing work has been completed and accepted by the Manufacturer. Upon acceptable completion, the Warranty shall be re-instated as applicable.
- D. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. 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.

## 3.3 GENERAL INSTALLATION REQUIREMENTS

- A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-Up Roofing."
  - 1. Install roofing system according to applicable specification plates of NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cants: Install and secure preformed 45-degree wood cants at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.

# ATTACHMENT 1A

- D. Cooperate with inspecting and testing agencies engaged or required to perform services for installing built-up roofing membrane system.
- E. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
  - 1. Provide cutoffs at end of each day's work to cover exposed ply sheets and insulation with a course of coated felt with joints and edges sealed.
  - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
  - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- F. Cold process adhesive heating:
  - 1. An in-line heat exchange unit may be used to facilitate application
    - a. Maximum adhesive temperature: 100° F. Do not exceed the flash point of the adhesive.
  - 2. Heat exchange unit: Filled with heat transfer oil approved by equipment manufacturer.
  - 3. Follow operation procedures as recommended by equipment manufacturer.
- G. Surfacing Adhesive
  - 1. Aggregate Surfacing: Limit temperature of cold adhesive surface coat to the minimum required for proper embedment of aggregate and the maximum that will permit retention of required coating weight based on slope of surface.
  - 2. Substrate-Joint Penetrations: Prevent roofing adhesive from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction. If it is applied directly to substrate, tape substrate joints.

## 3.4 INSULATION INSTALLATION (Where Occurs)

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.
- D. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Install one or more layers of insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2 inches or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.
- G. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
  - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

# ATTACHMENT 1A

- H. Attached Insulation: Over nailable decks, secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roofing insulation to deck type indicated. Over non-nailable decks, prime and install panels using maximum 4' x 4' panel size for first layer. Over LWC, mechanically install a base sheet and then adhere insulation using 4' x 4' maximum panel size for first layer. Install subsequent layers of insulation in a ribbon coverage of solvent free insulation adhesive at a rate of 1-½ gallons per 100 sq. ft. Immediately after placement, walk insulation boards into adhesive to achieve solid contact.
1. Fasten insulation according to requirements of FM's "Approval Guide" for specified Wind-storm Resistance Classification and the insulation and roofing system manufacturers' written instructions.
  2. Fasten insulation according to the insulation and roofing system manufacturers' written instructions.
- I. Adhered Insulation: Prime surface of concrete deck with primer at a rate of 150 – 250 sq. ft. per gallon, unless a greater weight is required by roofing system manufacturer, and allow primer to dry. Set each layer of insulation in a ribbon coverage of insulation adhesive at a rate of 1-½ gallons per 100 sq. ft. Immediately after placement, walk insulation boards into adhesive to achieve solid contact.

## 3.5 BASE-SHEET INSTALLATION

- A. Install one lapped course of base sheet according to roofing system manufacturer's written instructions, extending sheet over and terminating beyond cants. Attach base sheet as follows:
1. Non-Insulated Decks: Mechanically fasten to substrate.
  2. Over insulation, adhere to substrate in a uniform coating of cold adhesive. Where occurs.

## 3.6 ROOF MEMBRANE INSTALLATION

- A. Install ply felts according to roofing system manufacturer's written instructions, starting at low point of roofing system. Cut roofing ply sheets in 18 – 20 ft. lengths and allow to relax 30 to 60 minutes. Stack lengths. Do not re-roll. Shingle side laps of ply felts uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water. Extend ply felts over and terminate beyond cants.
1. Install 3 ply felts.
  2. Application: Adhere each ply felt in 2.5 gallons per 100 sq of cold adhesive, applied within temperature range and at rate required by roofing system manufacturer, to form a uniform membrane without ply felts touching each other.
- B. Surfacing Application:
1. Prior to application of surface coat, contractor shall inspect roof with manufacturer's technical representative and repair any deficiencies.
  2. Over entire roof surface of new work, apply uniform and continuous surface coat of surfacing adhesive at a rate of 5 gallons per 100 sq. ft.
- C. Aggregate Surfacing: Immediately broadcast minimum of 400 lbs /100 sq. ft. of new, clean roofing gravel. Cover surface coat material completely.

## 3.7 FLASHING AND STRIPPING INSTALLATION

- A. Elastomeric Flashing



# ATTACHMENT 1A

- a. Adhere elastomeric sheeting completely to flashing surface, cant and roofing with flashing adhesive; allow adhesive to remain open for approx. 15 minutes to flash off solvent prior to setting elastomeric sheeting into flashing adhesive.
- b. Apply consistent pressure to entire surface of elastomeric sheeting using a steel hand roller to achieve full adhesion of the sheeting to the flashing substrate. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends 4 inches. Adhere laps with flashing adhesive.
- c. Elastomeric sheeting width: Sufficient to extend at least 6 inches beyond toe of cant onto new roof.
- d. Seal vertical and horizontal edges of sheeting with reinforcing membrane embedded in a base course of flashing adhesive and a top course of modified asphalt mastic.

## B. Two Ply stripping for metal flanges:

1. Set flange in asphalt mastic. Seal flange with 2 stripping plies embedded between alternate applications of stripping adhesive/bitumen. Extend first ply 8 inches beyond flange; second ply 6 inches beyond first ply.

### 3.8 TIE-IN TO EXISTING MEMBRANE

- A. Follow Tremco Roofing standards for the Tie-In detail. Surfacing at existing membrane adjacent to new penetration, shall be removed to expose existing felts
- B. Prime existing felts and allow to flash.
- C. Install one 18-inch wide Composite Ply felt evenly across joint line of new and existing.
- D. Install two ply strip-in using ply felts that extend past the edge of the previous felt a minimum of 6 inches
- E. Surface coat and apply surfacing aggregate of same size and color as existing.
- F. Install surfacing sheet in color to match existing where applicable. Butt edge of new surfacing sheet against edge of next higher surfacing sheet as required to prevent the blockage of water flowing across roof. At gravel surfaces match existing as specified elsewhere.

### 3.9 LONG TERM WARRANTY EXTENSION

- A. Contractor shall review the existing roof conditions of all low slope roofing areas with the Manufacturer of Record, Tremco Roofing (Dan Gilday – [dgilday@tremcoinc.com](mailto:dgilday@tremcoinc.com)) prior to starting work.

### 3.10 FIELD QUALITY CONTROL

- A. Owner will engage, at their option, an independent testing and inspecting agency to perform field inspections and quality-assurance tests.
  1. The Manufacturer and the Testing Agency shall agree in writing to acknowledge and accept the comments of the other agency.
- B. Correct deficiencies in or remove and replace roof membrane that inspections and test reports indicate does not comply with specified requirements or are capable of being incorporated into the existing warranty.

# ATTACHMENT 1A

1. Repair roof membrane that does not comply with specified requirements by re-adhering test specimens back in place and by applying additional plies, equal to the original number of plies specified, over test specimens according to roofing system manufacturer's written instructions.
- C. Test Cuts: Before surface coating and surfacing built-up roofing membrane, test specimens will be removed to evaluate problems observed during quality-assurance inspections of roof membrane as follows:
  1. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with the criteria established in Appendix 3 of ARMA/NRCA'S "Quality Control Guidelines for the Application of Built-up Roofing."
- D. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.
  1. Notify Architect and Owner, General Contractor and Roof System Representative, 48 hours in advance of the date and time of inspection.

## 3.11 PROTECTING AND CLEANING

- A. Protect built-up roofing membrane from damage and wear during remainder of construction period. When remaining construction will 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. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

# ATTACHMENT 1A

## SECTION 07 51 13.13 SHINGLE ROOFING (PATCH AND REPAIR)

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

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

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Cold Applied built-up roof membrane.
  - 2. Base sheet.
  - 3. Roofing insulation.
  - 4. Aggregate ballast.
- B. Related Sections include the following:
  - 1. Division 6 Section "Rough Carpentry" for wood blocking, curbs, cants, and nailers; and wood-based, structural-use roof deck panels.
  - 2. Division 7 Section "Joint Sealants."
- C. Unit Prices: Refer to Division 1 Section "Unit Prices" for description of Work in this Section that is affected by unit prices.

#### 1.3 DEFINITIONS

- A. Roofing Terminology: Refer to ASTM D 1079 for definitions of terms related to roofing work not otherwise defined in this Section.
- B. Cold Applied Built Up Roofing – An asbestos free formulation of asphalt, solvent, thixotrope, mineral stabilizer and reinforcing fibers used as an interply adhesive and surface coat.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. General: Install a watertight, built-up roofing and base flashing roofing system with compatible components that will not permit the passage of liquid water and will withstand wind loads, thermally induced movement, and exposure to weather without failure.
- B. FM Listing: Although the School is not FM Insured, they choose to follow FM criteria where applicable. To that end, provide built-up roofing, base flashings, and component materials that comply with requirements of FM 4450 and FM 4470 and FM 1-49 Loss Prevention Data Sheet as part of a roofing system and that are listed in FM's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM markings.

# ATTACHMENT 1A

1. Roofing system shall comply with the following:
  - a. Fire/Windstorm Classification: FM Class 1A-90.
  - b. FM 1-49 Loss Prevention Data Sheet - Perimeter Flashing
  - c. FM 1-28 Loss Prevention Data Sheet - Wind Loads to Roof Systems and Decks
  - d. FM 1-29 Loss Prevention Data Sheet - Above Deck Components
  - e. ASCE 7 – Section 6: Wind Forces on Buildings and other Structures

## 1.5 SUBMITTALS

- A. Product Data: For each type of roofing product specified. Include data substantiating that materials comply with requirements.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work, for the following:
  1. Base flashings, cants, and membrane terminations.
  2. Tapered insulation, including slopes.
  3. Crickets, saddles, and tapered edge strips, including slopes.
- C. Samples for Verification: Of the following products:
  1. 12-by-12-inch (300-by-300-mm) square of roofing insulation.
  2. 3 lb (1.5 kg) of aggregate surfacing material.
  3. 6 insulation fasteners of each type, length, and finish.
- D. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, or licensed by manufacturer to install specified roofing system and is eligible to conduct the repairs or modifications in accordance with and to preserve the roofing manufacturer's warranty currently in place.
- E. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced installer to perform Work of this Section who has specialized in installing roofing similar to that required for this Project; who is approved, authorized, or licensed by the roofing system manufacturer to install manufacturer's product; and who is eligible to receive the standard roofing manufacturer's warranty.
- B. Manufacturers Technical Services: Contractor shall provide the Roofing System Manufacturers Technical Services Inspections. The job site inspections are to be performed by the Manufacturers full time employees. Inspections shall be documented in writing. Provide a minimum of three (3) days of job site inspection.
- C. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method indicated below by UL, FM, or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.
  1. Exterior Fire-Test Exposure: Class A; complying with ASTM E 108/UL 790, for application and slopes indicated.

# ATTACHMENT 1A

- D. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site. Meet with the same participants and review the same items listed for the pre-installation conference. In addition, review status of submittals and coordination of work related to roof construction. Notify participants at least 5 working days before conference.
- E. Pre-installation Conference: Before installing roofing system, conduct conference at Project site to comply with requirements of Division 1 Section "Project Meetings." Notify participants at least 5 working days before conference.
  - 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. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and attachment to structural members.
  - 4. Review loading limitations of deck during and after roofing.
  - 5. Review flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
  - 6. Review governing regulations and requirements for insurance, certifications, and inspection and testing, if applicable.
  - 7. Review temporary protection requirements for roofing system during and after installation.
  - 8. Review roof observation and repair procedures after roofing installation.
  - 9. Document proceedings, including corrective measures or actions required, and furnish copy of record to each participant.

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store roofing materials in a dry, warm, well-ventilated, weathertight location according to roofing system manufacturer's written instructions. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces. Do not double-stack rolls.
  - 1. Handle and store roofing materials and place equipment in a manner to avoid significant or permanent damage to deck or structural supporting members.
- B. Do not leave unused felts and other sheet materials on the roof overnight or when roofing work is not in progress unless protected from weather and moisture and unless maintained at a temperature exceeding 50 deg F (10 deg C).
- C. Deliver and store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.
- D. Protect roofing 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.

## 1.8 PROJECT CONDITIONS

# ATTACHMENT 1A

- A. Weather Limitations: Proceed with roofing work only when existing and forecasted weather conditions permit roofing to be installed according to manufacturers' written instructions and warranty requirements.

## 1.9 WARRANTY

- A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
1. Warranty Period: Continuance of Existing Tremco Warranty.
- B. Issuance of Long Term Warranty Extension. Owner requires that the existing Long Term Warranty be extended for an additional 10 years. Extension to begin at end of existing Long Term Warranty.
- C. Contractors Warranty
1. Contractors Warranty shall cover all labor and materials required to install the specified assemblies. Warranty period shall be 2 years from Substantial Completion

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturers: Materials are to be compatible with the existing materials and capable of inclusion into the long term warranty. Subject to compliance with requirements, provide products by the following: The Existing Roofing systems are Tremco.
1. Built-up Asphalt Roofing:
    - a. Tremco, Inc.
  2. Polyisocyanurate Board Insulation: (Where required)
    - a. Celotex Corp. (The).
    - b. Firestone Building Products
    - c. Rmax, Inc.
    - d. NRG Barriers, Inc.
  3. Wood-Fiber-Board Insulation:
    - a. Tremco Structo-Dek, ½" thick by largest panel size available.
  4. Walk Pads:
    - a. Tremco.

### 2.2 BASE-SHEET MATERIALS

- A. Sheathing Paper: Red-rosin type, minimum 3 lb/100 sq. ft. (0.16 kg/sq. m).
- B. Base Sheet: Unperforated, asphalt-impregnated and -coated, glass-fiber reinforced sheet, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.

# ATTACHMENT 1A

1. BURmastic Composite Ply HT by Tremco.

## 2.3 ROOF MEMBRANE PLIES

- A. Ply Felt: Asphalt-coated, glass-fiber reinforced felt, complying with ASTM D 4601, Type II. 33 Pounds per square

1. BURmastic Glass Ply by Tremco.

## 2.4 FLASHING MATERIALS

- A. Backer Sheet: Asphalt-coated glass-fiber and polyester bilaminate reinforced felt, dusted with fine mineral surfacing on both sides, complying with ASTM D 4601, Type II.

1. BURmastic Composite Ply HT by Tremco

- B. Flashing Sheet: White thermoplastic single ply membrane, comprised of an elastomeric Tri-Polymer alloy based blended with CPE and PVC, white on one side and gray on the opposite side, complying with ASTM D 4434.

- C. Glass-Fiber Fabric: Woven glass reinforcement treated with organic resin complying with ASTM D 1668, Type III.

1. BURmesh by Tremco.

## 2.5 ASPHALT MATERIALS

- A. Asphalt Primer Water-based asphalt primer

- B. Cold-Applied Adhesive: Roofing system manufacturer's standard asphalt-based, 1-part asbestos-free, cold-applied adhesive specially formulated for compatibility and use with built-up roofing membranes and flashings. Each container labeled with UL and FM logos indicating material was manufactured under the specified UL and FM quality assurance programs.

1. BURmastic LV Adhesive by Tremco. For use in large roof replacement areas as indicated.
2. BURmastic SF Adhesive by Tremco. For use at patch and repair roof areas limited to immediate area around individual mechanical equipment or penetrations outside of large roof replacement areas

## 2.6 AUXILIARY MEMBRANE MATERIALS

- A. General: Furnish auxiliary materials recommended by roofing system manufacturer for intended use and compatible with built-up roofing.

1. Furnish liquid-type auxiliary materials that meet VOC limits of authorities having jurisdiction.

- B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application

1. ELS by Tremco

# ATTACHMENT 1A

- C. Elastomeric Flashing Adhesive Butyl rubber based, trowel grade.
  - 1. Sheeting Bond by Tremco.
- D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470; designed for fastening base sheets and base flashings and for backnailing ply felts to substrate; tested by manufacturer for required pullout strength; and acceptable to roofing system manufacturer.
- E. Type and kind as required for the deck area in the area of work.
- F. Wood Nailer Strips: Furnish wood nailer strips complying with requirements of Division 6 Section "Rough Carpentry."
- G. Cants: Cellulosic-fiber board, complying with ASTM C 208, Type 2.
- H. Walkway Pads: Mineral-surfaced asphaltic composition panels, factory formed, nonporous, with a slip-resisting surface texture, manufactured specifically for adhering to built-up roofing as a protection course for foot traffic, of the following thickness:
  - 1. TremTred by Tremco.
  - 2. Thickness: **1/2 inch (12 mm)**.
- I. Aggregate Surfacing: Clean, dry, double washed, water-worn gravel, complying with ASTM D 1863. Color and size to match existing.
- J. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer for intended use.

## 2.7 INSULATION MATERIALS

- A. Polyisocyanurate Board Insulation: Rigid, cellular polyisocyanurate thermal insulation with core formed by using HCFCs as blowing agents complying with ASTM C 1289, classified by facer type as follows:
  - 1. Facer Type: Type II, black, non-asphaltic fiber reinforced felt on both major surfaces.
  - 2. Facer Type: Type IV, cellulosic-fiber insulating board, complying with ASTM C 208, Type II, Grade 2, **1/2 inch (12.7 mm)** thick on 1 major surface and a black, non-asphaltic fiber reinforced felt on the other.
- B. Cellulosic-Fiber-Board Insulation: Fibrous-felted, rigid insulation boards of wood fiber or other cellulosic-fiber and water-resistant binders, asphalt impregnated, chemically treated for deterioration, complying with ASTM C 208, Type II, Grade 2. Structo-Dek by Tremco

## 2.8 INSULATION ACCESSORIES

- A. General: Furnish roofing insulation accessories recommended by insulation manufacturer for intended use and compatible with sheet roofing material.
- B. Insulation Adhesive: Solvent free, bituminous urethane adhesive
  - 1. Low Rise Insulation Adhesive by Tremco.



# ATTACHMENT 1A

- C. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions of FM 4470, designed for fastening roofing insulation to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer.
- D. Tapered Edge Strips: Rigid, cellulosic-fiber insulation board, complying with ASTM C 208, Type 2.
- E. Tapered Edge Strips: Rigid, glass-fiber insulation board, complying with ASTM C 726.
- F. Substrate Joint Tape: 6 or 8 inches (150 or 200 mm) wide, coated, glass-fiber joint tape.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions under which roofing will be applied, with Installer present, for compliance with requirements.
- B. Verify that roof openings and penetrations are in place and set and braced and that roof drains are properly clamped into position.
- C. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at roof penetrations and terminations and match the thicknesses of insulation required.
  - 1. Verify that wood nailer strips are located perpendicular to roof slope and spaced according to requirements of roofing system manufacturer.
- D. Do not proceed with installation until after the minimum concrete curing period recommended by roofing system manufacturer.
  - 1. Test concrete substrate for excessive moisture by pouring 1 pint (0.5 L) of roofing asphalt at equiviscous temperature on deck at start of each day's work and at start of each roof area or plane. Do not proceed with roofing work if test sample foams or can be easily and cleanly stripped after cooling.
- E. Verify that flatness and fastening of metal roof decks comply with installation tolerances specified in Division 5 Section "Steel Deck."
- F. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Clean around area where new penetration has occurred. Remove aggregate surfacing and all materials that will prevent proper adhesion of new materials.
- B. Roofing Contractor shall cut existing membrane in manner to provide clean even edges. Take necessary precautions to prevent tearing and lifting of membrane to remain in place. General Contractor shall be responsible for maintaining openings in a weather tight condition. The existing Manufacturers Warranty shall be placed in suspension until all roofing work has been completed and accepted by the Manufacturer. Upon acceptable completion, the Warranty shall be re-instated as applicable.

# ATTACHMENT 1A

- C. Clean substrate of dust, debris, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- D. 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 GENERAL INSTALLATION REQUIREMENTS

- A. Install built-up roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-Up Roofing."
  - 1. Install roofing system according to applicable specification plates of NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Start installation of built-up roofing membrane in presence of roofing system manufacturer's technical personnel.
- C. Cants: Install and secure preformed 45-degree wood cants at junctures of built-up roofing membrane system with vertical surfaces or angle changes greater than 45 degrees.
- D. Cooperate with inspecting and testing agencies engaged or required to perform services for installing built-up roofing membrane system.
- E. Coordinate installing roofing system components so insulation and roofing plies are not exposed to precipitation or left exposed at the end of the workday or when rain is forecast.
  - 1. Provide cutoffs at end of each day's work to cover exposed ply sheets and insulation with a course of coated felt with joints and edges sealed.
  - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
  - 3. Remove and discard temporary seals before beginning work on adjoining roofing.
- F. Cold process adhesive heating:
  - 1. An in-line heat exchange unit may be used to facilitate application
    - a. Maximum adhesive temperature: 100° F. Do not exceed the flash point of the adhesive.
  - 2. Heat exchange unit: Filled with heat transfer oil approved by equipment manufacturer.
  - 3. Follow operation procedures as recommended by equipment manufacturer.
- G. Surfacing Adhesive
  - 1. Aggregate Surfacing: Limit temperature of cold adhesive surface coat to the minimum required for proper embedment of aggregate and the maximum that will permit retention of required coating weight based on slope of surface.
  - 2. Substrate-Joint Penetrations: Prevent roofing adhesive from penetrating substrate joints, entering building, or damaging roofing system components or adjacent building construction. If it is applied directly to substrate, tape substrate joints.

## 3.4 INSULATION INSTALLATION (Where Occurs)

# ATTACHMENT 1A

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installing roofing insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated and to Shop Drawings.
- D. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- E. Install one or more layers of insulation under area of roofing to achieve required thickness. Provide an average of R19 thermal value. Where overall insulation thickness is **2 inches (50 mm)** or greater, install required thickness in 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of **6 inches (150 mm)** in each direction.
- F. Trim surface of insulation where necessary at roof drains so completed surface is flush with ring of drain.
- G. Install insulation with long joints of insulation in continuous straight lines with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding **1/4 inch (6 mm)** with insulation.
  - 1. Cut and fit insulation within **1/4 inch (6 mm)** of nailers, projections, and penetrations.
- H. Attached Insulation: Over nailable decks, secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roofing insulation to deck type indicated. Over non-nailable decks, prime and install panels using maximum 4' x 4' panel size for first layer. Over LWC, mechanically install a base sheet and then adhere insulation using 4' x 4' maximum panel size for first layer. Install subsequent layers of insulation in a ribbon coverage of solvent free insulation adhesive at a rate of 1-½ gallons per 100 sq. ft. Immediately after placement, walk insulation boards into adhesive to achieve solid contact.
  - 1. Fasten insulation according to requirements of FM's "Approval Guide" for specified Wind-storm Resistance Classification and the insulation and roofing system manufacturers' written instructions.
  - 2. Fasten insulation according to the insulation and roofing system manufacturers' written instructions.
- I. Adhered Insulation: Prime surface of concrete deck with water based primer at a rate of 150 – 250 sq. ft. per gallon, unless a greater weight is required by roofing system manufacturer, and allow primer to dry. Set each layer of insulation in a ribbon coverage of solvent free insulation adhesive at a rate of 1-½ gallons per 100 sq. ft. Immediately after placement, walk insulation boards into adhesive to achieve solid contact.

## 3.5 BASE-SHEET INSTALLATION

- A. Install one lapped course of base sheet according to roofing system manufacturer's written instructions, extending sheet over and terminating beyond cants. Attach base sheet as follows:
  - 1. Mechanically fasten to substrate.
  - 2. Over insulation, adhere to substrate in a uniform coating of cold adhesive. Where occurs.

## 3.6 ROOF MEMBRANE INSTALLATION

# ATTACHMENT 1A

- A. Install ply felts according to roofing system manufacturer's written instructions, starting at low point of roofing system. Cut roofing ply sheets in 18 – 20 ft. lengths and allow to relax 30 to 60 minutes. Stack lengths. Do not re-roll. Shingle side laps of ply felts uniformly to achieve required number of membrane plies throughout. Shingle in direction to shed water. Extend ply felts over and terminate beyond cants.
  - 1. Install 3 ply felts.
  - 2. Application: Adhere each ply felt in cold adhesive, applied within temperature range and at rate required by roofing system manufacturer, to form a uniform membrane without ply felts touching each other.
- B. Surfacing Application:
  - 1. Prior to application of surface coat, contractor shall inspect roof with manufacturer's technical representative and repair any deficiencies.
  - 2. Over entire roof surface of new work, apply uniform and continuous surface coat of surfacing adhesive at a rate of 5 gallons per 100 sq. ft.
- C. Aggregate Surfacing: Immediately broadcast minimum of 400 lbs /100 sq. ft. of new, clean roofing gravel. Cover surface coat material completely.
- D. Aggregate Weight: 400 lb/100 sq. ft. (20 kg/sq. m), average.

## 3.7 FLASHING AND STRIPPING INSTALLATION

- A. Elastomeric Flashing
  - a. Adhere elastomeric sheeting completely to flashing surface, cant and roofing with flashing adhesive; allow adhesive to remain open for 15 minutes to flash off solvent prior to setting elastomeric sheeting into flashing adhesive.
  - b. Apply consistent pressure to entire surface of elastomeric sheeting using a steel hand roller to achieve full adhesion of the sheeting to the flashing substrate. Ensure complete bond and continuity without wrinkles or voids. Lap sheeting ends 4 inches. Adhere laps with Hypalon flashing adhesive.
  - c. Elastomeric sheeting width: Sufficient to extend at least 6 inches beyond toe of cant onto new roof.
  - d. Seal vertical and horizontal edges of sheeting with reinforcing membrane embedded in a base course of flashing adhesive and a top course of modified asphalt mastic.
- B. Two Ply stripping for metal flanges:
  - 1. Set flange in asphalt mastic. Seal flange with 2 stripping plies embedded between alternate applications of stripping adhesive/bitumen. Extend first ply 8 inches beyond flange; second ply 6 inches beyond first ply.

## 3.8 TIE-IN TO EXISTING MEMBRANE

- A. Follow Tremco Roofing standards for the Tie-In detail. Surfacing at existing membrane adjacent to new penetration, shall be removed to expose existing felts
- B. Prime existing felts and allow to flash.
- C. Install one 18-inch wide Composite Ply felt evenly across joint line of new and existing.

# ATTACHMENT 1A

- D. Install two ply strip-in using ply felts that extend past the edge of the previous felt a minimum of 6 inches
- E. Surface coat and apply surfacing aggregate of same size and color as existing.
- F. Install surfacing sheet in color to match existing where applicable. Butt edge of new surfacing sheet against edge of next higher surfacing sheet as required to prevent the blockage of water flowing across roof. At gravel surfaces match existing as specified elsewhere.
- G. Coat new surfacing to match existing surface coating.

## 3.9 LONG TERM WARRANTY EXTENSION

- A. Contractor shall review the existing roof conditions of all low slope roofing areas with the Manufacturer of Record (Tremco Roofing – Jim Gilday - 805-492-5222) prior to submitting bid.
- B. Contactor shall perform necessary maintenance and repairs as needed to enable Manufacturer to issue Long Term Warranty Extension.

## 3.10 FIELD QUALITY CONTROL

- A. Owner will engage, at their option, an independent testing and inspecting agency to perform field inspections and quality-assurance tests.
  - 1. Testing agency will prepare reports stating whether inspected and tested Work complies with or deviates from requirements.
  - 2. Testing agency personnel shall be versed and have minimum of 5 years experience in the type of roofing being inspected.
  - 3. The Manufacturer and the Testing Agency shall agree in writing to acknowledge and accept the comments of the other agency.
- B. Correct deficiencies in or remove and replace roof membrane that inspections and test reports indicate does not comply with specified requirements or are capable of being incorporated into the existing warranty.
  - 1. Repair roof membrane that does not comply with specified requirements by re-adhering test specimens back in place and by applying additional plies, equal to the original number of plies specified, over test specimens according to roofing system manufacturer's written instructions.
- C. Test Cuts: Before surface coating and surfacing built-up roofing membrane, test specimens will be removed to evaluate problems observed during quality-assurance inspections of roof membrane as follows:
  - 1. Test specimens will be examined for interply voids according to ASTM D 3617 and to comply with the criteria established in Appendix 3 of ARMA/NRCA'S "Quality Control Guidelines for the Application of Built-up Roofing."
- D. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect.

# ATTACHMENT 1A

1. Notify Architect and Owner, General Contractor and Roof System Representative, 48 hours in advance of the date and time of inspection.

## 3.11 PROTECTING AND CLEANING

- A. Protect built-up roofing membrane from damage and wear during remainder of construction period. When remaining construction will 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. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, reinstall roofing, and repair base flashings to a condition free of damage and deterioration at the time of Substantial Completion and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

**ATTACHMENT 2A  
ADDED TO A1.01**

| (E ) ROOFING TYPES |              |
|--------------------|--------------|
| BUILDING           | ROOFING TYPE |
|                    |              |
| AQUATICS           | BUILT-UP     |
| A                  | BUILT-UP     |
| B                  | BUILT-UP     |
| C                  | SHINGLE      |
| D                  | BUILT-UP     |
| F                  | BUILT-UP     |
| G                  | SHINGLE      |
| H                  | SHINGLE      |
| I                  | BUILT-UP     |
| J                  | SHINGLE      |
| K                  | SHINGLE      |
| L                  | BUILT-UP     |
| M                  | SHINGLE      |
| N                  | SHINGLE      |
| O                  | BUILT-UP     |
| Q                  | BUILT-UP     |
| U                  | BUILT-UP     |
| V                  | BUILT-UP     |
| W                  | BUILT-UP     |
| X                  | BUILT-UP     |
| Y                  | BUILT-UP     |
| COVERED WALKWAY    | BUILT-UP     |

# ATTACHMENT 1B

## SECTION 23 09 23

### ENVIRONMENTAL CONTROLS AND ENERGY MANAGEMENT SYSTEMS

#### PART 1 – GENERAL

##### 1.1 SUMMARY

- A. Section Includes: Environmental controls and energy management systems, including equipment, materials, installation, start-up, testing, documentation and training according to construction documents. The project drawings establish the scope of HVAC controls work in conjunction with the scope of work indicated in Section 23 09 00: HVAC Instrumentation and Controls. This Section complements the requirements of Section 23 09 00, and construction drawings for controls and system communications.
- B. Related Requirements:
1. Division 01: General Requirements.
  2. Section 01 45 23: Testing and Inspection.
  3. Section 01 79 00: Maintenance and Operations Staff Demonstration and Training.
  4. Section 01 91 13: General Commissioning Requirements.
  5. Section 23 05 00: Common Work Results for HVAC.
  6. Section 23 05 13: Basic HVAC Materials and Methods.
  7. Section 23 08 00: HVAC Systems Commissioning.
  8. Section 23 08 13: Environmental Controls and Energy Management Systems Commissioning.
  9. Section 23 30 00: Air Distribution.
  10. Section 23 70 00: Air Handling Units.
  11. Section 23 80 00: Heating, Ventilating and Air Conditioning Equipment.
  12. Section 26 05 00: Common Work Results for Electrical.
  13. Section 26 05 13: Basic Electrical Materials and Methods.
  14. Section 26 05 19: Low-Voltage Wires (600 Volt AC).
  15. Section 26 05 26: Grounding and Bonding.
  16. Section 26 09 23: Lighting Control Systems.
  17. Section 28 31 49: Carbon Monoxide Detection and Alarm Systems.
  18. Project Commissioning Plan (CxP).

##### 1.2 REFERENCES



# ATTACHMENT 1B

- A. The latest version of applicable codes, standards, and references. Inspections and tests shall be in accordance with the following applicable codes and standards, except as provided otherwise herein.
1. International Electrical Testing Association – NETA.
  2. National Electrical Manufacturers Association – NEMA.
  3. American Society for Testing and Materials – ASTM.
  4. Institute of Electrical and Electronics Engineers – IEEE.
  5. American National Standards Institute – ANSI.
  6. National Electrical Safety Code – NESC.
  7. California Building Code – CBC.
  8. California Electrical Code – CEC.
  9. California Mechanical Code – CMC.
  10. Insulated Cables Engineers Association – ICEA.
  11. Occupational Safety and Health Administration – OSHA.
  12. National Institute of Standards and Technology – NIST.
  13. National Fire Protection Association – NFPA.
  14. American Society of Heating, Refrigerating, and Air-Conditioning Engineers – ASHRAE  
(The HVAC Commissioning Process, ASHRAE Guideline).
  15. International Building Code – IBC.
  16. International Mechanical Code – IMC.
  17. InterNational Electrical Testing Association (NETA) Acceptance Testing.

## 1.3 SUBMITTALS

- A. Provide in accordance with Division 01 and Section 23 05 00: Common Work Results for HVAC.
- B. Shop Drawings shall include but not limited to:
1. Cover page with legend, common notes, symbol schedule, and drawing index.
  2. Complete point to point environmental controls and energy management network communication diagram(s) for Direct Digital Controls (DDC) of each system:
    - a. Identify all components.
    - b. Indicate conduit and wire characteristics, sizes and quantities.

# ATTACHMENT 1B

- c. Provide bill of materials.
3. Floor plans showing control panels and intercommunication wiring.
  - a. Show system(s) interface connections.
4. Valve Schedules where required.
5. Operations and Maintenance Manuals.
6. As-built submittal drawings.
7. Installation Instructions of each control device.
8. PC Workstation.
9. Software flow diagram of each unique system sequence of operation.
10. Software licenses and electronic keys.
11. Supplemental local or factory training schedule for post warranty support.
12. A complete list of recommended spare parts with pricing for the OWNER's use in keeping the environmental control system downtime to a minimum.
13. Composite CD-ROM with AutoCAD drawings in a ".dwg" format.

## 1.4 QUALITY CONTROL

- A. CONTRACTOR shall have adequate experience installing systems of similar size and complexity with the control product line proposed for this project.
  1. Qualifications of Installer: Minimum five years experience installing products and systems of similar scope and complexity.
  2. Installer shall submit certification from the equipment manufacturer indicating that installer is an authorized representative of the equipment manufacturer and is trained on network applications.
  3. Installer shall maintain a fully equipped service organization capable of furnishing repair service to the equipment and shall maintain a spare set of major parts for the system at all times.
  4. Installer shall furnish a letter from manufacturer of equipment certifying equipment has been installed according to factory standards and that system is operating properly.
  5. CONTRACTOR shall have participated in the commissioning of a minimum of 10 projects of similar magnitude to those needed for this project.
  6. System startup and testing shall be performed under the direct observation of the Project Inspector and OAR.
- B. Materials and equipment installed shall be new.
- C. System installation shall not begin until Shop Drawings are submitted and reviewed by the Architect or Engineer of Record.

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- D. Components for Direct Digital Control (DDC) shall comply with ASHRAE standards.
- E. The installer shall provide the system components required by code and for the life safety of the service personnel.
- F. System shall be able to interface with open protocol BACnet systems.
- G. Provide all ancillary components for the system to perform the required sequence of operations. Install, test and adjust the system accordingly.
- H. System components shall operate per industry standards. The standards shall be as defined by ASHRAE, SMACNA, AABC, NEBB, TABB, and the literature of the manufacturers listed in this Section.
- I. Provide field engineering tools including software and hardware needed for programing and/or modifying system controller and devices.

## 1.5 WARRANTY

- A. Components, system hardware and software, and parts and labor shall be guaranteed against defects in materials, fabrication, and execution for three years from date of system acceptance. Provide labor and materials to repair, reprogram, or replace defective components at no charge to the OWNER during the warranty period.
- B. Provide a list of applicable warranties for equipment and components, this list shall include warranty information, names, addresses, telephone numbers, and procedures for filing a claim and obtaining warranty services.
- C. CONTRACTOR shall respond to OWNER's request for warranty service within four hours of initial call to schedule a mutually agreeable time for service. Submit records of the nature of the call, the work performed, and the parts replaced or service rendered.

## 1.6 TRAINING

- A. Provide a competent instructor who is factory trained and has comprehensive knowledge of system components and operations to provide full instructions to designated personnel in the system operation, maintenance, and programming. Training shall be specifically oriented to installed equipment and systems.
  - 1. Provide four hours of onsite OWNER familiarization and training for the installed system. Training shall include system overview, time schedules, override commands, emergency operation, and programming and report generation. OWNER employees attending this training session shall be provided with the following documentation:
    - a. As-built drawings of System layouts and point to point connection diagrams.
    - b. System components cut sheets.
    - c. Operations and maintenance data.
  - 2. Programmer and maintenance training shall include database entry; trend logs application programs, diagnostic routines, reporting, failure recovery and calibration.
    - a. Provide 24 hours of training as follows:

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- 1) Training session shall accommodate a minimum of 20 persons and be facilitated at CONTRACTOR's training facility, which should be no more than 50 miles from the Project Site.
  - a) Training shall be delivered in 6 hours per session increments.
  - b) Obtain OWNER's approval for training locations exceeding 50 miles. In such cases, the CONTRACTOR shall be responsible for transportation expenses.
  - c) CONTRACTOR shall provide training computers for all attendees. Computers shall be ready for live training sessions.
- 2) Training shall cover instruction, theory, and expose the trainees to system's features, components, architecture, operations, programming, report generation, communications, and any other pertinent information required for the operations and maintenance of the system.
- 3) Each training session shall have an itemized agenda covering all aspects of the training to be covered in the sessions. CONTRACTOR shall obtain agendas approval from OWNER and Commissioning Agent.
- 3) Instructor(s) shall give the trainees the opportunity to practice on simulated and actual (installed) systems.
- 4) The training session shall cover, but not be limited to the following instruction modules or sessions:
  - a) System Architecture:
    - (1) System layout and components interrelations and hierarchical structure.
    - (2) Controllers interfacing and functions.
    - (3) Server functionality and data management, error messages, and alarm conditions.
    - (4) Connectivity and communication losses.
    - (5) Replacement procedures for system components.
  - b) User Operations:
    - (1) Familiarization and navigation with the EMS operating System.
    - (2) Window panes, menus, navigation buttons, alarm response windows, system passwords and accessibility features and options, monitoring and managing data points (inputs, outputs, numeric values, time and date, strings).

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- (3) Views: Provide sufficient information as to train staff on how and where to access programs, functions, adjust or alter diagnostic points and related data, override messages, reports and actions taken.
- c) Trending: Setting trend(s) intervals, accessing data trends and history logs for diagnosis points or groups, and reporting. Working with trended data graphical displays, including but not limited to hiding points, setting display types and colors, viewing and setting scales.
- d) Graphics: Standard symbols and color codes, graphics customization, how and where to access and manage the system with the graphic displays, including changing points and values, using HOA switches and viewing results, mapping to or with other graphic sources and functions, including groups, navigation, sequence of operations, and displays and reports.
- e) Alarms: Reading and interpreting alarms, acknowledging and silencing alarms, routing and setting priorities, viewing and responding e-mailed and paged alarms.

## PART 2 – PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

- A. Environmental controls and energy management systems shall be approved products of Carrier Open BACnet Controls only. No Substitutions.

### 2.2 SYSTEM ARCHITECTURE

- A. The system shall be capable of providing a peer-to-peer network of distributed stand-alone DDC controllers that meet ANSI/ASHRAE Standard 135 for open protocol communications.
- B. A maximum of 32 controllers shall be connected to any one MS/TP bus. Minimum Speed of 38kb and can support 127 devices per COM port. Provide a minimum of 2 ports.
  - 1. Provide a Building Automation System (BAS) that consists of Network Server/Controllers (NSCs), a family of Standalone Digital Control Units (SDCUs), Administration and Programming Workstations (APWs), and Web-based Operator Workstations (WOWs). The BAS shall provide control, alarm detection, scheduling, reporting and information management for the entire facility, WEB enable capabilities, and Wide Area Network (WAN).
  - 2. The Enterprise Level BAS shall consist of an Enterprise Server, which enables multiple NSCs (including all graphics, alarms, schedules, trends, programming, and configuration) to be accessible from a single Workstation simultaneously for operations and engineering tasks. The Enterprise Level BAS shall be able to host up to 250 servers, or NSCs, beneath it.
  - 3. For Enterprise and robust reporting capability outside of the trend chart and listing ability of the Workstation, a Reports Server shall be provided and installed on a Microsoft Windows based computer. The Reports Server can be installed on the same computer as the Enterprise Server.

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4. The system shall be a top-level 100/1000bT Ethernet network that utilizes BACnet/IP.
  - a. A sub-network of SDCUs using the BACnet MS/TP protocol shall connect the local, and stand-alone controllers with Ethernet-level Network Server Controllers/IP Routers.
5. The system shall match the existing LonWorks IP, and/or Modbus TCP protocol.
  - a. Integration to existing Modbus RTU/ASCII (and J-bus), Modbus TCP, LonTalk FTT-10A, and Web Services shall be native to the NSCs. There shall not be a need to provide multiple NSCs or additional software to allow all three protocols to be natively supported.
  - b. A sub-network of SDCUs using LonTalk FTT-10A, and/or Modbus RTU protocol shall connect the local, stand-alone controllers with Ethernet-level Network Server Controllers/IP Routers.
- C. Only systems that use HTML 5 structured language are allowed.
- D. The supplied computer software shall employ object-oriented technology (OOT) for representation of data and control devices within the system. For each global, system or unitary controller, provide a PICS document showing the installed device's compliance level. Minimum compliance is Level 3 with the ability to support data read and write functionality.
- E. Maximum acceptable response time from any alarm occurrence (at the point of origin) to the point of annunciation shall not exceed three seconds for network connected controllers or user interfaces.
  1. For each system point, alarms can be created based on high/low limits or in comparison to other point values.
  2. There is no limit to the number of alarms that can be created or stored in system hardware for any point, up to the system capacity.
  3. System shall generate configured alarms from single or multiple system conditions.
  4. Alarms will be generated from an evaluation of the alarm condition, and presented to the user in a fully configurable order, by priority, time, and category,
    - a. Alarm views shall be presented to the user upon logging into the system WorkStation and/or Webstation.
  5. Program the alarm management system to create and report alarm events history; the alarm events history data base shall provide the option to select alarm cause and action notes associated with an alarm event. The alarm management system shall also generate checklists for operators' use when utilizing a suggested mode of troubleshooting.
  6. Provide alarm event history for a feature use to permit assigning of events for resolution to OWNER staff. The system shall notify the user and assigned resolution personnel.
  7. Alarms shall be capable of being routed to any BACnet workstation that conforms to the B-OWS device profile and uses the BACnet/IP protocol.
- F. The system shall be able to interface with subsystems that utilize ANSI/CEA-709.1: Control Network Protocol Specification.

## 2.3 EMS SERVER AND USER INTERFACE WORKSTATION

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- A. EMS Server: The EMS Server shall include a tower or rack mounted server with an Intel Xeon E5 2600 processor, 8 Gb RAM, RAID 1 configuration with two hot swap 2TB 7200 RPM SATA drive, DVDRW drive, keyboard, mouse, 27 inch LCD color display and the latest version of Microsoft Windows Server operating system software. The workstation shall connect to the network through an internal 1Gbps Ethernet interface card.
1. Software licensing shall be provided for local or remote unlimited simultaneous users of the system, unlimited future point expansion, user graphical display generation and non-vendor controllers. Licenses and electronic keys shall be included with the M&O manuals for project acceptance. Conditional Licenses will not be acceptable.
  2. The system shall be programmed to email selected alarms to designated response personnel.
    - a. The ability to utilize email paging of alarms shall be a standard feature of the operating system's mail application interface (MAPI). No special software and no email client software must be running in order for the system to distribute emails.
    - b. The email notification shall be able to be sent to an individual user or a user group.
    - c. The NSC shall support the use of Web Services based on open standards, such as SOAP and REST. Use incoming third-party data (temperature forecast, energy cost) over the Web to determine site modes, scheduling, and programming.
  3. Web-based operation shall be supported directly by the NSCs and shall not require additional software.
  4. The supplied system shall incorporate the ability to access all data using HTML5 enabled browsers without requiring proprietary operator interface and configuration programs.
  5. Programming of SDCUs shall be capable of being done either off-line or on-line from any operator workstation. All information shall be available in graphic or text displays stored at the NSC. Graphic displays shall feature animation effects to enhance the presentation of the data, to alert operators of problems, and to facilitate location of information throughout the DDC system. All operator functions shall be selectable through a mouse.
  6. Programming in the NSC shall be either in graphical block format or line-programming format or both.
  7. Programming of the NSC shall be available offline from system prior to deployment into the field. All engineering tasks shall be possible, except the viewing of live tasks or values.
  8. The programmer's environment shall include access to a superset of the same programming language supported in the SDCUs.
  9. Provided NSC devices shall support both script programming language as well as the graphical function block programming language. For both languages, the programmer will be able to configure application software for custom program development, and write global control programs. Both languages will have debugging capabilities in their editors.

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10. The system shall be able to save custom programs as libraries for reuse throughout the system. A wizard tool shall be available for loading programs from a library file in the program editor.
11. The system shall be capable providing views of graphical programming in live and real-time from Workstation(s).
12. The system shall be capable of creating 'binding templates' allowing the user to bind multiple points to multiple objects all at once.
13. Automatic detecting zone that may be excessively driving the reset logic and generate an alarm.
14. Readily allow operator removal of zones from reset algorithm.
15. Applications shall be able to be assigned different priorities and cycle times for a prioritized execution of different function.
16. The provided system shall be able to create objects that allow common objects such as power meters, VFD drives, etc. to be integrated into the system with simple import actions without the need of complicated programming or configuration setups.
17. The BAS workstation software shall allow the creation of a custom, browser-style interface linked to the user when logging into any workstation. Additionally, it shall be possible to create customized workspaces that can be assigned to user groups. This interface shall support the creation of "hot-spots" that the user may link to view/edit any object in the system or run any object editor or configuration tool contained in the software. Furthermore, this interface shall be able to be configured to become a user's "PC Desktop" – with all the links that a user needs to run other applications. This, along with the Windows user security capabilities, shall enable a system administrator to setup workstation accounts that not only limit the capabilities of the user within the BAS software, but may also limit what a user can do on the PC and/or LAN/WAN. This might be used to ensure, for example, that the user of an alarm monitoring workstation is unable to shut down the active alarm viewer and/or unable to load software onto the PC.
18. The workstation software shall automatically log and timestamp every operation that a user performs at a workstation, from logging on and off a workstation to changing a point value, modifying a program, enabling/disabling an object, viewing a graphic display, running a report, modifying a schedule, etc.
19. Provide a Web Server to automatically convert system displays on the workstation to an Internet page. Internet page shall be readable from standard PC browsers. Acceptable browsers shall be latest version of internet explorer, Chrome, or Firefox. No additional plug-ins, programs, software, hardware, etc. shall be needed to access the Internet page. The server shall be a separate device to provide security protection for the building system from outside hackers.
  - a. Coordinate individual system components IP addresses, switch port assignments, security settings such as but not limited to SNMP alarm delivery, HTTPS/SSL settings, VLAN assignment and authorized IP address ranges with the OWNER's Information Technology Division. Coordination activities with ITD shall be executed through the OAR.
  - b. Provide IP address label on the interior of each cabinet door or equipment.



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- c. The system shall support the ability to notify school or OWNER designated personnel by SMS or Email messages, utilizing the OWNER's mail server when problems or situations that require immediate attention arise.
- 20. Operator Workstation shall display data associated with the project as called out on drawings or object type list supplied. Graphic files shall be created using digital, full color photographs of system installation, AutoCAD or Visio drawing files of field installation drawings and wiring diagrams from as-built drawings. Operator's workstation shall display data using three-dimensional graphic representations of mechanical equipment. System shall be capable of displaying graphic files, text, trend data and dynamic object data together on each display screen with animation of equipment operation.
- 21. Controllers shall be programmed using graphical software tools that allow connection of function blocks for visual sequencing of control logic. Function blocks shall display real time data and be animated to show status of data inputs and outputs when in real time operation. Animation shall also show change of status on logic devices and countdown of timer devices in a graphical format.
- 22. Operator Tracking Log shall record operator changes to the system for future review. This shall include, but not be limited to setpoint changes, time schedule overrides, alarm limits, etc.
- 23. The system shall be equipped with a battery back-up source capable of providing 30 minutes of operation (computer and monitor) in the absence of normal power, to allow for an orderly shutdown and data back-up.
- B. EMS Workstation: The EMS Workstation shall be an enterprise level tower with an Intel Core™ i7 or better processor, 16GB of RAM, 256 GB solid state drive, DVD drive, keyboard, mouse, 27 inch LCD color display and the latest version of Microsoft Windows professional operating system software. The workstation shall connect to the network through an internal 1Gbps Ethernet interface card.

## 2.4 GLOBAL CONTROLLER

- A. Building controllers shall incorporate the functions of a 3-way BACnet router. Controller shall route BACnet messages between the high-speed LAN (Ethernet 100MHz), master slave token passing (MS/TP) LANs, a point-to-point (PTP/RS-232) connection and telephone modem.
- B. Provide global control strategies for the system based on information from any point objects in the system. Programming shall be object-oriented using graphical control function blocks. Global strategies shall include, but not limited to unit scheduling, electrical demand limiting, optimized start-stop of equipment, central plan reset control, etc.
- C. Battery shall retain static RAM memory and real-time clock functions for a minimum of 1.5 years (cumulative). Battery shall provide up to five minutes of powerless operation for orderly shutdown and data backup.
- D. Each building controller shall support a minimum of 250 BACnet Schedule Objects and 250 BACnet Calendar Objects.
- E. Each building controller shall log a minimum 1,000 trend logs. Any point object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation. Building controller shall periodically upload trended data to networked operator's workstation for long term archiving if desired. Archived data shall be available for use in third-party spreadsheet or database programs.

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- F. Alarms may be generated within the system for any object change of value or state either real or calculated. This includes events such as analog object value changes, binary object state changes and various controller communication failures. Each alarm may be automatically dialed out to a telephone pager or emailed to any Internet PC computer.
- G. Provide a 1.5 KVA UPS with battery back-up capability to provide a minimum of 30 minutes of operation (computer and monitor) for orderly shutdown and data backup. Make connections and test the system for proper operation in the presence of the Project Inspector.
- H. The global controller shall be equipped with ADR demand limiting capacity interface.
  - 1. The system shall include 5 DI for interfacing to local utility ADR program. The 5 DI shall be located in a 24 X 24 X 6 NEMA 12 cabinet mounted in the MDF or IDF room. Upon closer of each DI the control system shall raise or lower (depend on system mode) global room temperature set point 1 degree (user adjustable).
  - 2. The system shall also include a demand-limiting program that utilizes data from site utility meter. Features indicated below shall be available via a switchable graphical user interface in all operating stations:
    - a. Shed/Restore equipment in digital format shall include 5 data input points for interface to future ADR web appliance located in an MDF/IDF room. System server shall accept ADR command from utility service via web interface, and shall include at least 5 priority levels of equipment shedding. Load shedding on a given priority level shall include two methods. In one the loads shall be shed and restored in a "first-off/first-on" mode and in the other; the loads shall be shed/restored in a linear fashion.
    - b. Adjust operator selected control setpoints in analog format based on energy usage when compared to shed and restore settings.
    - c. Shedding may be implemented independently on each and every zone or piece of equipment connected to the system.
    - d. Status of every load shed shall be capable of being displayed on every operator terminal connected to the system. Statuses shall be displayed along with the English description of each load.

## 2.5 APPLICATION (system and unitary) DDC CONTROLLERS.

- A. Application controllers shall include universal inputs with 10-bit resolution that accept 3K and 10K thermistors, 0 to 10VDC, 0 to 5 VDC, 4 to 20 mA and dry contact signals. Any input on a controller may be either analog or digital with a minimum of three inputs that accept pulses. Controller shall include support and modifiable programming for interface to intelligent room sensor with digital display, and set point adjustment and override button. Controller shall include binary and analog outputs on board. Analog outputs shall be switch selectable as either 0–10VDC or 0–20mA. Software shall include scaling features for analog outputs. Application controller shall include a supply voltage to power external sensors.
- B. Program sequences shall be stored in EEPROM or flash memory. No batteries shall be needed to retain logic program. Controller shall execute program sequences 10 times per second and be capable of multiple PID loops for control of multiple devices. Calculations shall be completed using floating-point math. Programming of application controller shall be completely modifiable in the field over the installed BACnet LANs or remotely via modem interface.

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- C. Central Plant Controllers shall interface to chiller gateways. Point objects shall reside in the central plant controller. Hand-Off-Auto switches shall be provided for direct wired output control circuits.
- D. Controllers for VAV boxes shall include one onboard airflow sensor microprocessor driven and pre-calibrated at the factory. Pre-calibration shall be at 16 flow points as a minimum. Factory calibration data shall be stored in EEPROM. Calibration data shall be field adjustable to compensate for variations in VAV box type and installation. Calibration parameters shall be adjustable through intelligent room sensor with digital display, and set point adjustment and override button. Operator workstation, portable computers and special hand-held field tools shall not be needed for field calibration. Boxes shall be controlled using pressure independent control algorithms and flow readings shall be in CFM
- E. Controllers for Dual Duct boxes shall include two onboard airflow sensors and function similar to the VAV box controller. Multiple VAV box controllers or controllers with remote airflow sensors are not acceptable.
- F. CONTRACTOR shall provide a laminated wiring diagram for each control panel. Locate diagrams on interior side of control panel's doors.

## 2.6 TEMPERATURE SENSORS

- A. Temperature sensors shall be 10K ohm thermistor factory-calibrated to within 0.5 degrees F, totally interchangeable with housings appropriate for the application.
- B. Wall sensors shall be installed 48 inches above finished floor. Duct sensors to be installed such that the sensing element is in the main air stream. Immersion sensors to be installed in wells filled with thermal compound. Outside air sensors shall be installed away from exhaust or relief vents, not in an outside air intake and in a location that is in the shade most of the day.
- C. Intelligent room sensors shall be equipped with digital display, set point adjustment and override button. Smart room temperature sensor/thermostat shall incorporate PIR motion sensor, temperature display, set point adjustment and override button. Acceptable Manufacturers: Schneider Electric SE8600 series, Viconics VT8600 series, Sigler 8600 series or equal.
- D. Room thermostat shall be BACnet capable, Acceptable manufacturers: Schneider Electric SE8600 series, Viconics VT8600 series, Sigler VT8600 series or equal.

## 2.7 CARBON DIOXIDE (CO<sub>2</sub>) SENSORS

- A. Sensors shall be wall mounted at a height of approximately 4 feet. Locate sensors adjacent to room thermostat.
- B. Sensors are not permitted on marker boards, between shelving, in recesses or above heat producing equipment.
- C. Sensors shall be furnished with a display window that provides continuous monitoring and sensor status readings, and with tamperproof cover.
- D. Sensors shall be gold plated for long-calibration stability, be factory calibrated and certified for a minimum of five years.
- E. CO<sub>2</sub> sensors shall be BACnet capable, acceptable manufacturers: Honeywell C7232A, Telaire Ventostat Wall Mount, Johnson Control CD-WRD-00-0, or equal.

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## 2.8 WINDOWS AND DOOR SENSOR

- A. Provide windows and door switches at every operable windows and door in controlled spaces. Each switch shall be connected to a DI point on the DDC controller. Each switch shall be wired independently. Wiring multiple switches in series shall not be acceptable. Acceptable Manufacturers: Illumra E3-MDCCP or equal.

## 2.9 PRESSURE SENSORS

- A. Differential and pressure sensors shall have a tensioned stainless steel diaphragm to form a variable capacitor that produces a linear output with an accuracy of 1.0 percent of full scale. The unit shall be able to withstand 10 PSIG over pressurization.
- B. Differential pressure switches shall utilize a diaphragm operated snap-acting switch with a setpoint range of 0.05 to 2.0 inches WC.
- C. Steam pressure sensors shall be mounted on a pigtail siphon with manual shutoff ball valve.

## 2.10 CARBON DIOXIDE (CO<sub>2</sub>) SENSORS

- A. Carbon dioxide concentration levels shall be sensed by non-dispersive infrared technology. A corrosion-free sensing chamber shall be used for accurate, stable CO<sub>2</sub> sensing. An LCD shall display sensed CO<sub>2</sub> concentration.
- B. Sensor shall be gold plated and have a range of 0-2000 PPM at +/- 5 percent accuracy for long-term calibration stability. Both analog and binary relay output circuits shall be available on the sensor. An automatic background calibration algorithm shall reduce required maintenance.
- C. Acceptable Manufacturers: Telaire, Honeywell, Johnson Controls, or equal.

## 2.11 ELECTRONIC VALVES

- A. Control Valves ½ inch to 2-inch shall be characterized stainless steel ball valves with actuators sized to close off against twice the maximum fluid pressure. Valve body shall be NPT screwed for 2-way or 3-way application. A push button release shall be provided for manual operation.
- B. Control Valves 2 ½-inch and larger shall be butterfly type with actuators sized to close off against twice the maximum fluid pressure. Valve body shall be flanged for 2-way or 3-way application. Contacts shall be provided to mechanically indicate the full open and full closed position of the valve.
- C. Steam Valves shall be globe valves suitable for 35-PSI inlet steam service. Valve bodies shall be NPT screwed or flanged with spring-return normally closed valve actuators.
- D. Valve control shall be accomplish with 2-10 VDC. All valve shall provide feedback signal to EMS/BMS for monitoring on GUI.
- E. Acceptable Manufacturers: Belimo, Honeywell, Johnson Controls, Schneider Electric or equal.

## 2.12 DAMPER ACTUATORS

- A. Electric damper actuators (including VAV box actuators) shall be direct shaft mounted and use a V-bolt and toothed V-clamp. The actuator mounting arrangement and spring return feature shall permit normally open or normally closed positions of the damper as required.

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- B. Actuators shall be sized for 200 percent of the design torque requirements.
- C. Damper actuators shall incorporate a release mechanism to manually position the damper for maintenance or emergency override.
- D. Damper Actuators located outdoors shall have a clear plastic weather shield specifically designed for the application.
- E. Damper motor control shall be with 2-10 VDC
- F. Acceptable Manufacturers: Belimo, Honeywell, Johnson Controls, Schneider Electric, or equal.

## 2.13 CURRENT SWITCH

- A. Current sensing switch shall be self-powered with solid-state circuitry and a dry contact output. A multi-turn setpoint adjustment shall set the trip point status. An LED shall indicate the on or off status.

## 2.14 CONTROL RELAY

- A. The relay shall be contained in a plenum rated NEMA 12 enclosure with a ¾" NPT conduit fitting. Coil voltage shall be 24 or 120 VAC with a contact rating of 10A. An LED on the enclosure cover shall indicate the relay is energized.

## 2.15 POWER SUPPLIES

Power supplies and panel assemblies shall be UL or NRTL listed.

## 2.16 ENCLOSURES

- A. Controllers, power supplies and relays shall be mounted in Hoffman A-LP NEMA 12 enclosures or equal when located in an indoor environment.
- B. Enclosures for outdoor applications shall be metal NEMA 4, Hoffman A-ALP, A-BLP or equal, and be mounted on the north exposure of the controlled unit.
- C. Enclosures shall have hinged, locking doors with common keying (CAT-60) for control panel on the Project Site.
- D. Enclosures shall have permanently affixed to the door an engraved nametag identifying the equipment served. The nametag shall be a minimum 1 inch by 3-inch with ½ inch lettering.

## PART 3 – EXECUTION

### 3.1 CONTROLS INSTALLATION

- A. Wiring methods for control system shall be as defined in the Division 26 specifications. Wire types shall conform to manufacturers' recommendations.
- B. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. One cabinet may accommodate more than one system in same equipment room. Control panel assemblies must be UL listed.
- C. Provide software and hardware required to provide controls and monitoring of diagnostic points indicated in specification Section 23 80 00.

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- D. Coordinate with Division 26 electrical installer so that "Hand/Off/Auto" selector switches are installed to override automatic interlock controls when switch is in the "Hand" position. Safety shutdown interlock wiring shall disable the equipment regardless of the position of the H-O-A switch.

## 3.2 ROOM SENSORS INSTALLATION

- A. Room sensors shall be wall mounted at a 48-inch height above finished floor. Room sensors are not permitted on outside walls, at chalkboards, between shelving, in recesses or above heat producing equipment. Coordinate with Division 26 for sensor or thermostat mounting adjacent to light switches.

## 3.3 COORDINATION

- A. Coordinate the work with other aspects of mechanical, electrical, fire-life safety and security systems, controls, and photo voltaic systems to obtain a complete and operating system in accordance with the contract documents.
- B. Meet with the OAR and school principal and other school staff to determine when each zone or building will be occupied, and to determine programming and scheduling of the heating, ventilating and air conditioning equipment.
- C. CONTRACTOR shall contact OAR to coordinate for timely availability of VPN access point(s) form OWNER's Information Technology Division.

## 3.4 DDC CONTROL SYSTEM ADJUSTMENTS

- A. Make adjustments under operating conditions to provide sequence of operation for each control system per design intent. If required operating conditions cannot be obtained prior to completion date of the contract due to outdoor seasonal temperatures, return to the job site when requested by the OWNER and re-adjust control system when outdoor temperatures will permit proper operating conditions. Start re-adjustment within seven calendar days after notification.

## 3.5 PERFORMANCE AND ACCEPTANCE:

- A. Test and calibrate each device including but not limited to the following for proper operation, connection, signal value or response.
  - 1. Building Controllers.
  - 2. Custom Application Controllers.
  - 3. Application Specific Controllers.
  - 4. Input / Output Devices. (Sensors, actuators and monitoring devices)
  - 5. Operator Interfaces.
- B. Verify that systems are standalone and operable upon network failure.
- C. Verify that systems return to normal operation automatically upon resumption of network operation or return of power.
- D. Test each system for functions of the required control sequence of operation either by normal control operation or forced operation as required. Log and submit results.

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- E. Test the network for connectivity, data transmission rates, input/output responses, and other appropriate parameters. Failure modes, including network failure, individual control system failure, and power outages, shall be simulated and responses logged, with any effects on network operation noted and corrected.
- F. Test each preprogrammed time and holiday schedule.
- G. Commissioning requirements of Divisions 01, 23, and 26 apply to this Section.
- H. Schedule of Responsibilities: Refer to Appendix A. The schedule identifies the responsibilities of the CONTRACTOR for the installation of the environmental controls and energy management system. Deviations and clarifications of this schedule only if allowed by the OAR, provided trade CONTRACTOR coordination and schedule requirements are met. Submit a record copy of the Schedule of Responsibilities to the OAR at the commencement of this Section's Work.

## 3.6 WIRING AND INFRASTRUCTURE

- A. Provide necessary wiring, terminations, connections and conduit infrastructure for the complete system as indicated in the construction documents.
- B. Exterior cables whether above or below ground level shall be rated for exterior applications. When entering a building provide a code sized pull box with necessary hardware to transition exterior rated cables to interior applications.
- C. Underground EMS cables are permitted to be installed with lighting control wiring in underground applications. Provide innerduct to separate EMS cables from lighting control system cables.
- D. Provide both labeling and record documentation for all EMS system cabling. A cable management schedule and diagram shall be provided at each system panel or cabinet, in addition to a complete cabling diagram to be provided at the head end equipment location.
  - 1. The cable management spread file shall include the following:
    - a. Cable Schedule.
    - b. Cable Test Forms.
    - c. Cable Label sequence and nomenclature.
    - d. Network chart.
  - 2. Cable numbering shall be based on a defined format which readily identifies cable type, and allows maintenance technicians to determine originating and terminating locations.
  - 3. Present the data in an Excel spreadsheet that will operate on the latest Windows platform. Information shall be presented in paper and electronic formats.
  - 4. A copy of the cable schedule in a transparent plastic sleeve shall be affixed in the interior side of the front door of each network cabinet or cables convergence hub points.

## 3.7 DATA LOGGING REQUIREMENTS

# ATTACHMENT 1B

- A. The system must be capable of storing the system's collected and diagnosis data for a minimum of seven days.
- B. Program the system for a standard seven day schedule including holydays.

## 3.8 CLEANUP

- A. Remove rubbish, debris and waste materials and legally dispose of off Project Site.

## 3.9 PROTECTION

- A. Protect Work of this Section until Substantial Completion.

**END OF SECTION 23 09 23**



## ATTACHMENT 1B

## APPENDIX A

## SCHEDULE OF RESPONSIBILITIES

|   | ITEM  | FURNIS<br>H<br>BY | INSTALL<br>BY | POWE<br>R<br>BY | CONTROL<br>WIRING<br>BY |
|---|---|-------------------|---------------|-----------------|-------------------------|
| 1 | Magnetic Motor Starters:  |                   |               |                 |                         |
|   | a. Automatic controlled, with or without HOA switches.  | E                 | E             | E               | DDC                     |
|   | b. Manually controlled  | E                 | E             | E               | N/A                     |
|   | c. Manually controlled furnished as factory wired unit equipment  | M                 | M             | E               | E                       |
|   | d. Special duty type (part winding, multi-speed, etc.)  | M                 | See Note 1    | E               | See Note 1              |
|   | e. Adjustable frequency drives with or without manual bypass.   | DDC               | E             | E               | DDC<br>See Note 2       |
|   | f. Domestic booster pump. Motor Controls  | M                 | M             | E               | DDC                     |
| 2 | Line voltage contactors.  | E                 | E             | E               | DDC                     |
| 3 | Control relay transformers (other than starters).   | DDC               | DDC           | E               | DDC                     |
| 4 | Control and Instrumentation panels  | DDC               | NI            | E               | DDC                     |
| 5 | Automatic control valves, automatic dampers and damper operators, solenoid valves, insertion temperature and pressure sensors including wells | DDC               | M             | E               | DDC                     |
| 6 | Control interlock wiring between chillers, pumps, cooling towers, fans and air handling units and other miscellaneous mechanical equipment.   | DDC               | DDC           | E               | DDC                     |
| 7 | Duct Smoke Detectors  | E                 | M             | E               | E                       |
| 8 | Dampers   |                   |               |                 |                         |
|   | a. Control Dampers  | M                 | M             | N/A             | DDC                     |
|   | b. Smoke Dampers and Combination Fire/Smoke Dampers   | M                 | M             | E               | E                       |
| 9 | Airflow Stations with transmitter.  | M                 | M             | E               | DDC                     |

## ATTACHMENT 1B

|    |   |     |     |     |     |
|----|---|-----|-----|-----|-----|
| 10 | Air terminal devices (I.e., VAV and fan powered boxes).   | M   | M   | E   | DDC |
| 11 | Intelligent Devices and Control Units provided with packaged mechanical equipment such as: Large VAV and constant volume package units Boilers and Chillers.  | M   | M   | E   | NI  |
| 12 | Intelligent Devices and Control Units not provided by equipment manufacturer such as: Air handling units, Heat pumps, AC units (small < 20 tons), Air terminal units (VAV boxes)  | DDC | DDC | E   | DDC |
| 13 | Intelligent Devices and Control Units provided with electrical systems such as: Occupancy / motion sensors, Lighting Control Panels, Switches and dimmers, Switch Multiplexing Control Units, Door Entry Control Units. | E   | E   | E   | DDC |
| 14 | Gateways for proprietary non-BACnet equipment   | M   | M   | E   | DDC |
| 15 | Communications network devices such as Routers, Bridges and Repeaters.  | DDC | DDC | DDC | DDC |

## Abbreviations

|         |                                      |
|---------|--------------------------------------|
| DD<br>C | DDC CONTRACTOR (controls CONTRACTOR) |
| M       | Mechanical CONTRACTOR                |
| E       | Electrical CONTRACTOR                |
| N/A     | Not Applicable                       |

## Notes:

1. Magnetic motor starters (special duty type) shall be set in place under electrical division except when part of factory wired equipment, in which case they shall be set in place under mechanical division.
2. Where a remote motor disconnect is required in addition to the one provided integral to a Variable Frequency Drive (VFD), controls CONTRACTOR shall provide the necessary control interlock between the disconnects.

# ATTACHMENT 1C

## SECTION 23 8001

### HEAT PUMP VARIABLE REFRIGERANT FLOW EQUIPMENT

#### Part 1 - General

##### 1.01 SYSTEM DESCRIPTION

###### A. SUMMARY

###### A. Related Requirements:

1. Division 01: General Requirements.
2. Section 22 1000: Plumbing.
3. Section 23 0500: Common Work Results for HVAC.
4. Section 23 0513: Basic HVAC Materials and Methods.
5. Section 23 0548: HVAC Sound, Vibration and Seismic Control.
6. Section 23 0923: Environmental Control and Energy Management System.

The heat pump variable refrigerant flow system is a two-pipe system consisting of a single or multiple outdoor units, multiple indoor units of various types and capacities, individual or central indoor unit controls with on/off temperature settings, all connected by fully insulated refrigerant lines utilizing factory supplied, fully insulated, branching kits. Indoor units are connected to condensate piping that shall be terminated to the nearest drain point.

- B. The system shall be fully capable of providing heating or cooling as requested by the individual indoor zones that can consist of single or multiple indoor units. The heating priority shall be the default factory setting and can be changed to cooling, majority or a single zone priority.
- C. The maximum number of connected indoor units shall not exceed 64.
- D. The total connected indoor unit capacity shall range between 50 and 150% of the outdoor unit capacity based on indoor unit type & size selected.

##### 1.02 QUALITY ASSURANCE

- A. Units shall be listed by ETL (Engineering Testing Laboratory) and be evaluated in accordance with UL standard 1995, 4th. edition.
- B. Units shall be listed in the AHRI directory.
- C. All units shall meet the Federal minimum efficiency standards and be tested per AHRI 1230 Standard.

##### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.
- B. Units shall be supplied with a base rail that provides openings for moving the unit by fork truck or rigging the unit by crane.

# ATTACHMENT 1C

## 1.04 WARRANTY

- A. Compressors shall be provided with manufacturer's five year warranty, replacement only.

## Part 2 - Products

### 2.01 EQUIPMENT

- A. Manufacturers: Toshiba, Mitsubishi, Daikin.

1. Basis of Design: [Toshiba]

#### General:

Factory-assembled, single piece air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the multiple inverter-driven twin rotary compressors.

1. The maximum sound pressure rating for a single module shall not exceed 64 dBA sound pressure in cooling and 65 dBA in heating and for multiple modular systems the sound pressure numbers should not exceed 68 dBA and 69 dBA. Sound pressure ratings are measured at a distance of 3 ft out and 4 ½ ft up from the side of the outdoor unit.
2. The outdoor unit shall include an oversized accumulator and a liquid tank for proper heating performance while allowing the indoor unit PMV (pulse modulating valve) metering device to shut off completely when a zone is satisfied.
3. The outdoor unit shall be protected by a high-pressure switch, high-pressure sensor, low-pressure sensor, fusible plug, PC board, and inverter overload protector.
4. The outdoor unit shall be capable of operating in cooling mode down to 14F ambient air temperature and down to -13 F wet bulb ambient air temperature in heating.
5. The outdoor unit shall include a total oil management system that balances oil between compressors within a module, replenishes compressor oil to the compressors in a module from the oil separator if required, and allows oil and refrigerant to move between multiple modular units if required, even if one of the units is not running.

#### B. Unit Cabinet:

1. Unit cabinet shall be constructed of pre-coated steel, finished on both inside and outside.
2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressors, fan, and control components.
3. Compressors shall be isolated in a compartment and have an acoustic wrap to assure quiet operation.
4. The outdoor unit control panel shall include a sliding window to access adjustable controls and an LED display for setup and diagnostics.
5. Unit cabinet shall be capable of withstanding 500-hour salt spray test per Federal Test Standard No. 141 (method 6061).

#### C. Fans:

1. Outdoor fan shall discharge air vertically and be driven by a DC inverter variable speed motor with 64 steps that is capable of running down to 60 rpm.
2. Outdoor fan motor shall be totally-enclosed with permanently-lubricated bearings.
3. Motor shall be protected by internal thermal overload protection.

# ATTACHMENT 1C

4. Fan blade shall be non-metallic and shall be statically and dynamically balanced.
5. Outdoor fan shall be protected by a raised non metallic protective grille.

## D. Compressors:

1. Each outdoor unit module shall be equipped with two inverter-driven twin rotary compressors with full range control to an accuracy of  $\pm 0.1$  Hz.
2. Compressor shall be totally enclosed in the machine compartment.
3. Compressors shall be equipped with factory mounted crankcase heaters.
4. Internal overloads shall protect the compressor from over-temperature operation.
5. Motor shall be suitable for operation in an R-410A refrigerant atmosphere.
6. Compressor assembly shall be installed on rubber vibration isolators.
7. To maximize compressor reliability, multiple compressors within a module shall be started and operated in variable patterns to ensure equal run time on all compressors.
8. To ensure maximum efficiency throughout the system operation range, no compressor is required to run at maximum speed under any condition.

## E. Outdoor Coil:

1. Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.
2. The coil configuration shall be 4-sided and fully separated from the machine compartment for more effective heat transfer and sound isolation.
3. The coil fins shall have a factory-applied corrosion resistant blue-fin finish.

## F. Controls and Safeties:

Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

1. Controls:
  - a. Compressor speed to match the refrigerant flow and capacity with the system requirements.
  - b. Outdoor fan motor speed for higher efficiency and lower sound.
  - c. Oil control for improved system reliability and comfort
  - d. Pulse modulating valve control for precise control of the refrigerant distribution and accurate capacity management to avoid starving any units.
  - e. Control of compressor staging to maximize reliability and minimum run time on all compressors.
  - f. Module control of compressor operation, compressor speed, and outdoor heat exchanger surface to maximize efficiency and sound level and reliability across the entire operating range of the system.



# ATTACHMENT 1C

1. All field-supplied copper tubing connecting the outdoor unit to the indoor unit shall use factory-supplied branching kits consisting of either Y joints or headers to ensure even refrigerant flow.
2. To ensure piping flexibility, the system shall allow having Y joints or headers downstream of another header.
3. When combining multiple modules, and in order to maximize efficiency and comfort, a 3/8-in. oil balance line shall be used to allow the flow oil and refrigerant between the two units, even when one of the units is not running.

**END OF SECTION**

# ATTACHMENT 1C

## SECTION 23 80 02

### HIGH-WALL INDOOR VARIABLE REFRIGERANT FLOW FAN/COIL EQUIPMENT

#### Part 1 – General

##### 1.01 SYSTEM DESCRIPTION

Indoor, high wall mounted, direct-expansion indoor units are matched with heat pump or heat recovery VRF (variable refrigerant flow) outdoor unit.

##### 1.02 QUALITY ASSURANCE

Unit shall be ETL (Engineering Testing Laboratory) listed and certified to UL 1995 4th edition standard.

##### 1.03 DELIVERY, STORAGE, AND HANDLING

Units shall be stored and handled per unit manufacturer's recommendations.

##### 1.04 Warranty (For Inclusion by Specifying Engineer)

#### Part 2 – Products

- A. Manufacturers: Toshiba, Mitsubishi, Daikin.
  - 1. Basis of Design: [Toshiba]

##### 2.01 EQUIPMENT

###### A. General:

Indoor, direct-expansion, wall-mounted fan coil. Unit shall be complete with coil, fan driven by DC inverter motor, PMV (pulse modulating valve), piping connectors, electrical controls, microprocessor control system, and integral temperature sensing. Unit shall be furnished with integral wall mounting bracket and mounting hardware.

###### B. Unit Cabinet:

Cabinet discharge and inlet grilles shall be attractively styled, high-impact nonmetallic material.

###### C. Fans:

- 1. Fan shall be tangential direct-drive blower type with air intake at the top of the unit and discharge at the bottom front. Automatic, motor-driven vertical air sweep shall be standard.
- 2. Vertical air sweep operation shall be user selectable using the remote control and the horizontal air direction may be set manually.

###### D. Coil:

Coil shall be copper tube with aluminum fins and galvanized steel tube sheets. Fins shall be bonded to the tubes by mechanical expansion and specially coated for enhanced wettability. A drip pan under the coil shall have a factory-installed drain connection (on both ends) for hose attachment to remove condensate.

###### E. Motors:

Motors shall be totally enclosed, permanently lubricated ball bearing with inherent overload protection. Fan motors shall be inverter controlled variable speed.

###### F. Controls:

The system shall be microprocessor-controlled to maintain precise room temperature and minimum power consumption. The controls system shall employ a genetic algorithm for temperature control. Any of the following user interface accessories shall be compatible with the unit.

- 1. Wireless Remote Controller

Wireless remote controller kit shall include a hand held device and a receiver integral to the unit.



# ATTACHMENT 1C

2. **Wired Remote Controller (Lite Vision Plus)**  
Wired remote controller shall communicate over two-core shielded wire up to 1640 ft. It shall be capable of controlling groups of up to 8 indoor units. It shall be able to operate as a primary or secondary controller when two remote controllers are connected to a single indoor unit or group. The system shall be able to be configured so that the return air (TA) can be sensed at the unit, at the remote controller or through a remote sensor. The local controller shall minimally be able to control On-OFF, set point, mode, and be able to display system generated error codes.
  
3. **Central Controller (Smart Manager)**  
Central controller shall communicate over two-core shielded wire up to 6500 ft and use existing indoor – outdoor communication protocol to communicate. A single central controller shall be capable of controlling up to 128 indoor units individually with capability to program maximum of 10 setups for each day. It shall be able to create 2 indoor unit line-ups with 64 units on each line. It shall provide master, weekly, four special day and monthly scheduling feature. During schedule operation, user can set the power status (ON/OFF), operation mode, temperature setup, and remote control operation, restricted / allowed, return back and ventilation operation. It shall provide a web interface for remote monitoring, control, and scheduling. It shall be capable of monitoring energy consumption for each tenant and generate monthly billing reports.
  
4. **Central Controller (Touch Screen)**  
Central controller shall communicate over two-core shielded wire up to 1600 ft and use existing indoor – outdoor communication protocol to communicate. A single central controller shall be capable of controlling up to 512 indoor units individually with capability to program maximum of 20 setups for each day. It shall provide master, weekly, five special day and monthly scheduling feature. In addition, an optional digital I/O interface shall provide alarm, fire and locking signals. It shall provide a web interface for remote monitoring, control, and scheduling. It shall be capable of monitoring energy consumption for each tenant and generate monthly billing reports.
  
5. **Management Systems**  
The system shall be able to be controlled by BACnet\* or LonWorks† protocols either directly or through an external gateway.  
BACnet and LonWorks shall be able to control:
  - a. ON / OFF
  - b. operation mode
  - c. fan speed
  - d. louver
  - e. set temperature
  - f. permit / prohibit local operation  
 BACnet and LonWorks shall be able to monitor:
  - a. ON / OFF
  - b. operation mode
  - c. fan speed

## ATTACHMENT 1C

- d. louver
  - e. set temperature
  - f. permit / prohibit local operation
  - g. room temperature
  - h. error status
  - i. error code
6. The unit shall have the following functions as a minimum:
- a. Selectable automatic restart. After power failure the system will restart at the same operating conditions as before the failure.
  - b. Temperature-sensing controls shall sense return air temperature at the unit or at the remote control
  - c. Indoor coil freeze protection in both cooling and heating (reversing valve failure) modes.
  - c. Automatic air sweep control to provide multiple operating modes of the air sweep louvers.
  - d. Dehumidification mode shall provide increased latent removal through total system modulation.
  - e.
  - f. Fan-only operation to provide room air circulation when no cooling is required.
  - g.
  - h. Fan speed control shall be user-selectable: high, medium, low, or microprocessor determined (Auto) based on the differential between the room temperature and the set point during all modes of operations.
  - i.
- g. Indoor coil high temperature protection shall be provided to detect excessive indoor discharge temperature in heating.
- h. Cold blow prevention in heating.
- i. Adjustable compensation for air stratification in heating.

G. Filters:

Unit shall have factory-supplied resin net (cleanable) type filters. The return air filter material shall have the following characteristics:

- 1. Odorless
- 2. Temperature resistant to 185 F
- 3. Humidity resistant up to 95% RH

# ATTACHMENT 1C

H. Electrical Requirements:

Indoor units are 208/230-1-60 (V-Ph-Hz).

I. Special Features (Accessories):

Condensate pump

**END OF SECTION**

# ATTACHMENT 1C

## SECTION 23 8003

### HEAT RECOVERY VARIABLE REFRIGERANT FLOW EQUIPMENT

#### Part 1 – General

##### 1.01 SYSTEM DESCRIPTION

###### A. SUMMARY

- A. Related Requirements:
1. Division 01: General Requirements.
  2. Section 22 1000: Plumbing.
  3. Section 23 0500: Common Work Results for HVAC.
  4. Section 23 0513: Basic HVAC Materials and Methods.
  5. Section 23 0548: HVAC Sound, Vibration and Seismic Control.
  6. Section 23 0923: Environmental Control and Energy Management System.

The heat recovery variable refrigerant flow system is a three-pipe system consisting of a single or multiple outdoor units, multiple indoor units of various types and capacities, and multiple flow selector boxes, individual or central indoor unit controls with on/off temperature settings, all connected by fully insulated refrigerant lines utilizing factory-supplied, fully insulated branching kits. Indoor units are connected to condensate piping that shall be terminated to the nearest drain point.

- B. The system shall be fully capable of simultaneous heating and cooling operation as requested by the individual indoor zones that can consist of single or multiple indoor units.
- C. The maximum number of connected indoor units shall not exceed 64.
- D. The total connected indoor unit capacity shall range between 50 and 150% of the outdoor unit capacity.

##### 1.02 QUALITY ASSURANCE

- A. Units shall be listed by ETL (Engineering Testing Laboratory) and be evaluated in accordance with UL standard 1995, 4th. edition.
- B. Units shall be listed in the AHRI directory.
- C. All units shall meet the Federal minimum efficiency standards and be tested per AHRI 1230 Standard

##### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Units shall be shipped in one piece and shall be stored and handled per unit manufacturer's recommendations.
- B. Units shall be supplied with a base rail that provides openings for moving the unit by fork truck or rigging the unit by crane.

##### 1.04 WARRANTY

# ATTACHMENT 1C

- A. Compressors shall be provided with manufacturer's five year warranty, replacement only.

## Part 2 - Products

### 2.01 EQUIPMENT

- A. Manufacturers: Toshiba, Mitsubishi, Daikin.

1. Basis of Design: [Toshiba]

#### General:

Factory-assembled, single-piece, air-cooled outdoor unit. Contained within the unit enclosure shall be all factory wiring, piping, controls, and the multiple inverter-driven twin rotary compressors.

1. The maximum sound pressure rating for a single module shall not exceed 66.5 dBA sound pressure in cooling and 67.0 dBA in heating. For twinned systems the sound pressure level shall not exceed 69.5 dBA and 70.0 dBA. For 3-module systems the sound pressure level shall not exceed 71.5 dBA and 71.5 dBA. Sound pressure ratings are measured at a distance of 3.28 ft out and 4.92 ft up from the side of the outdoor unit.
2. The outdoor unit shall include an oversized accumulator and a liquid tank for proper heating performance while allowing the indoor unit PMV (pulse modulating valve) metering device to shut off completely when a zone is satisfied.
3. The outdoor unit shall be protected by a high-pressure switch, high-pressure sensor, low-pressure sensor, fusible plug, PC board, and an inverter overload protector.
4. The outdoor unit shall be capable of operating in cooling mode down to 14 F dry bulb ambient air temperature and down to -13 F wet bulb ambient air temperature in heating. For simultaneous heating and cooling the unit shall be capable of operating between 14 F and 60 F ambient air temperature.
5. The outdoor unit shall include a total oil management system that balances oil between compressors within a module, replenishes compressor oil to the compressors in a module from the oil separator if required, and allows oil and refrigerant to move between twinned or 3-module units if required, even if one of the units is not running.

#### B. Unit Cabinet:

1. Unit cabinet shall be constructed of pre-coated steel, finished on both inside and outside.
2. Unit access panels shall be removable with minimal screws and shall provide full access to the compressors, fan, and control components.
3. Compressors shall be isolated in a compartment and have an acoustic wrap to assure quiet operation.
4. The outdoor unit control panel shall include a sliding window to access adjustable controls and an LED display for setup and diagnostics.
5. Unit cabinet shall be capable of withstanding 500-hour salt spray test per Federal Test Standard No. 141 (method 6061).

#### C. Fans:

# ATTACHMENT 1C

1. Outdoor fan shall discharge air vertically and be driven by a DC-inverter variable-speed motor with 64 steps that is capable of running down to 60 rpm.
2. Outdoor fan motor shall be totally-enclosed with permanently-lubricated bearings.
3. Motor shall be protected by internal thermal overload protection.
4. Fan blade shall be non-metallic and shall be statically and dynamically balanced.
5. Outdoor fan shall be protected by a raised non-metallic protective grille.

## D. Compressors:

1. Each outdoor unit module shall be equipped with two inverter-driven twin rotary compressors with full-range control to an accuracy of  $\pm 0.1$  Hz.
2. Compressor shall be totally enclosed in the machine compartment.
3. Compressors shall be equipped with factory-mounted crankcase heaters.
4. Internal safety logic shall protect the compressor from over-temperature operation.
5. Motor shall be suitable for operation in an R-410A refrigerant atmosphere.
6. Compressor assembly shall be installed on rubber vibration isolators.
7. To maximize compressor reliability, multiple compressors within a module shall be started and operated in variable patterns to ensure equal run time on all compressors.
8. To ensure maximum efficiency throughout the system operation range, no compressor is required to run at maximum speed under any condition.

## E. Outdoor Coil:

1. Coil shall be constructed of aluminum fins mechanically bonded to seamless copper tubes, which are cleaned, dehydrated, and sealed.
2. The coil configuration shall be 4-sided and fully separated from the machine compartment for more effective heat transfer and sound isolation.
3. The coil fins shall have a factory-applied corrosion resistant blue-fin finish.

## F. Controls and Safeties:

Operating controls and safeties shall be factory selected, assembled, and tested. The minimum control functions shall include the following:

1. Controls:
  - a. Compressor speed to match the refrigerant flow and capacity with the system requirements.
  - b. Outdoor fan motor speed for higher efficiency and lower sound.
  - c. Oil control for improved system reliability and comfort
  - d. Pulse modulating valve control for precise control of the refrigerant distribution and accurate capacity management to avoid starving any units.

# ATTACHMENT 1C

- e. Control of compressor staging to maximize reliability and minimum run time on all compressors.
  - f. Module control of compressor operation, compressor speed, and outdoor heat exchanger surface to maximize efficiency and sound level and reliability across the entire operating range of the system.
  - g. Control of the outdoor heat exchanger surface (main vs sub heat exchangers) for maximum efficiency and comfort.
2. Safeties:  
The following safety devices shall be part of the condensing unit:
- a. High-pressure switch
  - b. Fuses
  - c. Crankcase heater
  - d. Fusible plug
  - e. Over current relay for the compressor
  - f. Thermal protectors for compressor and fan motor
  - g. Compressor time delay
  - h. Oil recovery system
  - i. Oil level sensor
  - j. Over-current sensor
  - k. Compressor suction and discharge temperature sensor
  - l. Compressor suction and discharge pressure sensor
- G. Electrical Requirements:
- 1. All sizes shall utilize 208/230-3-60 or 460-3-60 (V-Ph-Hz) field power supply.
  - 2. Modular systems shall have separate field power supply to each module.
  - 3. Two-core, stranded, shielded low voltage cable shall be required for communication between outdoor and indoor unit.
  - 4. All power and control wiring must be installed per NEC and all local electrical codes.
- H. Refrigerant Piping and Line Lengths:
- 1. Piping connections shall be from the front or the bottom of the unit.
  - 2. The unit shall be capable of operating with maximum connected refrigerant line lengths of 3281 ft (actual).
  - 3. The outdoor unit shall have the ability to operate with a maximum height of 230 ft. between the outdoor and the lowest indoor unit.

# ATTACHMENT 1C

4. The maximum distance between the outdoor unit and the furthest fan coil shall not exceed 591 ft actual or 656 ft equivalent. No line size changes or oil traps shall be required.
5. The system shall be capable of operating when the height difference between the upper and the lower fan coil is 131 ft.

## I. Auxiliary Refrigerant Components:

1. All field supplied copper tubing connecting the outdoor unit to the indoor unit shall use factory-supplied branching kits consisting of either Y joints or headers to ensure even refrigerant flow.
  2. To ensure piping flexibility the system shall allow having Y joints or headers downstream of
  3. another header.
3. For modular systems, in order to maximize efficiency and comfort, a 3/8-in. oil balance line shall be used to allow the flow of oil and refrigerant between the modular units even when one of the units is not running.
4. A flow selector box will be required to regulate the flow of high-pressure hot gas or high-pressure liquid to the fan coil requiring heating or cooling.
5. Up to 8 fan coils, all requiring same duty cycle, may be connected to a single flow selector box.
6. A fan coil that runs in cooling only shall not be required to connect to a flow selector box.
7. The single port flow selector box can be installed up to 49 ft from the indoor unit.
8. The multi port flow selector box can be installed up to 164 ft from the indoor unit.
9. The single port flow selector box shall be wired from the indoor unit using a factory-supplied power and control wire harness.
10. The multi port flow selector box shall be powered by a dedicated 208/230-1-60 field power supply.
11. The single port flow selector box shall not require a drain connection.
12. The multi port flow selector shall require a drain connection.
13. The single port and multi port flow selector box shall include a galvanized steel enclosure, and shall be tested prior to shipment.
14. The single port flow selector box shall include full interior insulation.

**END OF SECTION**



# ATTACHMENT 2B

CAMARILLO HS HVAC UPGRADES

ADDENDUM 1 MECHANICAL NARRATIVE

09-17-2020

General Note: Disregard all NISOW notes on the HVAC plans.

1. M-005 – DELETE RTU/L-12, M-3, M-4, M-5 Power exhauster
2. M-006 – REVISE Fan coil unit data. VRF Heat Pump condensing unit data
  - a. DELETE FCU/Q-4
  - b. DELETE FCU/Q-23 :
  - c. DELETE FCU/Q-27
  - d. DELETE CU/Q-3 is deleted.
3. M-007 – Upsized Outdoor unit suction line sizes at HP/C-15, HP/F-1A, HP/F-5, HP/J-1, J2, J3, HP/K-1, K2, K4, HP/L12, HP/M-3, 4, 5, and HP/U-16 to be 0.5”..
  - a. FCU/W-5 : Changed from Under Ceiling model to High Wall model RAV-SP180CT-UL → 40MAQB09B.
4. M-008 – Changed DOAS model data..
  - a. Revised DOAS/Q-01 : Model and Capacity changed : Toshiba MMD-AP0481hF2-UL → ULTRA DRY IAIARE UGC-GC04MHD5053M00AFGVY1
  - b. Add DOAS/Q-02 (Ultra Dry unit)
5. M-010 – Revised Duct silencer data from 35 dbA to be in a range of 45dbA – 50 dbA range. Bldg. A – Model # RED-MV-F9. Bldg. B & C – Model # RED-UHV-F9. Bldg. D – Model # RED-HV-F8. (Credit).
6. M-011 – Revised Duct silencer data changed 35 dbA to be in a range of 45dbA – 50 dbA range. Bldg. F – Model # RD and RED. Silencers serving the Music Room will remain at 35 dbA. Bldg. G: Model # RED-HV-F9. Bldg. H: Model # RED-MHV-F9. Bldg. J: Model # RED-UHV-F9. Bldg. K: Model #RED-UHV-F9. Bldg. L: Model #RED-MHV-F9.
7. M-012 – Revised Duct silencer data from 35 dbA to be in a range of 45dbA – 50 dbA range. Bldg. I – Model #RED-MV-F9. Bldg. M – Model #RED-HV-F9. Bldg. N: Model #RED-UHV-F9.
8. MA-201 –Locate network link on south wall of Storage A14. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information.
9. MA-202 – Remove roof mounted HVAC control panel. Locate in Storage A14. See Electrical for additional information.
10. MB-203 – Locate network link on west wall of Custodian B8. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information.
11. MB-204 –Removed roof mounted control panel and place it in Custodian B8.
12. MC-205 - Locate network link on east wall of small storage closet adjacent to Classroom C5 along Gridline 1. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information.
13. MC-206 –Remove roof mounted HVAC control panel. Locate in the small storage closet adjacent to Classroom C5 along Gridline 1. See Electrical for additional information.
14. MD-207 – Locate Network Link on South wall of Storage D12. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information.

## ATTACHMENT 2B

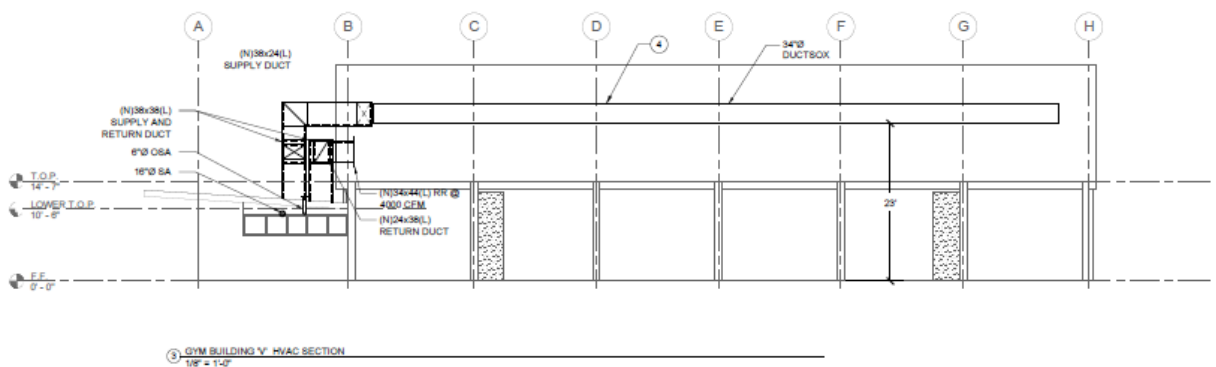
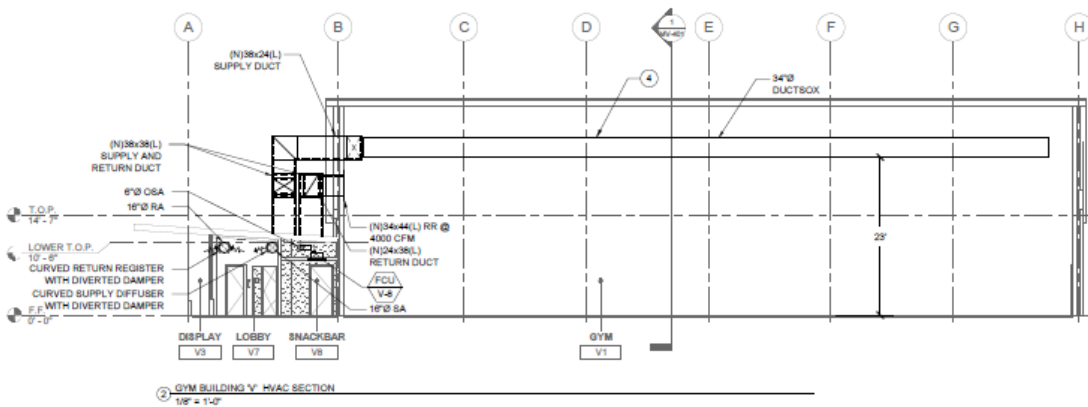
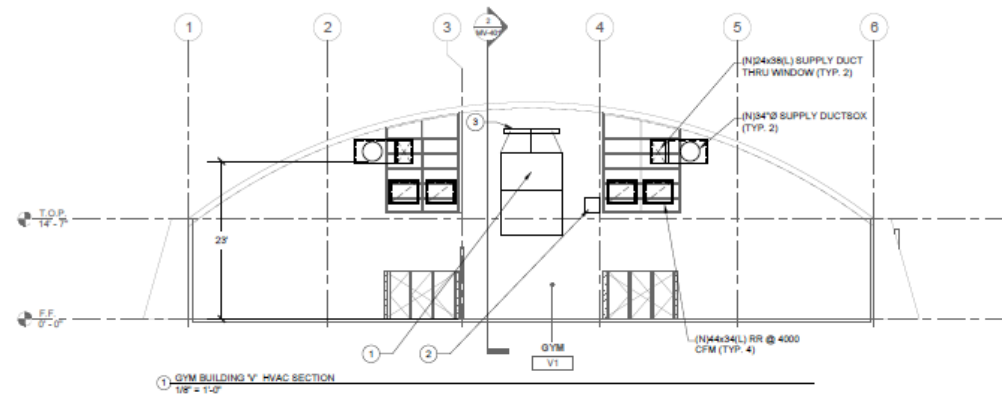
15. MD-208 –Remove roof mounted HVAC control panel. Locate in Storage D12. See Electrical for additional information. HP/D-7 shall be 10'-0" minimum from the roof edge.
16. MF-211 –Locate Network Link on North wall of Storage F3. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information. Deleted unused section through Music Room F2.
17. MF-212D – Call out to remove existing exhaust vent in between Gridlines 2 & 3 per Demolition Keynote D.
18. MF-212 –Remove roof mounted control panel. Locate in Storage F3. See Electrical for additional information.
19. MG-213 –Locate Network Link on east wall of Office G7. Provide new 120V network link with all related accessories. Provide mounting as required. See Electrical for more information.
20. MG-214 –Remove roof mounted control panel. Locate in Office G7. See Electrical for additional information.
21. MH-215 – Locate Network Link on East wall of Electrical Room H14, and Control Panel on South wall of Electrical Room H14. Provide new 120V Control Panel and new 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information.
22. MH-216 – Remove roof mounted control panel. Locate in Electrical Room H14. See Electrical for additional information.
23. MI-217 –Locate Network Link on East wall of Cheer Storage I20, and Control Panel on South wall of Cheer Storage I20. Provide new 120V Control Panel and new Network Link with all related accessories. Provide mounting as required. See Electrical for more information. Locate FCU/I-13 closer to west wall of Workroom I13.
24. MI-218 –Remove roof mounted control panel. Locate in Cheer Storage I20. See Electrical for additional information. Add fall protection near power exhauster for RTU/I-1. Add flue extension kit to RTU/I-2 and RTU/I-4.
25. MJ-219 –Locate Network Link and Control Panel on South Wall of Storage J8. Provide new 120V Control Panel and Network Link with all related accessories. Provide mounting as required. See Electrical for more information. Provide lighting bracing in Physics J3 where duct crosses the light. Show existing exhaust fan register in Work Room J7.
26. MJ-220 –Remove roof mounted control panel. Locate in Storage J8. See Electrical for additional information. Locate HP/J-3 and EF/J-3 to be 10'-0" from roof edge.
27. MK-221 - Locate Network Link and Control Panel on South Wall of Custodian K6. Provide new 120V Network Link and 120V Control Panel with all related accessories. Provide mounting as required. See Electrical for more information. Add lighting bracing at Enhanced Science Classroom K4, Pre-School Classroom K3, Home Economics K2 and Enhanced Science Classroom K1 where ducting conflicts with light.
28. MK-222 –Remove roof mounted control panel. Locate in Custodian K6. See Electrical for additional information. Relocate EF/K-1 and EF/K-2 to be 10'-0" from roof edge. All new and existing relocated HVAC equipment shall be minimum 10'-0" from roof edge.
29. ML-223 - Locate Control Panel on North Wall of Custodian L14. Locate Network Link on West wall of Custodian L14. Provide new 120V Control Panel and 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information.
30. ML-224 –Remove roof mounted control panel. Locate in Custodian L14. See Electrical for additional information.

## ATTACHMENT 2B

31. MM-225 - Locate Control Panel and Network Link on East wall of Storage M6. Provide new 120V Control Panel and 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information. Show routing of new exhaust ductwork (6" diameter) from Storage M6 and Science Office M7 (8" diameter) to location of relocated existing rooftop exhaust fans.
32. MM-226 –Remove roof mounted control panel. Locate in Storage M6. See Electrical for additional information. Relocate EF-6, EF-7, HP/M-6 and HP/M-7 to be minimum 10'-0" from roof edge. All new and relocated existing HVAC equipment shall be minimum 10'-0" from roof edge.
33. MN-227 - Locate Network Link on North wall of Storage N3. Provide new 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information.
34. MN-228 – Remove roof mounted control panel. Locate in Storage N3. See Electrical for additional information.
35. MO-229 - Locate Network Link and Control Panel on East wall of Storage O3. Provide new 120V Control Panel and 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information.
36. MO-230 –Remove roof mounted control panel. Locate in Storage O3. See Electrical for additional information. Provide roof duct supports per details 1, 4 & 5 on sheet M-612.
37. MP-231 - Locate Network Link and Control Panel on East wall of Faculty Lounge P1, adjacent to Unisex Toilet P3. Provide new 120V Control Panel and 120V Network Link with all related accessories. Provide mounting as required. See Electrical for more information.
38. MP-232 – Remove roof mounted control panel. Locate in Faculty Lounge P1. See Electrical for additional information.
39. MQ-233 – Locate Network Link, Control Panel and VRF Gateway on south wall of Heater Room Q-16. Provide New 120V Control Panel, New 120V Network Link, and new 120V VRF Gateway with all related accessories. Provide mounting as required. See Electrical for more information. Supplying OSA with wall mounted diffusers to all offices with DOAS units. Revised refrigerant calculations. Revise all wall mounted FCU locations to be on wall adjacent to hallway. All transfer ducts to route through the hallway. Route all refrigerant piping and OSA ducts through the hallways. Remove flow selectors, and change from a simultaneous heating & cooling to heat pump system. Remove FCU/Q-27.
40. MQ-234 – Remove roof mounted control panel. Locate in Heater Room Q-16. See Electrical for additional information. Revise refrigerant piping routing. Added roof mounted DOAS units. Provide heating element for existing electric roof mounted heat pump to remain. Provide roof mounted refrigerant piping support.
41. MQ-235: Revise VRF riser diagram – Eliminated simultaneous heating & cooling heat recovery, and became VRF heat pumps.
42. MQ-236: Revise VRF riser diagram - Eliminated simultaneous heating & cooling heat recovery, and became VRF heat pumps.
43. MU-239 –Locate Network Link and Control Panel on East wall of Storage U11. Provide new 120V Control Panel and new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information.
44. MU-240 –Remove roof mounted control panel. Locate in Storage U11. See Electrical for additional information.

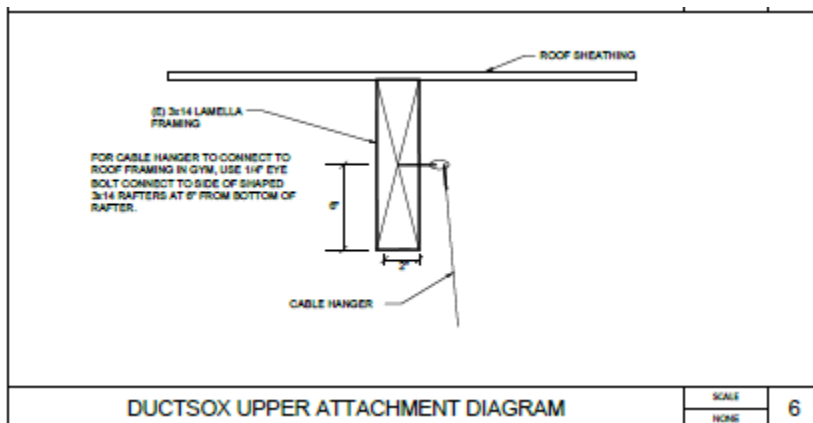
# ATTACHMENT 2B

45. MV-241 – Locate Network Link and Control Panel on North wall of Storage V12. Provide new 120V Control Panel and new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information. Revise Gymnasium duct routing so the entry points in the Gymnasium are between Gridlines 2 & 3, and Gridlines 4 & 5. Revise Lobby V7 duct drop and duct routing.
46. MV-242 – Revise 50 ton duct routing so the entry points in the Gymnasium are between Gridlines 2 & 3, and Gridlines 4 & 5. Remove roof mounted control panel. Locate in Storage V12. See Electrical for additional information. Provide duct through wall diagram where ducts go through windows.
47. MV-401 – Revised sections to show sheet metal duct entry into building, as well as 34" DuctSox routing.



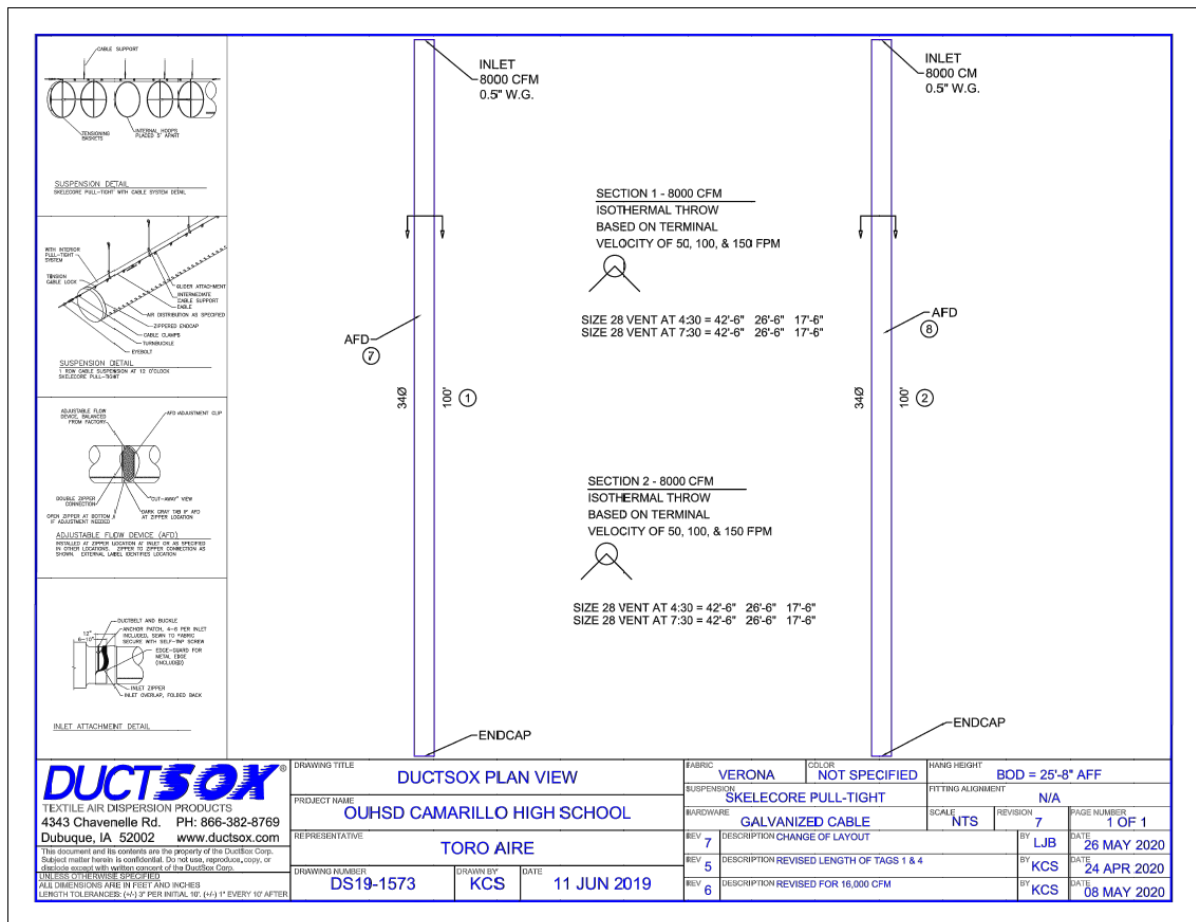
## ATTACHMENT 2B

48. MW-243 – Locate Network Link and Control Panel on North wall of Mech Room W20. Provide new 120V Control Panel and new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information. Revised ducting for FCU/W-16 so the MAU air isn't connected directly to the fan coil. Revise FCU/W-5 to be wall mounted.
49. MW-244 –Remove roof mounted control panel. Locate in Mech Room W20. See Electrical for additional information.
50. MX-245 –Locate Network Link on North wall of Storage X2. Provide new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information. Move existing light conflicting with return duct drop.
51. MX-246 –Remove roof mounted control panel. Locate in Storage X2. See Electrical for additional information.
52. MX-401 –Remove ductwork to storage room.
53. MY-247 - Locate Network Link on North wall of Storage Y2. Provide new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information.
54. MY-248 - Remove roof mounted control panel. Locate in Storage Y2. See Electrical for additional information.
55. MY-401 - Remove ductwork to storage room.
56. MAA-201 – Locate Network Link and Control Panel on South wall of Storage 104. Provide new 120V Control Panel and new 120V Network Link with all related accessories. Provide mounting as required. See Electrical drawings for more information. Provide lighting bracing for one light. Remove access panels.
57. M-601 - ADD DUCT SOX UPPER ATTACHMENT DETAIL 6 PER STRUCTURAL.



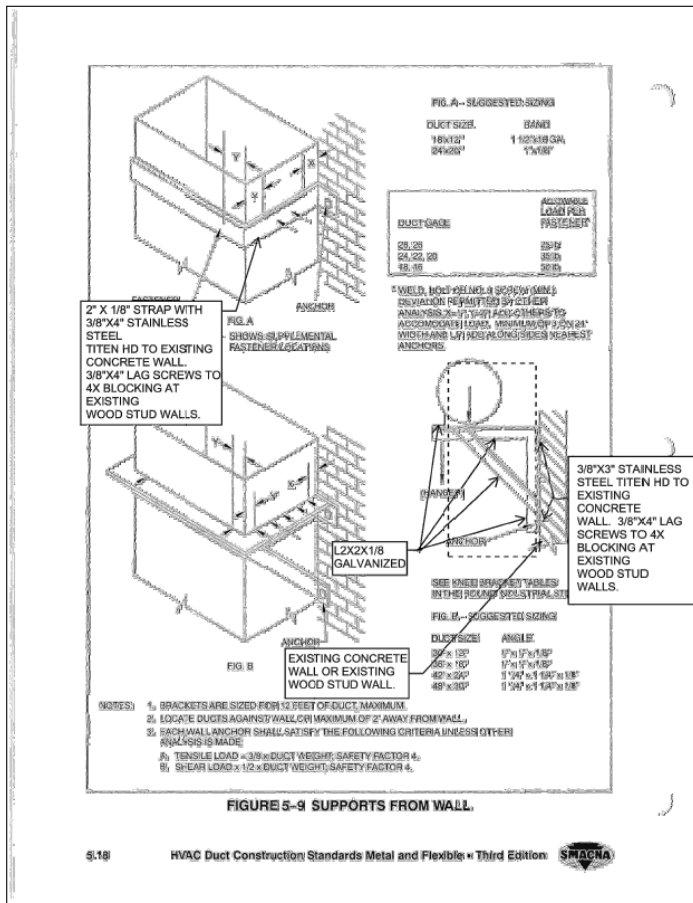
## ATTACHMENT 2B

ADD DUCT THROUGH WALL DETAIL 3.  
REVISE DUCTSOX DETAIL 1



58. M-603 - ADD STRUCTURAL REFERENCE FOR UPPER ATTACHMENTS TO 8/S-302 PER DSA. REMOVE ANCHORAGE DETAILS FOR CONCRETE PER DSA
59. M-608 –REVISE FILTER BOX MOUNTING DETAIL TO BE 2" SHEET METAL DUCT SUPPORT STRAP ANCHORED TO ROOF JOIST WITH #10X1.5" SCREW, FLEXIBLE CONNECTIONS AT INLET & OUTLET, 1'-8" HX2'-0" LX2'-0" W FILTER RACK PLENUM DIMENSIONS UPPER ATTACHMENT PER 8/S-302 PER DSA. REVISE DIFFUSER CONNECTION DETAIL 8/S-302 PER STRUCTURAL.
60. M-609 - REVISE ANCHORAGE REFERENCE DETAILS ON OUTDOOR UNIT MOUNTING DETAIL 5 FOR 16/S-301 PER DSA. REVISE WALL MOUNTED/HIGHWALL MOUNTED FCU DETAIL 7 TO INDICATE LAG SCREW EMBEDMENT AND FAN COIL WEIGHT PER DSA. REVISE CURVED SUPPLY/RETURN DIFFUSER 1 SO DIFFUSERS ARE AT 30 DEGREE ANGLE DOWN. REVISE DETAIL 2 TO INDICATE LTP5 EACH SIDE OF CURB TO FRAMING, AND A35'S PER DSA.
61. M-610 - DELETE CU ANCHORAGE DETAIL 4/M-610. PROVIDE 3-TON DOAS CURB BY CANFAB 1005-CB IN ITS PLACE.
62. M-612 - ADD VERTICAL DUCT ANCHORAGE DETAIL 6 PER STRUCTURAL PER SNAPSHOT BELOW.

## ATTACHMENT 2B



## VERTICAL DUCT ANCHORAGE

NOT TO  
SCALE

6

ADDED TYPICAL HANGING DUCT SUPPORT DETAIL 7 WITH 1"X22 GA. METAL STRAPS AT 4'-0" ON CENTER FOR ROUND AND RECTANGULAR DUCTS, WITH UPPER ATTACHMENT 4/S-302 PER DSA. REMOVED DETAIL 2. PAINT DUCT SUPPORTS AND COORDINATE WITH STRUCTURAL DETAIL 12/S-303 PER DSA.

## 63. Notes for M-701 thru M-705:

Lengths of controls conduits and conductors by controls contractor.

EMT inside, and rigid conduits on the roof.

Height of control panels shall be per manufacturer, including backing plate. Surface mounted.

## 64. M-701 –

- REVISE BUILDING Q CONTROLS DIAGRAM TO ADD CONNECTION FOR 1 NEW DOAS UNIT, 1 EXISTING RTU, AND 4 EXISTING EXHAUST FANS TO THE EMS. CONNECT EMS TO NEW FACP – PROVIDE NEW CONTROLLER TO FULLY CONNECT TO THE CARRIER IVU PRO. PROVIDE MICRO BACNET INTERFACE FOR CONNECTION TO EMS FOR EACH VRF INDOOR AND OUTDOOR UNIT. CONNECT ALL NEW AND EXISTING EXHAUST FANS TO CONTROL PANEL. PROVIDE NEW CONTROLLERS TO FULLY CONNECT MECHANICAL EQUIPMENT TO EXISTING CARRIER IVU PRO.
- REVISE BUILDING N CONTROLS DIAGRAM ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 1 SPLIT SYSTEM FCU/N-6. REVISED BUILDING M CONTROLS

## ATTACHMENT 2B

DIAGRAM TO ADD 5 INTERFACE KITS, AND ADD CONNECTIONS TO 3 EXISTING EXHAUST FANS, AND 3 NEW EXHAUST FANS.

- REVISE BUILDING P CONTROLS DIAGRAM TO ADD CONNECTION TO 1 EXISTING EXHAUST FAN.
- ADD ONE NEW PC IN BUILDING Q WITH STANDARD WEB BROWSER SOFTWARE AND LAN ACCESS, AND FRONT END GRAPHICS BY CONTROLS CONTRACTOR.
- ADD: CONTROLS CONDUIT AND WIRING BY CONTROLS CONTRACTOR.

### 65. M-702 –

- REMOVE CONTROL PANEL FROM BUILDING G CONTROLS DIAGRAM, AND ADDED INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR SPLIT SYSTEM.
- REMOVE CONTROL PANEL FROM BUILDING Y CONTROLS DIAGRAM.
- REMOVE CONTROL PANEL FROM BUILDING X CONTROLS DIAGRAM.
- ADDE 4 INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR SPLIT SYSTEMS, ADDED EMS CONNECTION FOR 1 MAU, 4 NEW EXHAUST FANS, AND 9 EXISTING EXHAUST FANS ON BUILDING W CONTROLS DIAGRAM.
- ADD: CONTROLS CONDUIT AND WIRING BY CONTROLS CONTRACTOR
- ADD: CONNECT ALL NEW AND EXISTING EXHAUST FANS AND MAKEUP AIR UNITS TO CONTROL PANEL. PROVIDE NEW CONTROLLERS TO FULLY CONNECT MECHANICAL EQUIPMENT TO EXISTING CARRIER IVU PRO.

### 66. M-703 –

- REVISE BUILDING V CONTROLS DIAGRAM TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 2 SPLIT SYSTEMS, AND CONNECTIONS TO 2 EXISTING EXHAUST FANS.
- REVISE BUILDING U CONTROLS DIAGRAM TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 2 SPLIT SYSTEMS, AND ADD CONNECTION FOR 5 NEW EXHAUST FANS, AND 6 EXISTING EXHAUST FANS.
- REVISE BUILDING H CONTROLS DIAGRAM TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 2 EXISTING SPLIT SYSTEMS, AND ADD CONNECTIONS FOR 1 EXISTING RTU, AND 2 EXISTING EXHAUST FANS.
- REVISE BUILDING F CONTROLS DIAGRAM TO REMOVE CONTROL PANEL, AND TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 3 NEW SPLIT SYSTEMS.
- REVISE BUILDING D CONTROLS DIAGRAM TO REMOVE CONTROL PANEL, AND TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 2 NEW SPLIT SYSTEMS.
- ADD: CONTROLS CONDUIT AND WIRING BY CONTROLS CONTRACTOR
- ADD: CONNECT ALL NEW AND EXISTING EXHAUST FANS AND MAKEUP AIR UNITS TO CONTROL PANEL. PROVIDE NEW CONTROLLERS TO FULLY CONNECT MECHANICAL EQUIPMENT TO EXISTING CARRIER IVU PRO.

### 67. M-704 –

- REVISE BUILDING L CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR NEW SPLIT SYSTEM FCU/L-12, ADDED 1 CONTROL PANEL, AND ADDED CONNECTION FOR 1 EXISTING EXHAUST FAN, AND 1 NEW EXHAUST FAN.
- REVISE BUILDING K CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 3 NEW SPLIT SYSTEMS, ADDED 1 CONTROL PANEL, AND ADDED CONNECTIONS FOR 3 EXISTING EXHAUST FANS, AND 4 NEW EXHAUST FANS.



## ATTACHMENT 2B

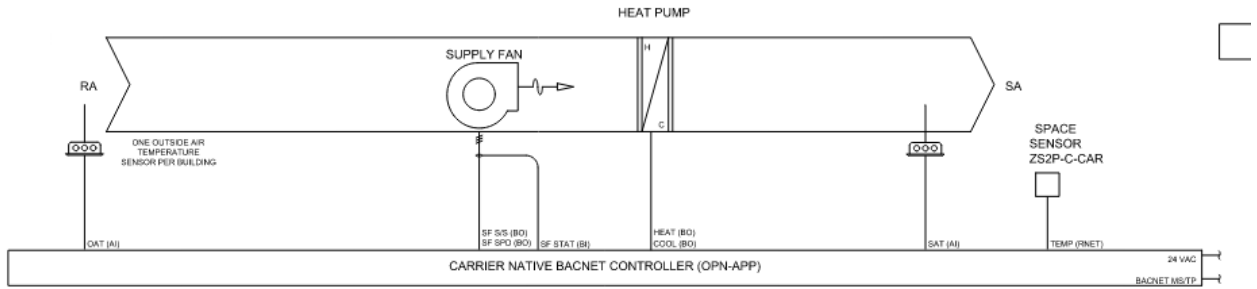
- REVISE BUILDING J CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 4 NEW SPLIT SYSTEMS, AND ADDED CONNECTIONS FOR 4 EXISTING EXHAUST FANS, AND 4 NEW EXHAUST FANS.
- REVISE BUILDING O CONTROLS DIAGRAM TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 4 NEW SPLIT SYSTEMS, AND ADDED CONNECTIONS FOR 3 RTU'S, AND 4 EXISTING EXHAUST FANS.
- REVISE BUILDING I CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 3 NEW SPLIT SYSTEMS, AND ADDED CONNECTIONS FOR 2 EXISTING EXHAUST FANS.
- ADD: CONTROLS CONDUIT AND WIRING BY CONTROLS CONTRACTOR
- ADD: CONNECT ALL NEW AND EXISTING EXHAUST FANS AND MAKEUP AIR UNITS TO CONTROL PANEL. PROVIDE NEW CONTROLLERS TO FULLY CONNECT MECHANICAL EQUIPMENT TO EXISTING CARRIER IVU PRO.

### 68. M-705 –

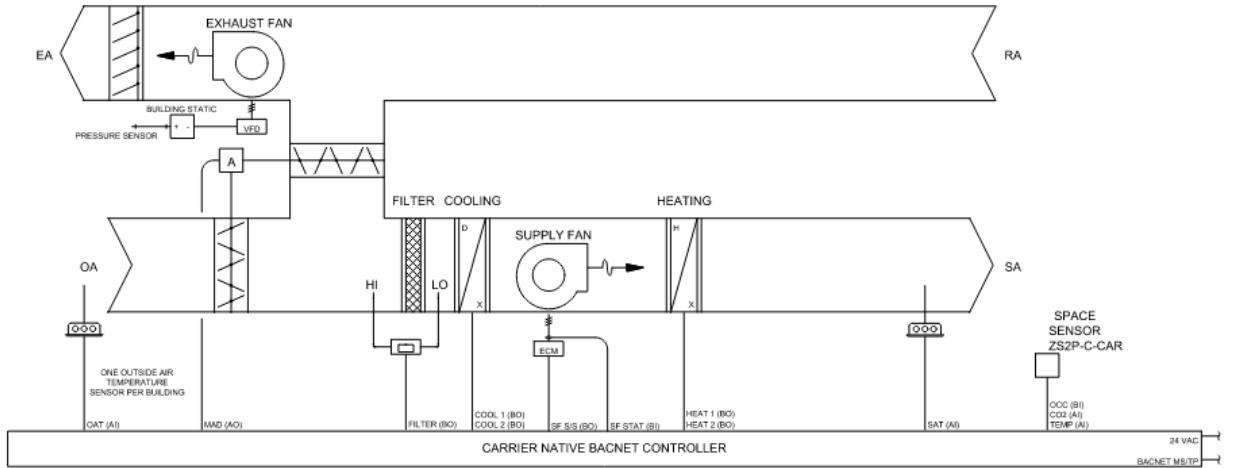
- REVISE BUILDING B CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 5 SPLIT SYSTEMS, AND REMOVED 1 CONTROL PANEL.
- REVISE BUILDING C CONTROLS DIAGRAM TO ADD INTERFACE KITS (24V AND BACNET 33CONNECTSTAT) FOR 2 NEW SPLIT SYSTEMS, AND REMOVED 1 CONTROL PANEL.
- REVISE BUILDING A CONTROLS DIAGRAM TO ADD INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR 1 SPLIT SYSTEM.
- ADD AQUATIC BUILDING TO CONTROLS DIAGRAM, WHICH CONSISTS OF 1 NETWORK LINK, 1 CONTROL PANEL, 1 INTERFACE KIT (24V AND BACNET 33CONNECTSTAT) FOR NEW SPLIT SYSTEM, AND CONNECTIONS TO 3 EXISTING FAU'S, AND 9 EXISTING EXHAUST FANS.
- ADD: CONTROLS CONDUIT AND WIRING BY CONTROLS CONTRACTOR
- ADD: CONNECT ALL NEW AND EXISTING EXHAUST FANS AND MAKEUP AIR UNITS TO CONTROL PANEL. PROVIDE NEW CONTROLLERS TO FULLY CONNECT MECHANICAL EQUIPMENT TO EXISTING CARRIER IVU PRO.

### 69. M-706 - REVISE WALL HUNG AND CASSETTE FAN COIL UNITS CONTROLS DETAIL 4. ADD 2-COOL/2-HEAT STAGED AIR COLUME ROOFTOP UNIT DETAIL 5. SEE SNAPSHOT BELOW.

# ATTACHMENT 2B



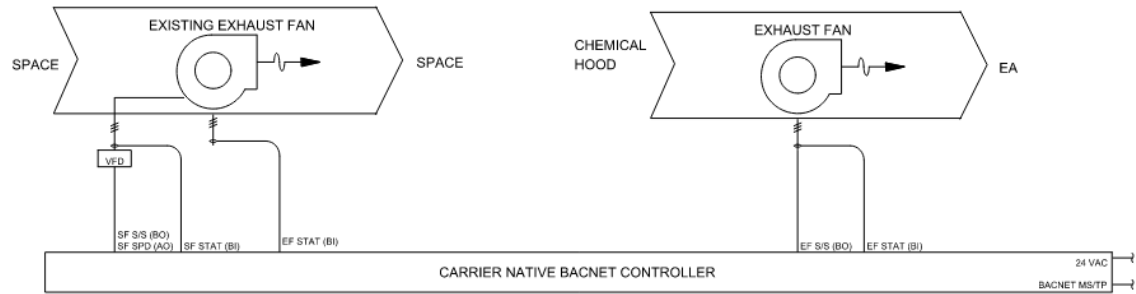
④ WALL HUNG AND CASSETTE FAN COIL UNITS CONTROLS DETAIL  
SCALE : NONE



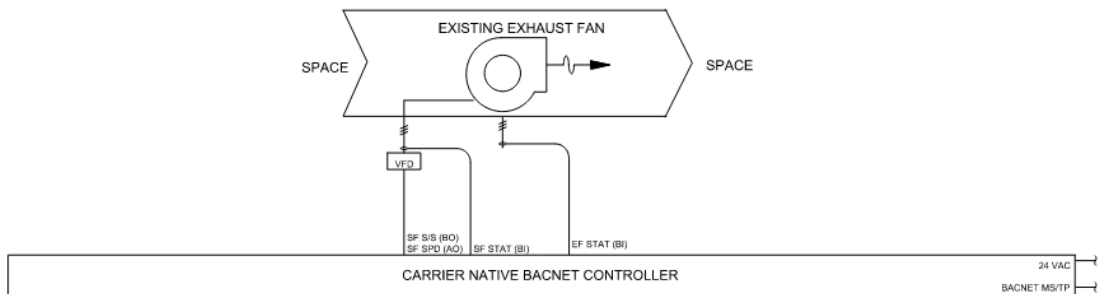
⑤ 2-COOL/2-HEAT STAGED AIR VOLUME ROOFTOP UNIT DETAIL  
SCALE : NONE

70. M-707 – ADD CHEMICAL HOOD DETAIL 3 AND EXISTING EXHAUST FAN CONTROL PANEL DETAIL  
4. SEE SNAPSHOT BELOW:

## ATTACHMENT 2B



③ CONTROL PANEL DETAIL (CHEMICAL HOOD CLASSROOMS)  
SCALE : NONE



④ CONTROL PANEL DETAIL FOR EXISTING EXHAUST FANS  
SCALE : NONE

71. Add specification sections 23 80 01 Heat Pump Variable Refrigerant Flow Equipment, 23 80 02 High-Wall Indoor Variable Refrigerant Flow Fan Coil Equipment, and 23 80 03 Heat Recovery Variable Refrigerant Flow Equipment.

# ATTACHMENT 2C

ADOLFO CAMARILLO HIGH SCHOOL

HVAC UPGRADE

ADDENDUM 1 NARRATIVE

ELECTRICAL

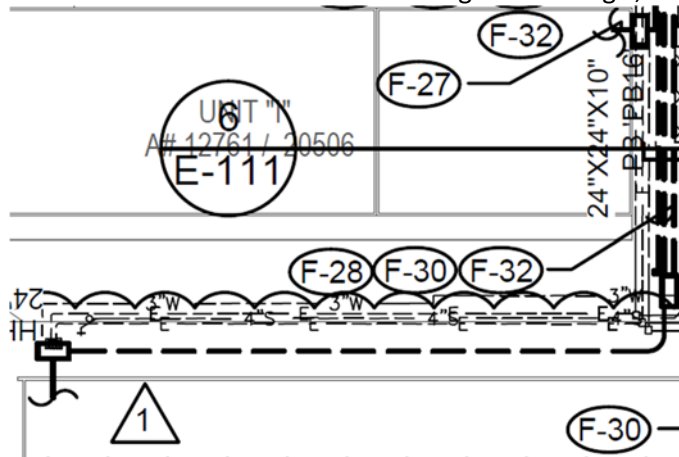
09-17-2020

| Sheet         | Changes  |              |                 |              |        |        |                   |    |                   |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
|---------------|--|--------------|-----------------|--------------|--------|--------|-------------------|----|-------------------|--------|---------|---------------|-----|--------|-------|-----|-------|--------------|------------|---|--------|--------|----|----------------|----|---------|--------|-----|-------|-----|-----|
|               | <p>ADD <del>Added</del> General Note "N" to all Lighting Reconstruction plans that shall read "Provide seismic bracing to all pendant mounted lighting fixture that cannot swing freely by 45 degrees in both "x" &amp; "y" direction. See Detail 4/E-113."</p>  |              |                 |              |        |        |                   |    |                   |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| E101          | <ul style="list-style-type: none"> <li>Revised wiring methods CEC Art. 300 to indicate EMT conduits for branch and feeder conductors (only within the buildings), Rigid galvanized steel conduits for Above roof, Above canopy roof, Exposed vertical risers and Schedule PVC-40 for undergrounds conductors. This was revised to match with the specs that were provided</li> </ul>   |              |                 |              |        |        |                   |    |                   |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| E102          | <ul style="list-style-type: none"> <li>PROVIDE New feeder 'F-13'.</li> <li>Revised panel HO Feeder breaker to 250AMP from 225AMP,</li> <li>Upsized 'F-13 &amp; F-14" under feeder conductor schedule, <del>this was done to compensate for added HVAC load</del></li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">F-13</td> <td style="width: 15%;">SUB STATION DS1</td> <td style="width: 15%;">PANEL 'DPLV'</td> <td style="width: 5%;">2</td> <td style="width: 10%;">3-1/2"</td> <td style="width: 10%;">4"</td> <td style="width: 10%;">4"</td> <td style="width: 10%;">4#750 +1 #1/0 GND</td> <td style="width: 5%;">CU</td> <td style="width: 5%;">600A-3P</td> <td style="width: 5%;">480.00</td> <td style="width: 5%;">---</td> <td style="width: 5%;">82.08</td> <td style="width: 5%;">486</td> <td style="width: 5%;">1.7</td> </tr> <tr> <td>F-14</td> <td>PANEL 'DPLV'</td> <td>PANEL 'HO'</td> <td>2</td> <td>2-1/2"</td> <td>2-1/2"</td> <td>3"</td> <td>4#250 + 1#4GND</td> <td>CU</td> <td>250A-3P</td> <td>236.15</td> <td>---</td> <td>82.08</td> <td>259</td> <td>1.4</td> </tr> </table>  | F-13         | SUB STATION DS1 | PANEL 'DPLV' | 2      | 3-1/2" | 4"                | 4" | 4#750 +1 #1/0 GND | CU     | 600A-3P | 480.00        | --- | 82.08  | 486   | 1.7 | F-14  | PANEL 'DPLV' | PANEL 'HO' | 2 | 2-1/2" | 2-1/2" | 3" | 4#250 + 1#4GND | CU | 250A-3P | 236.15 | --- | 82.08 | 259 | 1.4 |
| F-13          | SUB STATION DS1  | PANEL 'DPLV' | 2               | 3-1/2"       | 4"     | 4"     | 4#750 +1 #1/0 GND | CU | 600A-3P           | 480.00 | ---     | 82.08         | 486 | 1.7    |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| F-14          | PANEL 'DPLV'   | PANEL 'HO'   | 2               | 2-1/2"       | 2-1/2" | 3"     | 4#250 + 1#4GND    | CU | 250A-3P           | 236.15 | ---     | 82.08         | 259 | 1.4    |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| E103          | <ul style="list-style-type: none"> <li>Revised keynote 9 from note used to below, this keynote applies to panel 'WA', revise Panel WA to be new</li> </ul> <p style="text-align: center;">Ⓣ REPLACE (E) 42 CIRCUIT WITH (N) 54 CIRCUIT(MIN.) PANEL.<br/>RECONNECT ALL (E) CIRCUITS AND PROVIDE (N) 90A-3P BREAKER FOR PANEL 'HW'</p> <ul style="list-style-type: none"> <li>Revise DPLV single line diagram to show 600AMP breaker for panel HV instead of 400AMP.</li> <li>PROVIDE F-16A feeder to below</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">F-16A</td> <td style="width: 15%;">PANEL 'DPLV'</td> <td style="width: 15%;">PANEL 'HV'</td> <td style="width: 5%;">1</td> <td style="width: 10%;">3-1/2"</td> <td style="width: 10%;">4"</td> <td style="width: 10%;">4"</td> <td style="width: 10%;">4#750 +1 #1/0 GND</td> <td style="width: 5%;">CU</td> <td style="width: 5%;">600A-3P</td> </tr> </table> <ul style="list-style-type: none"> <li>Revise 'F-23" under feeder conductor schedule, conduit sizes are the same, wires changed as below:</li> </ul> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 10%;">4#2 +1 #8 GND</td> <td style="width: 5%;">CU</td> <td style="width: 10%;">90A-3P</td> <td style="width: 5%;">71.72</td> <td style="width: 5%;">---</td> <td style="width: 5%;">23.00</td> <td style="width: 5%;">120</td> </tr> </table> | F-16A        | PANEL 'DPLV'    | PANEL 'HV'   | 1      | 3-1/2" | 4"                | 4" | 4#750 +1 #1/0 GND | CU     | 600A-3P | 4#2 +1 #8 GND | CU  | 90A-3P | 71.72 | --- | 23.00 | 120          |            |   |        |        |    |                |    |         |        |     |       |     |     |
| F-16A         | PANEL 'DPLV'   | PANEL 'HV'   | 1               | 3-1/2"       | 4"     | 4"     | 4#750 +1 #1/0 GND | CU | 600A-3P           |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| 4#2 +1 #8 GND | CU   | 90A-3P       | 71.72           | ---          | 23.00  | 120    |                   |    |                   |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |
| E105 TO E107  | <ul style="list-style-type: none"> <li>Add 20 amp power for control panels for each panel.</li> <li>PROVIDE Panel HV bus size 600AMP</li> <li>Revise Panel HO circuit 1,3,5 to 80AMP 3P, circuit 7,9,11 to 80AMP 3P</li> <li>Revise Panel HQ circuit 16,18,20 to 40AMP 3P, circuit 7,9,11 to 80AMP 3P, circuit 24,26,28 to 30AMP 3P, circuit 30,32 to 15AMP 2P, circuit 34 to 20AMP 1P</li> <li>Revise Panel HV circuit 1,3,5 to 350AMP 3P, circuit 7,9,11 to 80AMP 3P,</li> </ul>   |              |                 |              |        |        |                   |    |                   |        |         |               |     |        |       |     |       |              |            |   |        |        |    |                |    |         |        |     |       |     |     |

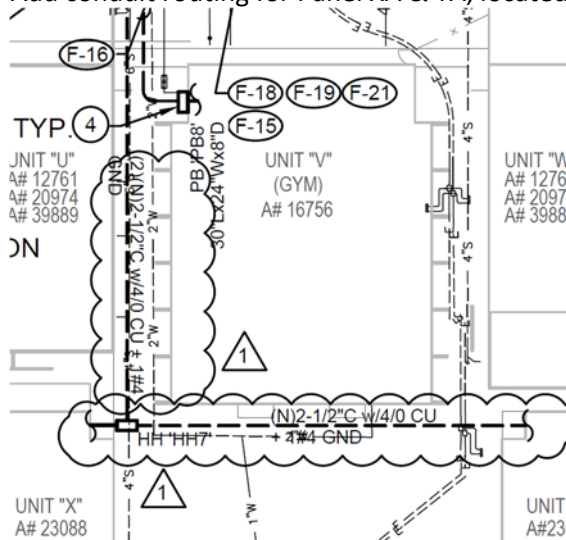
# ATTACHMENT 2C

E109

- Revise site distribution conduit routing for Building L, see below :

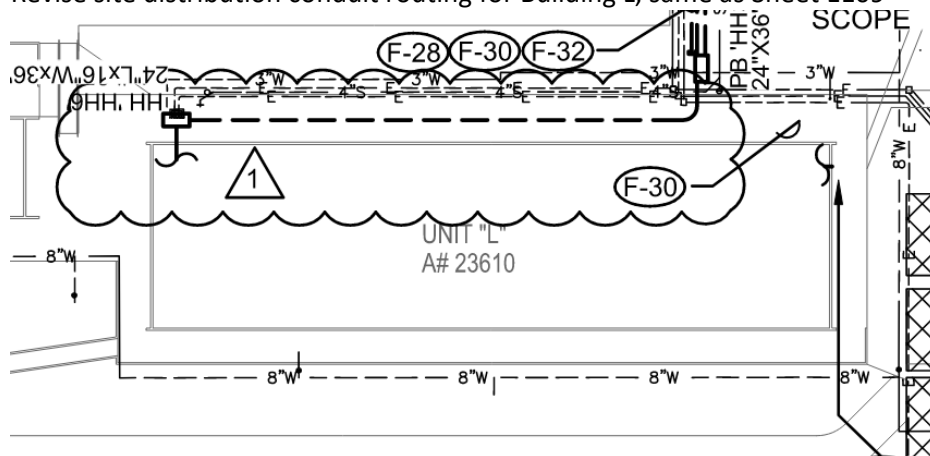


- Removed keynote 8 and all applicable callouts from the sheet
- Add conduit routing for Panel XA & YA, located in building X & Y, wire sizing are shown as well



E109c

- Revise site distribution conduit routing for Building L, same as Sheet E109



## ATTACHMENT 2C

|       |   |
|-------|---|
| E113  | <ul style="list-style-type: none"> <li>Revise detail 4 pendant lighting mounting fixture details.</li> </ul> <ul style="list-style-type: none"> <li>Revised Detail 2 with SEOR input per DSA comments.</li> <li>Revise conduit canopy detail 3 with SEOR per DSA comments. Added embedment information.</li> </ul>  |
| EA201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Storage Room A14. . Use HVAC-A panel , Provide 20 amp 1p breaker</li> <li>Revise Keynote 13 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Delete (1) B fixture and added (1) G fixture in classroom A12, &amp; A8.</li> <li>Add (1) fixture type B in Classroom A1.</li> </ul> |
| EA202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve.</li> <li>Remove power from control panels from the roof to Storage Room A14.</li> </ul>   |
| EB201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Custodian B8. . Use Panel HB, Provide 20AMP 1P Breaker</li> <li>Revise Keynote 13 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Add (2) light fixture type A in each Classrooms B2 &amp; B3.</li> </ul>  |
| EB202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve.</li> <li>Remove power for control panels from the roof to Custodian B8.</li> </ul>  |
| EC201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel in closet next to Panel 'DPLC' adjacent to Girls Restroom C18. Use Panel HC, Provide 20AMP breaker 1P</li> </ul>  |

## ATTACHMENT 2C

|       |   |
|-------|---|
|       | <ul style="list-style-type: none"> <li>Revise Keynote 15 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Delete half shade of all lighting fixtures in Classrooms C5, C6, &amp; C7</li> </ul>   |
| EC202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to closet next to Panel 'DPLC' adjacent to Girls Restroom C18.</li> </ul>   |
| ED201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Storage D12. . Use panel HD, provide 20AMP 1P breaker.</li> <li>Revise Keynote 14 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Delete one fixture each in classrooms D1 &amp; D3, Fixture type A/31 for Class D1 and Fixture Type JE/31 for D3</li> </ul> |
| ED202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage D12.</li> </ul>  |
| EF201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply Locate panel at Storage F3. Use Panel HF, provide 20AMP 1P breaker.</li> <li>Revise Keynote 8 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>  |
| EF202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage F3.</li> <li>Revise Fuse size for HP F-15 changed from 25 to 30 AMPs</li> <li>Revise Fuse size for RTU F-2 changed to 40 AMPs and switch is same as 60AMPs</li> </ul>  |
| EG201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply Locate panel at Office G7. Use panel HG, provide 20AMP 1P</li> <li>Revise Keynote 12 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Revise lighting layout in office room G7 and increase the total number of fixture type B to four (4).</li> </ul>                          |
| EG202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Office G7.</li> </ul>  |
| EH201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Electrical Room H14. . Use panel HH, provide 20AMP 1P</li> <li>Add Keynote 15 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Revise lighting layout in Workroom H6 by adding (2) type G and (2) type B fixtures.</li> </ul>                                 |
| EH202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Electrical Room H14.</li> </ul>  |
| EI201 | <ul style="list-style-type: none"> <li>Add a J-box or HVAC control panel power supply Locate panel at Cheer Storage I20. . Use panel HI, provide 20AMP 1P</li> <li>Added Keynote 16 to provide provisions for J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>  |
| EI202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage I20</li> </ul>   |
| EJ201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel and . Locate panel in Storage J8. Use panel HJ, provide 20AMP,1P breaker</li> <li>Revise Keynote 16 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>   |

## ATTACHMENT 2C

|       |   |
|-------|---|
|       | <ul style="list-style-type: none"> <li>Add power to condensate pump for FCU J-3</li> </ul>  |
| EJ202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage J8.</li> <li>Revise Fused Disconnect Schedule: Add HP/J-3 to be 15AF and 30AS, and revise HP/J-7 to be 25AF and 30AS</li> </ul>  |
| EK201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel power supply . Locate panel at Custodian K6. . Use panel HK, provide 20AMP 1P breaker</li> <li>Add keynote 15 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>   |
| EK202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve. Removed power for control panels from the roof to Custodian K6.</li> </ul>  |
| EL201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel power supply . Locate panel at Custodian L14. Use panel HL, provide 20AMP 1P breaker</li> <li>Add keynote 12 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Revised POC for Building L, see snapshot provided on sheet E109c</li> </ul>                                      |
| EL202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Custodian L14</li> <li>Remove disconnect switch for 'RTU L-12' power exhaust</li> <li>Add keynote 6</li> </ul> <p>⑥ RELOCATE ALL EXISTING CONDUITS WHICH ARE }<br/>CONFLICTING WITH THE HVAC UNITS. REFER TO DETAIL }<br/>NUMBER 8 ON SHEET E-111.</p> |
| EM201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel for power supply Locate panel at Storage M6. Use Panel HM, provide 20AMP 1P breaker</li> <li>Revise Keynote 13 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Identify B2 fixtures in Classrooms M4 &amp; M5.</li> </ul>   |
| EM202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage M6.</li> <li>Revise disconnect switch schedule to add HP/M-6 15AF 30AS</li> <li>Revise keynote 6 to relocate Existing exhaust fans 'eh-6 &amp; 'ef-7' to new locations with all of their electrical power accessories</li> </ul>               |
| EN201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel power supply Locate panel at Storage N7. . Use Panel HN, provide 20AMP 1P breaker</li> <li>Revise Keynote 13 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> <li>Add (2) fixture type G fixture in Computer Workroom M6.</li> </ul>   |
| EN202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage N7.</li> <li>Revise N-3 and N-5 RTU fuse size to 40 AMPs</li> </ul>  |
| EO201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel power supply Locate panel at Storage O3. . Use panel HO, provide 20AMP 1P breaker</li> <li>Revise Keynote 6 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>   |
| EO202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> </ul>   |



## ATTACHMENT 2C

|       |   |
|-------|---|
|       | <ul style="list-style-type: none"> <li>Remove power for control panels from the roof to Storage O3.</li> <li>Revise disconnect schedule , RTU/O-1A fuse and switch size 80AF,100AS, RTU/O-1B fuse and switch size 80AF &amp; 100AS, RTU/O-1A power exhaust fuse size 12AF, RTU/O-1B power exhaust fuse size 12AF</li> <li>Add Keynote 9 to relocate Existing exhaust fan 'EF-1' to new location with all electrical power accessories</li> </ul>  |
|       | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply Locate panel at Faculty Lounge P1. . Use Panel PA,</li> <li>Add Keynote 3 for provision of j-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> </ul>   |
|       | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve. Remove power for control panel from the roof to Faculty Lounge P1.</li> </ul>   |
| EQ201 | <ul style="list-style-type: none"> <li>Provide a J-box for HVAC control panel power supply . Locate panel at Heater Q16. Use panel HQ, provide 20AMP 1P breaker</li> <li>Revise Keynote 6 for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> <li>Removed power for DOAS units</li> <li>Provided power to FACP in Administration office Q-13</li> </ul>  |
| EQ202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Heater Q16.</li> <li>Remove power for CU Q-3 Unit</li> <li>Revise Fuse size for RTU Q-13 to 40 AMPs</li> <li>Add power to DOAS Q-1 and Q-2. Provide 30AS,30AF, WP, NEMA 3R, 3P disconnect switch for each. Homerun Q-1 to HQ-,24,26,28 &amp; Q-2 to HQ-25,27,29</li> </ul>   |
| EU201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Storage U11. . Use panel HW, provide 20AMP 1P breaker</li> <li>Revise keynote 3 for 20A motor rated switch at condensate pump.</li> <li>Revise Keynote 6 for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> </ul>  |
| EU202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Add power for control panels from the roof to Storage U11.</li> </ul>   |
| EV201 | <ul style="list-style-type: none"> <li>Provide J-box for HVAC control panel power supply . Locate panel at Storage V12. . Use Panel HV, provide 20AMP breaker 1P</li> <li>Revise Keynote 10for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> <li>Revise fused disconnect size for RTU/V-1 to 350 AMPs</li> <li>Revise branch circuit conductor schedule for B-19 to (2)2", (3)3/0+#6GND.</li> <li>Add power to FCPS located in Vestibule V10. Homerun to HV-21.</li> </ul> |
| EV202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage V12.</li> <li>Remove RTU from roof plan down to grade.</li> </ul>  |
| EW201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply. Locate panel at Mechanical Room W20. Use panel HW Provide 20AMP 1P breaker</li> <li>Revise Keynote 7 for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> </ul>   |
| EW202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> </ul>   |

## ATTACHMENT 2C

|        |   |
|--------|---|
|        | <ul style="list-style-type: none"> <li>Remove power for control panels from the roof to Mechanical Room W20.</li> </ul>   |
| EX201  | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply . Locate panel at Storage X2. Use Panel XA, provide 20AMP 1P breaker</li> <li>Add keynote 6 for provision of J-box and all required accessories including Transformers to convert 120V to 24V for control panel power supplies</li> </ul>  |
| EX202  | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Removed power for control panels from the roof to Storage X2.</li> </ul>  |
| EY201  | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply. Locate panel at Storage Y2. . Use Panel YA, provide 20AMP 1P breaker</li> <li>Revise Keynote 6 for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> </ul>   |
| EY202  | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Remove power for control panels from the roof to Storage Y2.</li> </ul>   |
| EAA201 | <ul style="list-style-type: none"> <li>Add a J-box for HVAC control panel power supply Locate panel at Storage 104. Conduit shall be concealed above attic to greatest extent possible. Use Panel LP, provide 20AMP 1P breaker</li> <li>Revise Keynote 7 now calls out for provision of J-box and all required accessories including transformers to convert 120V to 24V for control panel power supplies.</li> </ul> |
| EAA202 | <ul style="list-style-type: none"> <li>All disconnect switches and service receptacles shall be installed on the HVAC units they serve</li> <li>Removed power for control panels from the roof to Storage 104.</li> </ul>   |

# ATTACHMENT 2D

ADOLFO CAMARILLO HIGH SCHOOL

HVAC UPGRADE

ADDENDUM 1 NARRATIVE

PLUMBING

09-17-2020

## PQ-201 BUILDING 'Q' PLUMBING FLOOR PLAN

- Reduced condensate connections for FCUs and condensate pumps from 23 units to 19 units.
- Added Keynote no. 8 to Reconnect the existing gas and condensate for RTU-1.
  
- 
- P-001 Plumbing Front Sheet  
Add RP-1 (3/4" CW REDUCED PRESSURE BACKFLOW PREVENTOR BY FEBCO LF860. INSTALL PER MANUFACTURER'S INSTRUCTIONS) for MAU/O1, MAU/U1 and MAU/W1. Locate RP-1's on roof near the MAU's.

*Bid Clarification Addendum #1*

Attachment I

Novus Construction RFI



Phone (818) 700-2649  
FAX (818) 700-0702

**PRE-BID RFI #: 1**

**DATE:** November 16, 2020

**PROJECT NAME:** Adolfo Camarillo High School New HVAC Modernization – OUHSD (REBID)

**PROJECT ADDRESS:** 4660 Mission Oaks Blvd., Camarillo, CA 93012

**ATTN.:** Brittany Villasenor-Project Engineer / Karl Aldridge–Senior Project Manager

**EMAIL:** [bvillasenor@bernards.com](mailto:bvillasenor@bernards.com) / [kaldridge@bernards.com](mailto:kaldridge@bernards.com)

**FROM:** NOVUS Construction

**E-MAIL:** [bid@novusconstruction.com](mailto:bid@novusconstruction.com)

**ADDRESS:** 9205 Alabama Ave., Suite F, Chatsworth, CA 91311

**TELEPHONE & FAX NUMBER:** 818.700.2649 / 818.700.0702

**DOCUMENT/DIVISION NUMBER:** General Conditions/Document 001116/Notice to Bidders

**DRAWING NUMBER:** N/A

**REQUESTED CLARIFICATION:**

- 1) Can a Subcontractor that “Holds” a C-4, C-7, C-10, C-16, C-20, C-34, C-36, C-38, C-42, C-43 or C-46 license be listed for a trade that does not require work performed under one of these licenses if they are not prequalified?

Please reference Document 00 11 16 Notice to Bidders for clarification

Karl Aldridge / Bernards / 11.16.2020

9205 Alabama Avenue, Suite F, Chatsworth, California 91311

*Bid Clarification Addendum #1*

**Attachment J**

**Santa Barbara Glass Co.**

**RFIs**

## Pre-Bid (RFI)

ISSUED BY SANTA BARBARA GLASS COMPANY

|                               |                                      |                     |              |
|-------------------------------|--------------------------------------|---------------------|--------------|
| <b>DATE:</b>                  | 11-16-20                             | <b>RFI No.:</b>     | 2            |
| <b>PROJECT:</b>               | Adolfo Camarillo HS HVAC Replacement | <b>PROJECT NO.:</b> |              |
| <b>CONTRACTOR:</b>            | Santa Barbara Glass Company          |                     |              |
| <b>CONTACT PERSON:</b>        | Ed Dickson                           | <b>PHONE:</b>       | 805-962-7648 |
| <b>E-MAIL ADDRESS:</b>        | ed@sbglassmen.com                    | <b>FAX:</b>         | 805-966-6673 |
| <b>RFI ISSUED TO:</b>         |                                      |                     |              |
| <b>RFI SUBJECT:</b>           | Exterior Glass Types                 |                     |              |
| <b>SPEC SECTION REF:</b>      |                                      |                     |              |
| <b>RFI REFERENCES:</b>        |                                      |                     |              |
| <b>INFORMATION REQUESTED:</b> |                                      |                     |              |

### 1. Exterior Glass types

- a. Please provide manufacture and composition of required exterior glass including overall thickness, glass types to be used, tint if any, and performance values. Article 088000 2.7A describes laminated glass only and to be used at "all new window locations". The details on sheets A9.03 and 9.04 identify 1" Insulated glass. There are no performance values listed and Low E glazing is not listed.

Please provide/clarify the exterior glass for this project.

- b. If laminated glass is to be used as part of exterior glazing 088000 2.7A1c calls for tinted laminated with a 1/4" thick interlayer and the tint color is not listed. 1/4" thick interlayer is not available. Common thickness is .030 and .060 interlayer thickness.

Please clarify and provide tint color.

**WRITTEN BY:** \_\_\_\_\_ **RESPONSE REQUIRED BY:** \_\_\_\_\_

**INITIATED BY:** \_\_\_\_\_

**RESPONSE:** U Factor : 0.29; SHGC: 0.34; VT:0.46

A. DETAILS ON SHEET A9.03 AND A9.04 DEPICT IG UNIT. EXTERIOR GLASS ASSEMBLY SHALL BE:  
 PROVIDE EXTERIOR LITE 1/4" LAMINATE: 1/8"GRAY - 0.030"CLEAR PVB - 1/8"CLEAR  
 PROVIDE 1/2" AIR SPACE  
 PROVIDE INTERIOR LITE 1/4" LAMINATE: 1/8" PPG SOLARBAN 60 ON CLEAR LOW -E #5 - 0.030 CLEAR PVB - 1/8" CLEAR

**RESPONDED BY:** IRVINE CARRILLO **DATE RESPONDED:** 11/16/2020

**COST IMPACT?** \_\_\_\_\_ **SCHEDULE IMPACT?** No

**ATTACHMENTS?** NO

## Pre-Bid (RFI)

ISSUED BY SANTA BARBARA GLASS COMPANY

|                               |   |                     |              |
|-------------------------------|---|---------------------|--------------|
| <b>DATE:</b>                  | 11-16-20  | <b>RFI No.:</b>     | 3            |
| <b>PROJECT:</b>               | Adolfo Camarillo HS HVAC Replacement  | <b>PROJECT NO.:</b> |              |
| <b>CONTRACTOR:</b>            | Santa Barbara Glass Company   |                     |              |
| <b>CONTACT PERSON:</b>        | Ed Dickson  | <b>PHONE:</b>       | 805-962-7648 |
| <b>E-MAIL ADDRESS:</b>        | ed@sbglassmen.com   | <b>FAX:</b>         | 805-966-6673 |
| <b>RFI ISSUED TO:</b>         |   |                     |              |
| <b>RFI SUBJECT:</b>           | Waterproofing requirements at window break metals covering existing posts & materials.<br>Window Anchor Spacing requirements. |                     |              |
| <b>SPEC SECTION REF:</b>      |   |                     |              |
| <b>RFI REFERENCES:</b>        |   |                     |              |
| <b>INFORMATION REQUESTED:</b> |   |                     |              |

Waterproofing Requirements at window break metals sheet A9.03 and A9.04

1. Please advise if any waterproofing membranes or other materials are required behind the break metal wraps and sill flashings shown in the details sheet A9.03 and A9.04.
2. Please advise if the break metal intersections A9.03 and A9.04 will need any type of caulking beauty bead at the abutting joints or if they are to just butt each other no caulking. If yes please advise which intersections will require caulking.
3. Please advise if the break metal wraps Sheet A9.02 will need any type of fasteners for installation or if the break metal wraps are to be caulked/glued in place with no fasteners.

Window Anchor Spacing Sheet A9.03 and A9.04 Spec 085113 2.02 J

1. What is the required anchor spacing for window anchors shown on details on sheets A9.03 and A9.04.
2. 085113 2.02J calls for 18-8 or 410 installation screws. Please clarify manufacture and type of anchors to be used at new window locations and spacing of anchors.

**WRITTEN BY:** \_\_\_\_\_ **RESPONSE REQUIRED BY:** \_\_\_\_\_

**INITIATED BY:** \_\_\_\_\_

**RESPONSE:**

1. NO DISSIMILAR METALS OCCUR; PROVIDE CONTINUOUS SEALANT BED AT PERIMETERS & JOINTS
2. REFER TO SHEET A9.03 GENERAL WINDOW NOTES #8, #9, #10.
3. AT DETAIL 8/A9.03 BRAKE METAL, USE WOOD COUNTER SUNK FASTENERS
4. PROVIDE ANCHORAGE AS FOLLOWS:
  - A. AT CONCRETE: 1/4" TITEN HD, 2" MIN EMBEDMENT AT 12" O.C.
  - B. AT WOOD: #10 STAINLESS STEEL SCREWS, 1.5" EMBEDMENT AT 12" O.C.
  - C. AT BRAKE METAL PROVIDE #6 STAINLESS STEEL SCREWS AT 18" O.C.

**RESPONDED BY:** IRVINE CARRILLO **DATE RESPONDED:** 11/16/2020

**COST IMPACT?** \_\_\_\_\_ **SCHEDULE IMPACT?** No

**ATTACHMENTS?** NO